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Streamlining Project Handover Processes – A Case Study

Introducing Agile Project Management, Lean Six Sigma, and Stakeholder Theory to Streamline Project Handovers at Company X

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Abstract

This thesis addresses the inefficiencies in project handover processes at Company X, a European market leader in its industry. The aim of the research is to develop a standardized project handover template by introducing Agile Project Management, Lean Six Sigma, and Stakeholder Management principles. The research is conducted in a case study consisting of a theoretical framework, an analysis of two external case studies, and focus group workshops with project experts at Company X.

The research findings show the challenges Company X faces in communication, stakeholder engagement, and post-handover support. These challenges are similar to the challenges presented in the external case studies. These issues lead to inconsistencies in project handovers, disengaged stakeholders, and reversion to old methods. The study proposes a standardized handover template for the purposes of Company X, emphasizing clear communication strategies, well-defined responsibilities, post-handover support, and sufficient training.

The implementation of the project handover template that emerged from this thesis is expected to improve the company's project handover success, ensuring smooth transitions, and higher stakeholder engagement and satisfaction. Recommendations for future research include a practical application of the handover template and assessing its long-term impact on project success.

Language: English
Key Words: Case study, Agile Project Management, Lean Six Sigma, Stakeholder Management

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List of abbreviations

APM – Agile Project Management

DMAIC – Define, Measure, Analyze, Improve, Control

KPI – Key Performance Indicator

LSS – Lean Six Sigma

NPS – Nord Pool Spot

PMBOK – Project Management Body of Knowledge

PMO – Project Management Office

ROI – Return on Investment

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1 Introduction

Today's rapidly changing business landscape requires organizations to be dynamic and quickly adapt to challenges that may appear, whether it is upgrading old hardware, integrating new technologies, or introducing new software to users. Many organizations face significant challenges in project management, specifically the handover of a product to end-users (Wysocki, 2019). Such issues may result in project delays, misunderstandings, unmet requirements, inefficacy, and potential financial losses. Therefore, improving project handover processes is crucial for organizations such as Company X to achieve long-term strategic objectives.

To address these project management challenges, also found in Company X, this thesis aims to conclude three key frameworks in this area: Agile Project Management, Lean Six Sigma, and Stakeholder Management theory.

Agile Project Management is chosen due to its iterative approach and flexibility, making it viable for the dynamic project environments that Company X experiences. Lean Six Sigma is a cornerstone of Company X's values and strategy, hence in this thesis it complements Agile Project Management by focusing on efficiency and quality improvement. Stakeholder Management theory is included in this thesis to engage stakeholders effectively and complement this specific topic where Agile Project Management and Lean Six Sigma are lacking.

Agile Project Management is the preferred project management theory due to its increasing popularity in businesses requiring flexible and adaptive project management approaches (Paquette & Frankl, 2016). This theory is relevant to Company X and its strategy in digital transformation, based on iterative development and dynamic stakeholder requirements.

Lean Six Sigma complements APM by focusing on efficiency and quality improvement (Project Management Institute, Inc., 2017), which are two of the cornerstones of Company X's long-term strategy. Furthermore, Lean Six Sigma emphasizes data-driven decision-making (Antony et.al., 2020), which ensures that the project handover template developed

in this thesis streamlines transitions from project groups to the operations, and also maintains high standards of efficiency.

Both APM and Lean Six Sigma highlight the need for efficient, clear communication and stakeholder engagement, however, stakeholder management theory is needed to complement these theories to create a clearer understanding of the critical role of stakeholders in project management. The complexity of Company X's internal and external stakeholder environment requires effective stakeholder management to ensure alignment of project goals with the expectations to reach successful project handovers.

By applying these theories, this study aspires to enhance the project management of Company X, eliminating project management pitfalls, and fostering a culture of communication and continuous improvement. The findings, together with the recommendations for future research, offer valuable insight into current project management theory and a practical example of theoretical application in a real-world setting.

1.1 Company X

Company X, located in Ostrobothnia, Finland, is a European market leader in their business area, focusing on the process equipment industry and pressure vessels. The company employs approximately 250 persons in Finland and approximately 500 persons in total. The company is well known for its high standards of quality and safety, which are the two core values of the company.

In recent years, Company X has embraced digital transformation, enhancing its operational efficiency and product quality. Collaborating with many different IT solutions suppliers and implementing advanced software, Company X aims to develop its change management and project management competencies.

Embracing automation, digitalization, and availability of advanced data analytics, Company X is committed to further establishing its position as a market leader in the industry. Not only does digitalization aid Company X in making processes more efficient, but it also increases customer satisfaction by providing reliable data and greater output of products to fill distribution stocks, reducing lead times and increasing sales.

The thesis is performed at the request of Company X in response to challenges faced in project handover processes. The challenges include difficulties in retaining newly implemented practices and achieving consistent project objectives and fully realize intended benefits of their investments. These issues will be further addressed in the thesis process to ensure enhanced project management and sustainable project handovers.

1.2 Business problem and research objectives

Due to inefficiencies in the handover process, Company X can face operational inefficiencies and potential losses. Furthermore, without a standardized handover process, there is a lack of consistency, and the quality of project transitions can vary, potentially reducing productivity. Lastly, stakeholders might become disengaged from the project and its deliverables, if they are not informed and adequately involved in the projects, leading to unmet expectations and needs.

Therefore, the business problems can be summarized as follows:

1. Inefficient handover process,
2. Lack of standardization in project management,
3. Stakeholder disengagement.

Based on these research problems, the objective of the thesis is to identify and eliminate inefficiencies by utilizing the theoretical framework presented. Then, the aim is to develop a standardized handover process by providing Company X with a template for this purpose. This ensures consistency and quality across all projects when used correctly. The result of the project handover template should increase stakeholder engagement and increase end-user satisfaction.

Therefore, the research objectives can be summarized as follows:

1. Identify and mitigate inefficiencies,
2. Develop a standardized project handover template,
3. Enhance stakeholder engagement and satisfaction.

To address these issues and reach the objectives, the following research question has emerged:

How can the principles of Agile Project Management, Lean Six Sigma, and Stakeholder Management theory be applied to streamline and enhance the development of a standardized handover process at Company X?

The product of the thesis is thus a theoretical framework based on Agile Project Management, Lean Six Sigma, and Stakeholder Management theory, and a practical project handover template based on the requirements of Company X.

1.3 Thesis structure

To get the best theoretical framework for a study, it is suggested to use the most recent research available, both in the form of textbooks and journal articles (Kuada, 2012). Hence the theoretical overview in this thesis is based on relevant textbooks and supported by journal articles relevant to the research. Furthermore, the three theories presented are connected to Agile Project Management, Lean Six Sigma, and Stakeholder Management, and combined into a single, overall framework for the case study.

Then, two similar case studies are analyzed to be able to compare other organizations' challenges with the challenges of Company X. By examining the experiences of other organizations, the aim is to identify common challenges and similarities compared to Company X. The case studies are used for comparison to verify the findings about Company X's challenges, ensuring greater accuracy and validity of the study.

The case study conducted in this thesis consists firstly of an analysis of the project management environment in Company X is conducted after the theoretical framework has been presented and the two case studies are analyzed. The analysis of Company X reveals existing challenges and opportunities for improvement, which are translated and developed into a project handover template, addressing identified gaps and ensuring smooth project transitions.

After the foundation is known a focus group workshop is held with project managers of Company X, from which the first version of the template emerges. The findings of the

workshop are presented to the Project Management Office of Company X, after which a final version of the template is handed over to the company.

Lastly, the thesis brings forward a discussion consisting of the research value generated from this thesis, as well as its limitations and challenges. Furthermore, further research is presented, both academic research and managerial suggestions for Company X to focus on the improve their project management practices.

2 Agile Project Management

This chapter focuses on Agile Project Management, or APM for short, by briefly introducing its field of use, its core concepts, and the fundamental values of APM. Different project life cycles that can be used in APM are presented and illustrated. Lastly, the chapter goes in-depth into Agile theory and how it approaches project handovers.

2.1 Introduction to Agile

Traditional project management is a one-dimensional approach, focusing mostly on the iron triangle perspective; time, scope, and cost (Ciric Lalic, Lalic, Delic, Gracanin, & Stefanovic, 2022; Zwikael, Salmona, Meredith, & Zarghami, 2023). Furthermore, Ciric Lalic et.al. (2022) highlights that traditional project management follows highly disciplined and thoughtful planning and control methods that are based on logical, linear processes. Hence, from the traditional project management perspective, the key to project success is control and stability (Badakhshan, Conboy, Grisold, & vom Brocke, 2019).

Agile Project Management, on the other hand, can be used as a synonym for high-uncertainty project management that requires some kind of problem-solving, new designs, and new solution creation (Project Management Institute, Inc., 2017). Agile is seen as a multi-dimensional and long-term perspective, which focuses on effectiveness, organizational impact, long-term organizational goals, and customer satisfaction (Ciric Lalic et.al., 2022)

Academic research shows that Agile Project Management has been used mostly in software development projects, as those kinds of projects experience more uncertainty (Ciric Lalic, et.al., 2022), than definable projects, e.g., manufacturing and construction work (Project Management Institute, Inc., 2017).

The PMI (2017) and management research have summarized the fundamental values of the Agile mindset as collaboration and cooperation over processes and tools, value creation over comprehensive documentation, flexibility and response to change over strictly obeying a plan (Ray, 2023). Furthermore, today's dynamic business environments require more agility and flexibility, compared to what traditional business management theory provides (Badakhshan, et.al., 2019). Due to this, Agile has become a popular approach to

confront the challenges of unpredictability and to handle complex relationships with project stakeholders (Ciric Lalic, et.al., 2022). Stakeholder theory will be presented in more detail later in this thesis.

Agile Project Management is not a standalone theory per se but is rather a complement to already existing project management theories, such as The Project Management Body of Knowledge and Lean Principles (Badakhshan et.al.,2019; Cobb, 2011; Project Management Institute, Inc., 2017). Lean Six Sigma will be presented in more detail later in this thesis.

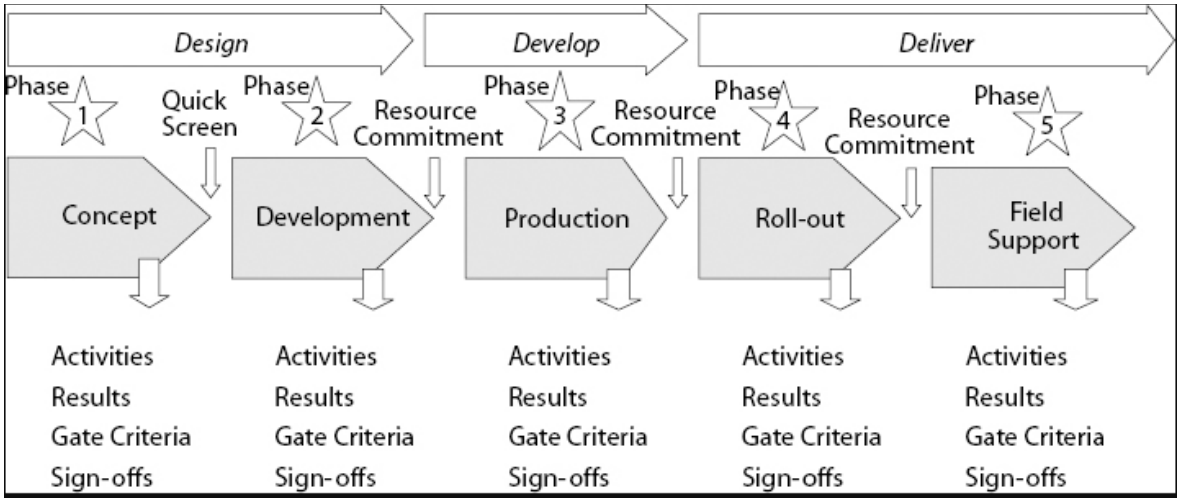


Figure 1 The phase-gate process (Thamhain, 2000)

The core of The Project Management Body of Knowledge, or PMBOK for short, is based around phase-gates, also called stage-gates, illustrated in Figure 1. The gate model allows projects to determine whether the project can advance to the next stage or whether it should be revised, in the worst case dismissed (Thamhain, 2000). As the model shows, each gate consists of specific activities, and gate acceptance criteria must be specified and fulfilled to proceed to the next phase of the project.

2.2 Fundamental values of Agile Project Management

Research shows that Agile Project Management has a positive impact on the project team and gives better preparation for the future, most likely due to more individual involvement and freedom in the Agile management approach (Ciric Lalic, et.al., 2022). This subchapter will highlight the fundamental values of Agile leadership and Agile Project Management.

As mentioned before in the thesis, Agile management focuses a lot on cooperation and collaboration between individuals. According to Ray (2023), having an Agile mindset empowers individuals to take ownership of their work and become self-accountable, hence an Agile leader should lead through guidance and support, rather than a strict, control-oriented approach.

Research has also shown that teamwork quality is critical for project management success (Agbejule & Lehtineva, 2022), hence it has been identified that a cross-functional approach to collaboration, for example, in exchanging information and skills, has taken project management to the next level (Ray, 2023).

Even though Agile Project Management is mostly used when there is a lot of uncertainty and complexity involved (Project Management Institute, Inc., 2017), there are still deliverables to be met and value to be created, however, unmet targets and process errors are to be seen as learning opportunities and growth possibilities, rather than failures (Ray, 2023). Ray (2023) also highlights that Agile leadership is not nonchalant towards organizational discipline, but instead, it respects the individual skills of the team members and is invested in the success of the organization.

Furthermore, as part of the collaboration, communication, and cross-functional approaches require high communication skills (Agbejule & Lehtineva, 2022), effective communication is a key trait in Agile leadership (Ray, 2023), as it allows the teams to make rapid decisions based on the shared knowledge of each function (Ciric Lalic, et.al., 2022).

The ability to quickly adapt to sudden changes and requests is one major advantage of Agile leadership, as the teams are self-powered with a high level of autonomy in the decision-making (Ray, 2023). Again, in highly dynamic environments, the need for clear communication with all stakeholders is key to project success (Agbejule & Lehtineva, 2022; Zwikael et.al., 2023).

The below table summarizes the Agile Manifesto by the PMI (2017) and is the cornerstone of the Agile mindset.

Table 1 The Agile Manifesto (Project Management Institute, Inc., 2017)

Individuals and interactions	over processes and tools
Working software	over comprehensive documentation
Customer collaboration	over contract negotiation
Responding to change	over following a plan

Shortly, Agile Project Management is a flexible project management approach, aiming to deliver frequent, high-quality outputs by collaborating with the customer in a constantly changing environment.

2.3 Project life cycles

The Agile Practice Guide by the PMI (2017) has identified four different types of project life cycles; a predictive life cycle, an iterative life cycle, an incremental life cycle, and an agile life cycle. Some project management theories also add a fifth and a sixth project life cycle, namely the extreme approach and the hybrid approach (Wysocki, 2013; Wysocki 2019). Cobb (2011) highlights that the differences between the different life cycle models are very fuzzy and sometimes even undistinguishable, hence the hybrid approach is becoming a popular approach among project managers (Wysocki, 2019). The next table shows the characteristics of each approach presented in this subchapter.

Table 2 Project life cycle characteristics (Project Management Institute, Inc., 2017; Wysocki, 2019)

Characteristics				
Approach	**Requirements**	**Activities**	**Delivery**	**Goal**
Predictive	Fixed	Performed once for the entire project	Single delivery	Manage cost
Incremental	Dynamic	Performed once for the given increment	Frequent smaller deliveries	Speed
Iterative	Dynamic	Repeated until correct	Single delivery	Correctness of solution
Agile	Dynamic	Repeated until correct	Frequent smaller deliveries	Customer value via frequent deliveries and feedback
Extreme	Dynamic, identified as project progresses	Clarifying scope as project progresses	Frequent smaller deliveries	Search for solutions and goals where none has been found before
Hybrid	Dynamic	Re-evaluated as project progresses	Frequent smaller deliveries	Flexibility in high-uncertainty projects

The predictive life cycle is the most traditional approach to project management, as most planning is done before the project and the project is performed and delivered in a linear process, with one single product delivery (Project Management Institute, Inc., 2017). This is usually applied when similar projects have been performed, or the scope of the project is well-defined (Wysocki, 2013).

Figure 2 The predictive life cycle (Project Management Institute, Inc., 2017)

An incremental life cycle delivers a product to be used immediately, but not to its full potential (Project Management Institute, Inc., 2017), hence Wysocki (2013) highlights that the finished product will be delivered in increments, meaning that there is room for improvement during the project timeline. This approach is mostly used when the project

requires rapid business value and more freedom of approach than the predictive, linear project life cycle (Wysocki, 2019).

Figure 3 The incremental life cycle with increments varying in size (Project Management Institute, Inc., 2017)

An iterative life cycle is an approach where the product can be unfinished within an iteration, which allows for improvements and modifications (Project Management Institute, Inc., 2017), and where change can and will occur during the project timeline (Wysocki, 2013). Furthermore, Wysocki (2013) states the key attribute of an iterative life cycle is that the project is performed in several iterations until the project is completed, hence the final solution is known, but it takes several iterations, or waves, to identify the needed functions and features of the final product.

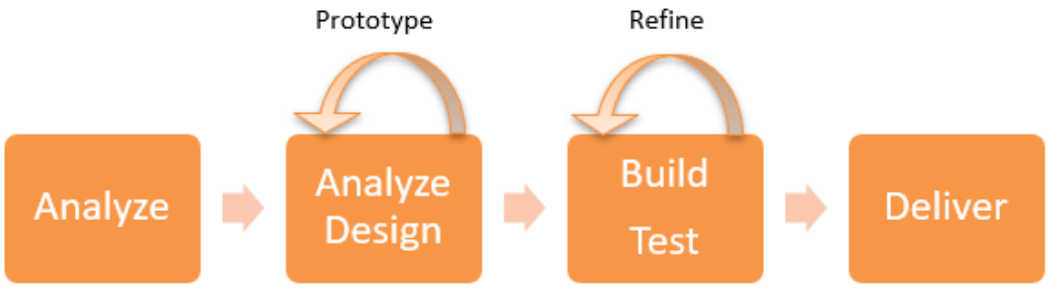


Figure 4 The iterative life cycle (Project Management Institute, Inc., 2017)

The agile life cycle, which is the main topic of this thesis, is on the other side of the spectrum, and in contrast to the predictive life cycle, it allows for both iterative and incremental approaches to continuously improve the product and allows for several deliveries (Project Management Institute, Inc., 2017). This approach allows for constant, unpredictable changes in the deliverables and adapts to the constantly changing conditions (Wysocki, 2013).

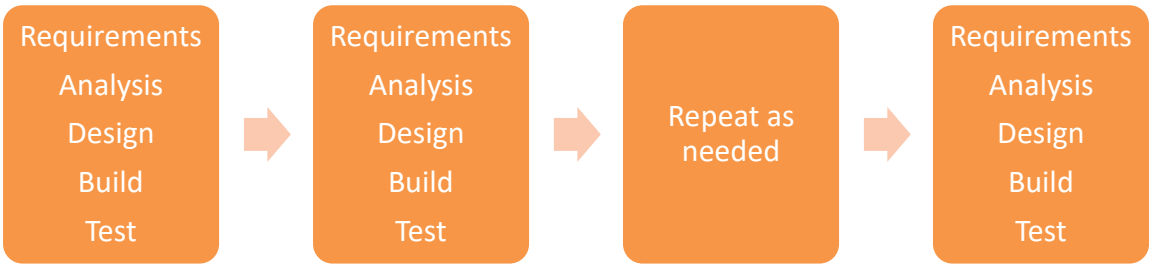


Figure 5 Iteration based agile (Project Management Institute, Inc., 2017)

The main difference between iteration-based agile, figure 5, and flow-based agile, figure 6, is the time required to complete each box, also called a sprint (Project Management Institute, Inc., 2017). In iteration-based agile each box, or sprint, is allocated a fixed duration to complete the tasks. On the other hand, the sprints in flow-based agile are allowed to vary in duration, accommodating different time requirements necessary for each sprint.

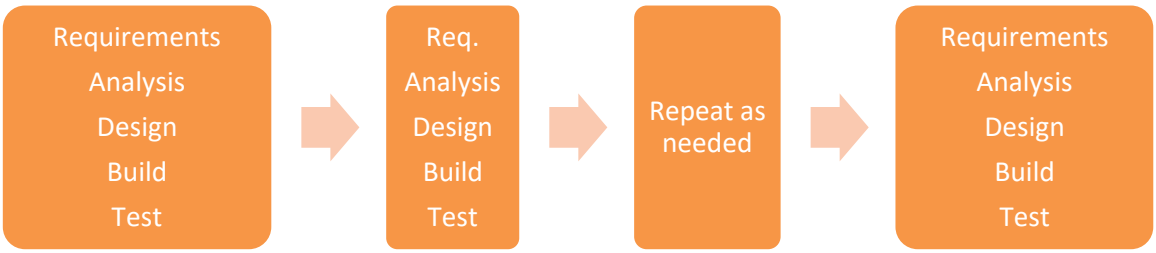


Figure 6 Flow-based agile (Project Management Institute, Inc., 2017)

Wysocki (2013) proposes a supplement to the already presented life cycles, the extreme project life cycle. This lifecycle is characterized by the highest level of uncertainty, as neither the goal nor solution are specified, as those are figured out along the way (Wysocki,

2013). This approach is oftentimes associated with high costs, high speed, and very high uncertainty of reaching the vision. This approach is similar to flow-based agile; however, this approach releases partial solutions until all iterations are completed.

In the eighth edition of the book “Effective Project Management”, Wysocki (2019) also identifies a sixth project life cycle, called the hybrid project life cycle, which is characterized by using several project life cycle approaches in one project. The hybrid life cycle is also mentioned in the Agile Practice Guide by the PMI (Project Management Institute, Inc., 2017). A simplified description of the hybrid project life cycle is that the project applies different or several features from the different life cycles presented above, which allows for adaptability to the situation and enables project teams to use a mix of iterative and sequential approaches based on the unique requirements of the project (Wysocki, 2019)

Project life cycles provide project management with a structured approach to managing projects, ensuring a systematic way of working by planning, executing, and closing projects in specified timelines. Different projects have different requirements depending on the dynamics of the project, whereas the presented agile life cycles allow for a more dynamic approach where there is high uncertainty.

The Agile project life cycle in depth

As seen in the figures above, the agile project life cycle works in cycles, that consist of different phases that are repeated until project closure; scope, plan cycle, launch cycle, monitor and control cycle, close cycle, next cycle, and lastly close the project (Wysocki, 2013). However, the PMI (2017) mentions that there is not one specific definition of an agile project life cycle, as the key is that the project life cycle fulfills the Agile Manifesto principles, hence incremental and iterative life cycles can be considered as agile life cycles as well.

There are many different opinions and perspectives on how an agile project life cycle is laid out (Project Management Institute, Inc., 2017), hence the below definition is a combination of several authors’ and researchers’ works, making it a hybrid approach per definition.

Scope/Requirements

This stage of the project life cycle consists of defining the requirements and goals of the project at a higher level (Wysocki, 2013), understanding the project vision (Project Management Institute, Inc., 2017), as well as creating an initial concept of how things should work after the project has been launched (Misra & Singh, 2015). Usually at this stage, the timeline is decided at a high level as well. (Project Management Institute, Inc., 2017).

Analyze / Plan

The analyze and plan stage of the project life cycle analyzes the requirements of the project and based on those requirements, a time plan is created together with a decision of how many cycles, or iterations, will be needed for releasing the full product (Project Management Institute, Inc., 2017; Wysocki, 2019). Wysocki (2019) highlights that in this stage the functionality of the final product shall be known, and in this stage, it can be decided whether the project will create a complete plan for creating the final product or only create a partial plan for the key functions, while side functions will be specified in later cycles.

This plan also consists of who the primary stakeholders are, what are the benefits delivered by the project, and how the different stakeholders are working together to achieve said benefits and goals (Project Management Institute, Inc., 2017).

Design

In the design phase, the foundation is laid for the final product and detailed specifications for the cycle are made, which the building phase will then follow (Cobb, 2011; Misra & Singh, 2015). As the design phase is present every time the cycles are repeated, the details for each cycle can be deferred, which allows for the cycle to get started more rapidly (Cobb, 2011). Furthermore, the design phase should, in accordance with the Agile Manifesto, allow for different functions and stakeholders to be part of the specification process (Project Management Institute, Inc., 2017).

Build

A prototype is built based on the design specified in the design phase of the project (Misra & Singh, 2015), which is presented to the users, and based on the user feedback it is either re-specified, re-designed, and re-built, or the project may continue to the testing phase (Cobb, 2011). Once the prototype is completed and accepted, the project can build the test version of the product (Misra & Singh, 2015).

Test

When the test version is built, there should be an acceptance test procedure, where the project team decides that the product is according to the requirements (Wysocki, 2013). If the tests are not accepted by the testing team, the product should be brought back to the building stage, and this process is repeated until the product is accepted and ready for launch (Misra & Singh, 2015). The PMI (2017) highlights that the entire project team should be part of the acceptance testing process, to ensure that all requirements from all stakeholders are met.

Launch

There must be a common understanding between stakeholders that the project is ready for launch, and the launch criteria must be specified beforehand (Project Management Institute, Inc., 2017). After the launch, there should be a channel available to report discrepancies and bugs in the product, so the responsible persons are able to review and refine the product (Misra & Singh, 2015).

Review and refine

After the launch, a review is conducted of what has been delivered together with all stakeholders (Misra & Singh, 2015). This review and refine phase is meant for understanding and learning from previous work, gaining experience, gathering and processing data, and using this newly gained knowledge in the next iteration, alternatively in the next project (Project Management Institute, Inc., 2017).

Close

When all iterations or cycles are completed, the final product is released and the project is closed (Misra & Singh, 2015; Project Management Institute, Inc., 2017). Misra and Singh (2015) highlights that after the launch phase, there should also be a feedback channel after the project closure. After the project is ended, the project team should reflect on what has been learned from the project, what are the experiences, and if the project did fulfill the requirements and expectations (Project Management Institute, Inc., 2017).

2.4 Handover process in Agile Project Management

This thesis's main research field is the handover process; hence it will focus more in-depth on the last three project life cycle phases launch, review and refine, and closing the project. At each of these three life cycle phases, there are handovers to end users, and usually, project teams should not be involved in the software support after a project has been handed off to the new responsible persons.

There is not only one correct way for project managers to conduct the project handover, as is usually the case of Agile Project Management, hence the approach must be tailored according to the organization-specific business environment (Cobb, 2011). Agile delivery approaches consist of, for instance, case studies, backlog analysis, iterative testing, requirement analysis and development, and feedback forums for customers and users (Paquette & Frankl, 2016).

As has already been mentioned, one of the Agile core values is collaboration, and according to Binci et.al. (2022) the organization should apply not only a top-down approach, meaning from management towards teams, but also a bottom-up approach, where the teams are able to give feedback to the higher-ups. Therefore, it is highlighted that adopting feedback, suggestions, and requirements is key to a successful handover (Paquette & Frankl, 2016).

In the closing stage of the project life cycle, it is important to audit all lessons learned from the project and previous iterations, validate the success criteria, and whether all deliverables and installations are according to the set requirements, and whether there are improvements to be made and how to proceed now that the deliverables have been handed over to the new responsible persons (Wysocki, 2019). This aspect of the closing

stage in a project makes organizations better prepared for future challenges and aids in future project successes and can even aid in developing and innovating new technologies (Ciric Lalic et.al., 2022), hence it is important to write down and share the findings with the project management office, as it may impact the future success of the organization (Project Management Institute, Inc., 2017).

According to Levy (2011), one of the main challenges is knowledge retention, hence documentation and integrating knowledge back into the organization is of high importance for organizational success. The PMI (2017) further highlights the need for regular retrospectives, with the primary goal of learning what has happened in the project so far, and how the project can become more effective and bring more business value. Such retrospectives should be performed regularly, and not only in any of the closing stages, as it boosts project productivity and keeps everyone on track towards the common goal of the project (Project Management Institute, Inc., 2017). Levy (2011) suggests the following framework when it has been identified that knowledge retention is needed; scope, transfer, integration. The below list is based on the research by Levy (2011).

- Scope; Deciding what knowledge is essential and what should be retained.

- Transfer; The transfer stage consists of documenting both explicit and tacit knowledge. It is suggested that there is a template for documentation, so as to not take any information for granted, for example, knowledge area lists, knowledge relationship maps, knowledge portfolios, and a lessons learned table.

- Integration; Transfering and integrating the knowledge into the company processes. The information should be easily accessible for the persons who need it, and the organization should arrange training sessions based on the knowledge to be retained.

Paquette and Frankl (2016) highlights the top Agile processes for successful change management and project handover; business participation in the shape of active stakeholder involvement, effective communication of the intended changes and their benefits, mutual understanding and collaboration in the promotion of a change culture, and lastly an open discussion forum that includes the employees in the change culture and understanding of the long-term project business value for the organization.

In the case of a delivery being unsuccessful, there must be a rollback plan, so the business can continue as before and the project group can review and refine the deployment once more (Paquette & Frankl, 2016).

2.5 Summary of Agile Project Management

Agile Project Management, as elaborated by Wysocki (2019) among others, is a flexible project management approach, emphasizing collaboration between stakeholders, and adaptability to a dynamic environment, while having a customer-oriented perspective. In contrast to traditional project management, Agile Project Management is ideal in situations where adaptability and innovation are critical, most commonly in software development. As mentioned, Agile Project Management has a research gap in hardware installation and development.

The handover process in Agile Project Management highlights collaboration with, and feedback from the end users. Due to the dynamic nature of APM, each organization must adapt the key concepts of APM theory according to their own specifications and needs. An agile handover process emphasizes individual involvement and ownership of tasks, and fosters a culture of teamwork, and cross-functional collaboration. To achieve this, effective communication is key to project success.

3 Lean Six Sigma

Lean is often mentioned together with Agile principles (Project Management Institute, Inc., 2017; Wysocki, 2013), therefore it will be analyzed in this thesis. For this thesis, Lean Six Sigma is the core quality management theory that will be applied, as it is the quality management approach that is already in use in the case company.

Lean Six Sigma is a quality management approach that focuses on continuous improvements, analyzing the root cause of issues, and making decisions based on measured data (Taghizadegan, 2006). It is considered to be the most used quality management approach to develop an organization's operations (Raval, Kant, & Shankar, 2021). The main task of Lean Six Sigma is to reduce the organizations' costs by reducing waste, and improving business performance and overall efficiency (Raval, Kant, & Shankar, 2021), thus the Lean Six Sigma approach shares the same concepts with the Agile approach to focus on value creation, elimination of unnecessary waste, adaption to change, and continuous improvement (Project Management Institute, Inc., 2017).

The base of the Lean Six Sigma approach is to define, measure, analyze, improve, and control (Taghizadegan, 2006), which is very similar to the Agile project life cycle identified earlier in the thesis; scope, analyze, design, build, test, launch, review and refine, close.

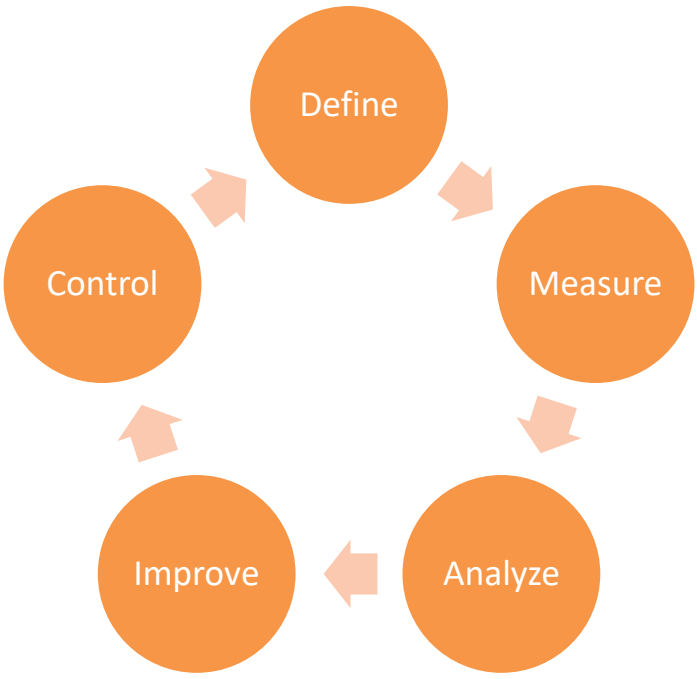


Figure 7 Lean Six Sigma baseline.

Raval et.al. (2021) identified in their research over 40 critical factors that affect the success of Lean Six Sigma implementation, and grouped them into the following categories:

Strategic factors

A top-to-bottom approach in the implementation is essential, as resources need to be allocated correctly where they are needed, and different change management tools must be applied to manage the transformation.

Organizational factors

The organization should enable and motivate the employees to contribute to the continuous improvement work and enable data gathering that decisions will be made on, rather than subjective decisions based only on emotions. Furthermore, the organization should enable effective communication that guides the teams towards common goals.

Culture-related factors

The culture-related factors go hand in hand with the organizational factors, as the quality mindset should be incorporated into the organizational culture. Lean Six Sigma knowledge and understanding by all employees play a vital role in the incorporation of the approach into the organization.

Finance-related factors

The organization should allocate needed resources and funds for the implementation of the continuous improvement approach, as organizational changes require financial support to some extent.

Customer-related factors

Customer satisfaction should be the highest priority of every company, as without customers the company is not doing any business. There should be a complete understanding and specification of what the customer requires and needs. This applies to internal customers as well, i.e. other departments in the organization.

Supplier-related factors

Also, from the customer's perspective towards the supplier, it is important to communicate and specify the needs and have a two-way communication to determine what is expected. This helps in developing higher-quality supply chains and streamlines a more efficient customer-supplier relationship.

The above factors are the most frequent Lean Six Sigma factors analyzed in different research articles and are considered to be critical success factors for reaching organizational goals (Raval, Kant, & Shankar, 2018). However, in the research by Raval et.al. (2018) it is highlighted that there is not an absolute integration model, hence the Lean Six Sigma approach must be tailored specifically for every organization and its goals. Snee (2010) also highlights that even though Lean Six Sigma is a well-established, robust theory, managers should not stare blindly into the existing theories on Lean Six Sigma, as these theories can be continuously improved over time as well.

Lean Six Sigma and project management

The Lean Six Sigma approach also specifies various project success factors; selecting the right project, selecting the right people, effective project management and gate reviews, and sustaining the benefits and improvements (Taghizadegan, 2014). Taghizadegan (2014) highlights that the selected projects should support the business strategies and goals and the right people, meaning the competent people, should be selected for the key roles. Furthermore, the management and steering committee should set up project gate reviews as milestones to support the advancement of the project (Taghizadegan, 2014). Lastly, the organization should incorporate tools for sustaining the improvements generated by the projects, however, it is important to understand that once a project is completed there can be further continuous improvements in the same field (Taghizadegan, 2014).

Taghizadegan (2014) presents that the Lean Six Sigma stakeholder analysis consists of five different groups of stakeholders; project champion, project sponsor, process owner, project team member, and other individuals who directly contribute to the project. By identifying how much each stakeholder group contributes to the project, the need for different communication strategies should be analyzed and applied accordingly (Taghizadegan, 2014). Research by Elias (2016) highlights that Lean Six Sigma literature

acknowledges and emphasizes the importance of stakeholder management in projects and the relationship between stakeholder management and project success rate. However, the same research shows that there is a lack of concrete examples in Lean Six Sigma literature that illustrate how a stakeholder analysis is conducted by using Lean Six Sigma principles (Elias, 2016), therefore the next chapter in this thesis will look more deeply into stakeholder management.

Lean Six Sigma literature also highlights the need for communication plans and training plans in projects, though literature lacks concrete examples in these aspects as well (Snee, 2010). Antony et.al. (2020) mention that Lean Six Sigma provides powerful communication tools, however they do not specify which the intended tools are.

However, the more recent Lean Six Sigma theory by Antony et.al. (2020) present a concrete example of a seven-step training plan in a Lean Six Sigma project:

1. **Training needs assessment.** This phase identifies who needs the training, what skills they should develop, and how it contributes to the objectives.

2. **Purpose, objectives, and outcomes.** The scope of the training is defined and communicated to the trainees. It is important to ensure that the trainee understands the scope of the training and the goals, as well as how the training will be conducted.

3. **Relevant content.** The training should include relevant, understandable content for the training.

4. **Active learning.** The training should consist of live demonstrations of the skills the trainee should develop.

5. **Practical learning.** The trainee should receive opportunities to apply the theoretical knowledge in practice in a safe environment. This can be conducted through, for example, training workshops or individual training sessions.

6. **Regular feedback.** The trainee should receive constructive feedback on their performance in the newly acquired skill, during or just after the practical training sessions.

7. **Post-training environment.** The trainee should be allowed to apply their newly acquired skills in practice. If this is not done, the training risks to be unnecessary as the trainee might forget the skill.

According to Barnes and Walker (2010), the communication plan in Lean Six Sigma projects can be conducted through using the core principles; DMAIC.

1. **Define** the stakeholders and the needed communication towards the stakeholder groups can be specified.

2. **Measure** objective metrics that are important for the stakeholder groups and agree on the next actions.

3. **Analyze** the root causes and assess the issues together with the stakeholder groups before developing solutions.

4. **Improve** the processes based on the solutions developed and communicate who does what, how it is done, and when it is done.

5. **Control** that all stakeholder requirements are met and ensure there are feedback forums available.

Lastly, Barnes and Walker (2010) highlights the need for also communicating the achievements of the project team to the rest of the organization.

3.1 Summary of Lean Six Sigma

In summary Lean Six Sigma highlights the importance of integrating quality management principles into project management, as stated by the Institute of Leadership and Management (2003). Organizations can eliminate inefficiencies, achieve a culture of continuous improvement, and ensure that projects deliver high-quality results that meet stakeholder expectations.

The theory emphasizes the need for stakeholder engagement with the main goal is to drive continuous improvement and collaboration between stakeholders (Taghizadegan, 2006) Lean Six Sigma is analyzed thoroughly, as it is the quality management of choice by Company X. Lean Six Sigma highlights the need for sustaining improvements post-project,

by ensuring effective training and communication, by introducing different frameworks, such as DMAIC, to ensure that stakeholders are engaged in the correct ways.

The chapter also emphasizes the need for each organization to adapt these methodologies according to the specific context of each organization to maximize the value of the theory.

4 Stakeholder Management

Stakeholder management in projects is shortly summarized as a concept that systematically maps all individuals and groups that affect project performance, directly and indirectly, and planning and organizing activities to avoid the negative impact of stakeholder influences (Eskerod, Lund Jepsen, & Dalcher, 2013), however, research shows that projects often fail due to unsuccessful stakeholder management (Fallah, Kermani, Moini, & Mashayekh, 2023).

Stakeholder theory suggests that project stakeholders are only motivated to contribute to the project, as long as they have been assigned different tasks (Eskerod, et.al., 2013), hence effective project stakeholder management should encourage different stakeholders to engage in collaboration and cooperation in the project (Fallah et.al., 2023).

Fallah et.al. (2023) highlights the need to group different stakeholder dependencies, and categorize them into three groups; collaborative, cooperative, and conflicting. The collaborative group is the direct project group that works towards the mutual goal. The cooperative group are other departments that are affected by the project and to some extent contribute to the design but are not part of the direct project group. Lastly, the conflicting groups are groups that are gatekeeping their area of work and trying to slow down or hinder the project. Research highlights that the relationships between the different stakeholder groups easily become a wicked problem, as the management must consider and understand the complete environment and impact of all the groups (Foster & Jonker, 2007).

The term “wicked problem” was introduced in 1973 by Horst Rittel and Mel Webber, and is briefly described as a complex issue that cannot easily be solved by using traditional methods (Head, 2022). Furthermore, Head (2022) highlights that solutions to wicked problems require stakeholder engagement and are more about managing complexity rather than finding definitive answers. The complexity of wicked problems derives from each stakeholder’s own interests and the need to meet the different requirements in a way that all parties are satisfied with the solution (Head, 2022).

Identifying and sharing key information with different stakeholder groups provides a positive environment (Fallah et.al., 2023), however, it is important for project managers to

communicate strategically towards the different stakeholder groups based on how many affiliations they have with the project (Eskerod, et.al, 2013). The decision-making processes should also be defined together with the key stakeholders, as all stakeholder groups have their own interests and work towards achieving their own goals (Foster & Jonker, 2007).

Eskerod et.al. (2013) suggest that a simple stakeholder analysis is enough to achieve the main benefits of stakeholder management; project stakeholder identification, project stakeholder assessment, and project stakeholder prioritization.

1. **Project stakeholder identification.** The list should group different stakeholders together, to ease the communication towards the different groups. It is suggested that there is a checklist to ensure follow-up with the different stakeholders.

2. **Project stakeholder assessment.** Identify how different stakeholders contribute to the project and how they are engaged in the project objectives. Define also their own interests in the project and create a risk analysis together with a risk mitigation plan.

3. **Project stakeholder prioritization.** Identify which stakeholders need the most attention and how the communication is steered towards them.

It is also highlighted that once the analysis is completed, the project management should keep monitoring the different stakeholder activities and engage them according to the current needs of the project (Zwikael et.al., 2023).

According to Foster and Jonker (2007), stakeholder management should be incorporated into quality management theories, as there are already many similarities in this aspect in both theories, however, it is here suggested that quality management theory should consider also the nature and needs of all relevant stakeholders, meaning also non-customer stakeholders. Study findings show that good communication and good project stakeholder management are key to project efficiency and success (Bai, et.al., 2022; Zwikael et.al., 2023), hence the proposal by Foster and Jonker (2007) to combine the theories.

4.1 Summary of Stakeholder Management

Stakeholder management in projects is described by Eskerod et.al. (2013) and Fallah et.al. (2023) as systematically identifying, analyzing, and managing expectations and influences of the project stakeholders that may affect project performance and results. Poor stakeholder management often results in unsatisfactory project results; therefore, it is crucial to understand the stakeholders' different requirements.

The core concept in stakeholder management is the need for clear communication between all parties, regular engagement, and adaptive strategies to manage the interests of the identified stakeholders (Eskerod, et.al., 2013). Further, based on the prioritization of the stakeholder impact, the project can focus on key stakeholders, instead of using resources on stakeholders that are not as much affected by the project.

5 Summarizing and combining the theories

This chapter focuses on summarizing and combining the key elements of the three theories presented in this thesis: Lean Six Sigma theory, Agile Project Management theory, and Stakeholder Management theory. By combining these three theories, the aim is to create a viable project handover process tailored for Company X. The chapter focuses on the strengths of each theory, addressing the challenges that may occur in project handovers, and in the end improving the effectiveness of project handovers conducted at Company X.

Figure 8 The theoretical framework

A recurring element that has been highlighted in all the presented theories is the critical role of collaboration and communication between key stakeholders. It is strongly suggested that the requirements and specifications are understood by all stakeholders and that the needs and expectations are communicated and documented. It is highlighted that stakeholders are identified, assessed, and prioritized based on project impact and needs.

By understanding these factors, projects can make information-based decisions concerning all stakeholders and communicate outcomes efficiently.

The second key aspect presented is efficient and correct communication between all stakeholders involved, and understanding what information needs to be frequently communicated. Based on the stakeholder assessment, an example of a communication plan was presented based on the Lean Six Sigma approach DMAIC; Define, Measure, Analyze, Improve, Control. Implementing a structured communication plan ensures that all stakeholders are informed and engaged throughout the different phases of the project. Also, efficient communication facilitates a smooth project handover and enhances stakeholder satisfaction by minimizing risks originating from poor communication.

Both Lean Six Sigma and Agile Project Management theories highlight the need for continuous improvements throughout different project phases. This has been presented in both the project life cycle as the review and refining phase, as well as the “improve” aspect of the DMAIC approach. As it is a circular and iterative approach, there is a strong need for adaptive project management and leadership. By fostering an environment of continuous improvement, projects are able to adapt and remain flexible to dynamic changes in requirements and respond by making information-based decisions.

The Lean Six Sigma theory suggests a structured seven-step training plan in project handovers, which consists of the following core elements:

- Clear scope statements.
- Well-defined requirements and expectations.
- Constructive two-way feedback between project management and end-users.
- Supportive training and post-training environment.

This theory is further complemented in Agile Project Management theory by ensuring that there are available feedback channels after the project handover, together with a requirement assessment to ensure that specifications are met. Furthermore, it is required that after a handover is completed, there is a need for monitoring and controlling to ensure that the end-users understand the specific requirements of their new roles. Focusing on

these elements in the training plan enhances the effectiveness of project handovers and ensures that end-users are prepared for their new roles and responsibilities.

Lastly, there should be a holistic understanding of stakeholder requirements and their roles and responsibilities in the project. The communication plan should ensure that all stakeholders understand their roles and responsibilities, even when the project environment is changing and the project advances. Therefore, it is crucial that communication is consistent and regular, to ensure that all stakeholders are informed and involved in the progress of the project.

This summary highlights how elements of collaboration and communication from the three theories, Lean Six Sigma, APM, and Stakeholder theory can be integrated into a comprehensive project handover plan, emphasizing the importance of stakeholder engagement and effective communication.

6 Case studies identified for comparison

This chapter explores two different case studies where Agile Project Management has been applied as the main theory. The first case study, the Master's thesis "Best Practices for Project Handover in Middle-Sized Organizations" (Laine, 2012), examines current project handover processes at Nord Pool Spot AS. It was observed that unsuccessful handovers at NPS derive from a lack of resources and poor communication, leading to uncertainties in roles and responsibilities. The second case study conducted by Lithonius (2021), as the topic for the Master's thesis "Creation of project management framework towards more structured, effective and common way of working on projects in the case organization", creates a project management framework for the anonymous case company, identified as Company X, to mitigate the poor project management and aid the company in its ways of working with projects. For the purpose of not mixing up the thesis case company. and the external case company, the external company will be called "Anonymous Company".

These case studies are included in this thesis to serve relevant purposes within the context of this research. The case studies are examples of real-world application of Agile Project Management, while facing similar challenges to the company analyzed in this research, particularly in the areas of project handover inefficiency, lack of communication, unclear stakeholder responsibilities, and the absence of a standardized project management framework. Examining other case studies provides an opportunity to assess the application of APM principles in real-world situations and understand the common project management challenges and pitfalls faced by different organizations.

These case studies contribute directly to the research question addressed in this thesis, by offering insights into how other organizations have implemented APM principles to overcome project handover challenges and pitfalls. Furthermore, Lean Six Sigma focuses on continuous improvement, which primarily highlights continuous learning from experience. Case Nord Pool Spot AS shows the challenges of poor communication and role definition in project handovers (Laine, 2012), while case Anonymous Company highlights the importance of creating a project management framework as a guide in the handover process (Lithonius, 2021). Addressing these case studies in this research allows for a comparison of common project management pitfalls and best practices, as well as offering

comparison to validate the findings and proposed solutions for this thesis' case organization, Company X

A comparison with external case studies ensures that the findings of this research are relevant in the context of both APM studies, as well as the complete theoretical framework provided in this thesis. The primary aim of a comparison using multiple case studies, is to verify the findings, strengthen the validity of the research conclusions, and benchmark Company X's current project handover practices. Through this comparison, and the theoretical framework, the study can propose strategies for Company X that have been proven successful in other organizations.

The insights and key takeaways from the case studies are integrated into the project handover template developed for Company X in this study. Furthermore, the insights allow for reflections incorporated into the recommendations brought forward for Company X, to avoid similar pitfalls and adopt a more structured, efficient project handover approach.

6.1 Case Nord Pool Spot AS

This case study, "Best practices for project handover in middle-size organizations", is a master's thesis by Markus Laine (2012) and its aim is to examine current project handover processes at Nord Pool Spot AS and develop a best practice for project handover for the organization. The main theory used in this thesis is the PMBOK Guide. Laine interviewed project participants regarding their view of past projects and how they had conducted the handovers, as well as the issues and success factors of said handovers.

It was identified that the common nominators for unsuccessful handovers at NPS were a lack of resources for the specific tasks, together with unclear roles and responsibilities. According to Laine (2012), this shows that the organization clearly was not mature and organized for performing such tasks, as the knowledge level for project handovers was not sufficient. Furthermore, the end users had low motivation to receive the product, due to unclear responsibilities, poor documentation, and lack of communication between all stakeholders.

Laine (2012) developed a handover process for Nord Pool Spot AS that consists of clear stakeholder responsibilities and highlights that stakeholder knowledge should be

considered. Furthermore, the thesis set a knowledge base for the project managers at Nord Pool Spot AS that might have lacked needed expertise. The handover process which Laine (2012) created for Nord Pool Spot AS consists of the checkpoints presented in the following table.

Table 3 Handover process for Nord Pool Spot AS by Laine (2012)

Project Handover Process
- Define roles and responsibilities for the End User
- Educate the End User
- Verify documentation and User Guides
- Create Escrow package
- Check warranty, maintenance and hosting agreements
- Run the Operational Acceptance Testing

Lastly, Laine (2012) highlights that key factors of this handover process are the cooperation between key stakeholders, knowledge sharing between the stakeholders, validating and verifying that the results are according to the requirements and specifications, and that the communication is clear and effective between the stakeholders.

6.2 Case Anonymous Company

The Master's thesis "Creation of project management framework: towards more structured, effective and common way of working on projects in the case organization" by Lotta Lithonius (2021) is conducted on behalf of an organization that needs to be anonymous, and the aim of the thesis is to create an effective, common way of working on projects in the case organization. The main issue identified in Anonymous Company is a lack of a common, structured way of working on projects and a lack of project management expertise, even though the core business is project-based.

It was identified that Anonymous Company lacked planning in all phases of the project life cycle, hence Lithonius (2021) created, based on theory presented, a project charter in the initiation phase, which makes the baseline for the project. Furthermore, there was a lack of documentation in the initiating phase, and a framework for documentation was also developed (Lithonius, 2021).

It was also identified that there was a lack of a constructive handover, as the project members started to focus on the next project before completing the current project (Lithonius, 2021). Therefore, a handover process was introduced, which includes planning and agreeing on the specifics of the handover process, followed by clearly specified maintenance, feedback channels, and future development (Lithonius, 2021).

Lastly, Anonymous Company lacked clear responsibilities in their project management, hence Lithonius (2021) provided the organization with clearly defined roles and general responsibilities for the project groups. Also, the project decision-making process had to be specified as it was unclear in the case company how much decision-making power the project teams had, and who to consult about different decisions.

It was also highlighted that Anonymous Company needs to improve their meeting practices to have more efficient meetings, and also improve the information sharing among different project stakeholders (Lithonius, 2021).

6.3 Key takeaways from the case studies

The key takeaways from the analyzed case studies reveal that they have several common pitfalls and challenges in the project management of the investigated companies. The pitfalls, though varied in context and industry, include ineffective communication among project stakeholders, unclear stakeholder responsibilities that must be improved, and inadequate project handover practices.

Furthermore, both case studies identified the lack of a constructive and consistent approach to project handovers. Both theses offer comprehensive tools and recommendations for how the organizations can improve their project management practices. The pitfalls can be categorized into different categories:

1. Ineffective communication among stakeholders, which may lead to misunderstandings, unclear expectations, and poor decision-making, in the end impacting project success. It is recommended that documentation and communication is streamlined according to set practices early in the project life cycle. Regular and clear communication is essential in stakeholder theory, as well

as other project management theories, particularly before and during the critical handover phase.

2. Unclear stakeholder responsibilities, which shows that project members and stakeholders are unaware of what is required and expected from them, leading to confusion and inefficient project progress. The premature departure of project teams leaves the end-users without the necessary support to transition to new systems, leading to a reversion to old methods. It is recommended that roles and expectations are clearly defined and reviewed with all stakeholders. For example, a responsibility matrix should be included in the project plan, as well as regular reviews and availability of feedback loops to ensure that stakeholders are aligned and accountable for their new roles and responsibilities.

3. Inadequate project handover practices were a common theme in both case studies, showing a lack of constructive and streamlined approaches to project handovers. This may lead to unutilized systems and low efficiency, eventually leading to reversion to old methods. It is recommended that there is a clear structure for the handover, adequate training for end-users, and post-handover support. By incorporating these elements into the project plan, organizations can improve the effectiveness of the project handovers and achieve better outcomes.

4. It is further highlighted that adequate support to end users after the project handover is completed is critical to project success. The long-term success of project handovers can only be achieved by robust post-handover support, which includes regular follow-ups, additional training sessions if needed, and clear feedback channels for users to seek support and report issues. Continuous engagement with the end users can enhance their ability to adapt new systems and processes.

As has been identified in this thesis as well, the theoretical framework suggests that effective project management practices include project scope specification, documentation, stakeholder identification and assessment, clear communication, and clearly defined roles and responsibilities.

The key takeaways are summarized in the following table.

Table 4 Key takeaways from the case studies

Aspect	Nord Pool Spot AS	Anonymous Company	Best Practices
Communication	Inadequate, Role confusion	Limited, Inconsistent	Regular updates, Clear roles
Stakeholder Engagement	Weak, Unclear responsibilities	Lacking, Low involvement	Defined roles, Regular check-ins
Training	Insufficient, Rushed	Inconsistent	Comprehensive, Ongoing
Documentation	Poorly verified,	Lacking standardization	Detailed, Easily accessible
Post-Handover Support	Minimal, Reactive	Limited, Inadequate	Proactive, Structured follow-up

In conclusion, the key takeaways from the two case studies presented highlight the importance of robust project handover practices. Effective communication, stakeholder engagement, role management, and post-handover support are essential components for effective project management and successful project handover. By addressing these critical areas, organizations can enhance the efficiency of their project handovers, leading to higher stakeholder satisfaction, end-user adaptation, and mitigating risks to reverse to old methods.

7 Research methodology

The study is conducted as a case study, investigating Company X's project management environment, comparing its situation to other organizations' challenges and findings, and lastly develop a robust handover template that will be integrated into Company X's project management toolbox.

The case study is conducted through a qualitative research method, as suggested by Kuada (2012), to be the most suitable research method when a detailed examination of specific cases is required. The chosen data gathering method is interviews through focus groups. Focus groups should consist of 6 to 10 people (Sachdeva, 2008) and last for no longer than two hours (Kuada, 2012). The chosen participants of the focus group are considered to be key project experts in Company X. The topic discussed is steered to the presented theoretical framework.

Case studies are often used to understand specific processes and situations, and also to develop new products and processes (Sachdeva, 2008). Case studies are suitable to be used when the research problem is set in a real-life exploratory context, when the context is complex and examines in-depth situations, and also practical application based on a theoretical framework (Baškarada, 2013).

Based on the requirements gathered in the focus groups, a template for project handover will be developed. The results of the case study will be reviewed with the Project Management Office, refined according to new findings, and delivered to Company X as a result of this thesis.

Case study theory

The case study process is done in six interdependent steps; plan, design, prepare, collect, analyze, and share (Baškarada, 2013). According to Baskarada (2013), the planning stage aims to understand the "how" and "why" of the case study, and clearly specify the aim of the research by understanding the research problem.

The aim of this thesis is to investigate how to apply Agile Project Management, Lean Six Sigma principles, and Stakeholder Manager theory to develop a streamlined and enhanced handover process template at Company X. Answering the "how"; a theoretical framework

is created and based on the theoretical framework a first draft of a template is created. The draft is presented in the focus group workshops, revised and refined, after which the handover template is presented to the Project Management Office of Company X. Based on the feedback from the presentation, a final version of the handover template is prepared and given over to Company X for their purposes.

Answering the “why”; Company X does not have a method for project handovers, hence there is a need to develop a standardized process that benefits all projects conducted in Company X.

Multiple case studies allow comparison and validation of the developed framework (Baškarada, 2013, Yin, 2014), hence two independent case studies are analyzed for comparison, and the similarities and differences between the different organizations are discussed.

The data collected should be relevant to the case studies, both the theoretical data and the data gathered either by qualitative or quantitative analysis (Baškarada, 2013, Gillham, 2000). Yin (2014) highlights that multiple sources of evidence strengthens the validity of the findings. The theoretical framework in this thesis is based on multiple journal articles and textbooks, which have been identified by the thesis author to be viable and current in their respective research fields.

The qualitative data for the case studies is gathered by focus group workshops, in which project experts of Company X participate. In the workshops, the theoretical framework is presented together with the first handover template draft, which is discussed and refined if necessary. The workshop discussions are recorded and transcribed, and in the end, summarized in the thesis.

According to Baskarada (2013), the case study investigator should prepare for the case studies by developing necessary skills to conduct the case study, create a case study protocol, conduct a pilot case, and if needed get necessary approvals to conduct the case study. The thesis author is a Project Manager in Company X, hence it is considered that the case study investigator has relevant experience and knowledge to conduct the case studies in Company X.

Case study data is collected according to the protocol, as well as case study evidence and observations (Baškarada, 2013). For the observations of current ways of working in Company X, this thesis uses primarily participant observations, meaning being involved in the process that is being studied (Gillham, 2000). Baskarada (2013) highlights that a case study database should be created and maintained, which allows the investigators to maintain a chain of evidence and trace the trails in the case studies. The data gathered for the case studies in this thesis are theoretical frameworks and subjective opinions of selected project experts in Company X.

The case study data analysis should begin with organizing the raw data, identifying themes and patterns, analyzing the content, triangulation, interpretation, validation, and final reporting (Baškarada, 2013, Yin, 2014). The triangulation, or in this case a comparison can be done by comparing the case study conducted in this thesis to the presented case studies.

Baskarada (2013) highlights that the first step of reporting the case study is identifying the target audience of the report, as the report should include an analysis of the results based on the target audience's needs. Furthermore, the case study report should be reviewed with peers and case study participants, as it gives an insight into the thoughts of the audience to the investigator, and the report can be refined (Baškarada, 2013). The case study report will include an introduction, a short summary of the theoretical framework presented in this thesis, methodology and case descriptions, analysis and findings, discussion, conclusions, and recommendations. According to Gillham (2000), by transparently reporting the case study findings, the research should ponder on the limitations and what could have been done differently in the research process.

The target audience of the findings in this thesis are project managers of Company X. The findings are going to be used as a tool for successful project management. Before the final template is published to the common database of Company X, it is reviewed and approved by the Project Management Office, and shared with all project managers of the company.

Table 5 Summary of Case Study Analysis Framework

Analysis Framework	Details
Design of the Study	**Research Question**: How can APM, Lean Six Sigma, and Stakeholder Management principles be applied to streamline and enhance the development of a standardized handover process at Company X?
	Case Studies: Primary case study (Company X) and a comparison with Nord Pool Spot AS and an anonymous company.
	Objective: Develop a standardized project handover template.
Data Collection Preparation	**Theoretical Framework**: APM, Lean Six Sigma, Stakeholder Management.
	Data Sources: Focus group workshops, internal project documents, and external case studies.
Data Collection	**Method**:
	- Focus group interviews with project experts in Company X.
	- Analysis of internal project management documents at Company X.
	- Cross-case comparison with external case studies (Nord Pool Spot AS and anonymous company).
Data Analysis	**Within-case analysis**: Analyse findings from focus group interviews and internal documents.
	Cross-case analysis: Compare findings from Company X with Nord Pool Spot AS and the anonymous company for comparison.
	Thematic analysis: Identify key themes related to communication, role clarity, and handover practices.
Reporting	**Target Audience**: Company X's Project Management Office (PMO) and stakeholders.
	Review and Refine: Present findings to PMO and refine the handover template based on feedback.
	Recommendations: Finalize recommendations for improving handover processes and long-term adoption of the template.

7.1 Validity and reliability

A weakness of focus groups is that the moderator may create bias in the results, as the discussed topics are steered by the moderator, thus generating low reliability of the research (Sachdeva, 2008). However, as the aim of this thesis is to create a beneficial handover process for Company X, researcher bias is considered a low-risk factor for generating negative results. Furthermore, the discussions are based on the theoretical framework that has been presented. The completed project handover template is based on the theoretical framework together with the requirements gathered from the focus group workshops; hence this thesis should generate a reliable result for Company X and a valuable theoretical application of the presented theories.

The validity of a study is dependent on the data gathered, both the theoretical framework and the practical study (Kuada, 2012). For the purpose of this thesis, several textbooks and journal articles have been studied to increase the validity of the theoretical framework. In regard to the practical part, the theoretical framework is applied to the qualitative data gathering as well as the case study conducted. To ensure that the focus group data is understood correctly by the researcher, the transcript is shared with the respondents.

In the context of this case study, the academic validity of the research is strengthened by a comparison method, which includes the analysis of the presented external case studies, verifying and supporting the findings related to Company X. A comprehensive theoretical framework that applies multiple project management theories, APM, Lean Six Sigma, and Stakeholder Management theory, ensures that the study covers several dimensions of project management. The theories presented are well-established in this context, further enhancing the theoretical validity of the study.

A key challenge is the reliability of focus group workshops, as responses may vary based on the workshop environment, participants' mood, group dynamics, or context at the time of the discussions. Furthermore, focus groups are subject to moderator bias, in this case, the researcher, and sometimes more dominant members within the focus group may outvote the more silent participants.

To mitigate this issue, the study followed guidelines for conducting focus group workshops, by encouraging participants to speak openly about the topic, as well as ensuring accuracy

by transcribing and reviewing the conclusions with the participants. The case study protocol is followed, ensuring a structured and transparent research process, and simultaneously allowing for replication of the research process. However, full replicability of the research in another organization's context might be difficult due to the qualitative nature of the study and the subjectivity of focus group discussions in Company X.

Furthermore, incorporating a broader variety of external case studies into the comparison would ensure that the findings are more widely applicable and consistent across different organizations and contexts.

8 The case study of Company X

This part of the thesis applies the theoretical foundation that has been brought forward in the earlier chapters. First, the current way of working with project handovers in Company X is presented. Secondly, the summary of discussions in the workshop with project experts of Company X is presented, and based on the discussions the handover template is created. As the last step, the handover template is presented to the Project Management Office at Company X, after which feedback is gathered and a last revision of the template is completed and given over to Company X for their purposes.

8.1 Current way of project handovers in Company X

The main reason for the employer to request this master's thesis topic is that there is a lack of a concrete handover process in projects, both when it comes to software solutions and hardware in the form of new machines, etc. This has led to challenges in sustaining project success, i.e. sustaining the operational changes and business value, which the projects were aiming to achieve. Oftentimes, the operations find their own workarounds and the operators and employees slowly return to old ways of working when opportunity arises.

From the thesis author's understanding, there has also been a lack of continuity, where the project team has departed the project and the team taking over has not been fully integrated into the new process and lacks knowledge about the new ways of working. This may cause an attitude of the employees where they are not interested in the new process, if they feel abandoned by the project team. Furthermore, there oftentimes are misunderstandings of responsibilities between the outgoing project member and the actual operational worker.

Generally speaking, projects in Company X have often had mismatched expectations between the project teams and the end users. This has led to end users feeling deceived about what the final product is, which has reduced their motivation heavily in adapting to new ways of working.

Oftentimes, it has also been noticed that the project group has not provided adequate support to the end-users after a completed project handover, whereas users are not fully integrated into the new processes and slowly go back to the old ways of working. This may

lead to the underutilization of new systems, a decline in efficiency, and failure to meet project expectations.

Company X is using the earlier presented phase-gate model as a project management tool, however, there are no standardized approaches to the different steps in each phase-gate. Therefore, every project works in its own way, which generates confusing scenarios and potentially reduces project efficiency and project success. Long term, this might delay the expected return on investment or even create a scenario where the project does not generate any benefits.

Summarizing the project handover situation in Company X, it appears that there is a lack of concrete project management tools offered by the case company. There also seems to be a lack of communication in giving over responsibility and miscommunication in expectations of the project results.

Hence, the primary goal of the thesis is to address the presented issues related to project handover and post-project adaptation. Specifically, the aim is to create a robust and comprehensive project management tool that assists project managers at Company X in overcoming these challenges. The template created in this thesis aims to achieve the following elements:

- Enhance post-project support,
- Ensure end-user adoption and integration,
- Assists in achieving project expectations and goals,
- Streamline the communication and collaboration.

Addressing these elements of a project handover can significantly improve project management practices, improve levels of stakeholder and end-user satisfaction, and potentially generate more successful project outcomes.

Comparison to the external case studies

There are several similarities and differences that can be identified in the external case studies and the current way of working in Company X. The main similarities are summarized first, followed by a summary of the main differences in the case studies.

The comparison shows that all three companies have similar challenges due to poor communication between stakeholders, resulting in misaligned expectations and confusion about project direction. Furthermore, the lack of clearly defined roles is a common theme across the case studies, resulting in confusion and lack of ownership of tasks. A common nomenclature is also the post-handover support, which is perceived as inadequate, as well as lack of documentation and limited follow-up, leading to disengaged stakeholders and reverting to old methods. All three case studies show the need for structured, standardized processes to reduce inconsistencies in project management and project handovers.

The differences between the case organizations are connected to the level of organizational maturity, as it seems to be different in the analyzed case studies. Nord Pool Spot was not mature enough to handle handovers due to insufficient stakeholder knowledge and resource limitations. Anonymous Company X lacked planning across all phases of project life cycles but had some frameworks in place. Company X in this study lacks a formalized handover process, but the overall project management structure seems more advanced, using tools from PMBOK. Also, the project management expertise in the two external case companies seems lacking, while Company X has project management expertise and is only lacking a standardized handover process, leading to inefficiencies in project outcomes.

8.2 Project expert workshop conclusion

The main scope of the theoretical framework that has been brought forward in this thesis was presented to project experts of Company X. All participants of the workshop are working as project managers in the case company and have been chosen based on what project is closest to the handover stage in its life cycle. Based on this workshop the first version of the handover template is created. The template is presented in the appendices.

Handover scope

Firstly, understanding the scope of the handover is an important aspect, to ensure that all parties understand what is and is not included in the handover, i.e. a brief description of what is on the agenda. This prevents miscommunication and misunderstanding, and also ensures a smoother handover. In the workshop, it was discussed that some kind of table matrix gives the most efficient overview. In most cases, Microsoft Excel is sufficient and user-friendly enough to document and follow the progress of the plan, making it accessible to all stakeholders of the handover. Hence, the first sheet of the template gives a brief description of what is included in the handover plan. This sheet serves as an introduction to the handover plan and lists key items and activities included in the handover, giving the stakeholders an overview of the content.

Stakeholder analysis and communication plan

As most theories presented in this thesis have highlighted, the need for collaboration and communication is a key element of a successful project handover. Therefore, the template first identifies the parties that are directly and indirectly involved in the project handover, i.e. the stakeholder analysis and communication plan. As the theory presented, a simple stakeholder analysis is sufficient, where each stakeholder or stakeholder group is identified, how they impact and their level of influence on the handover, what each stakeholder's specific needs are, for example, information needs, engagement needs, etc.

Furthermore, the template specifies the actions to be taken towards the stakeholder, whether it is meetings or info mails, in other words, the brief for the following communication plan. Lastly, an engagement strategy for each stakeholder is defined. The engagement strategy presents the overall approach and methods to establish an efficient and productive relationship with the stakeholders throughout the handover process.

The theory presented recommends a communication plan based on Lean Six Sigma theory, specifically utilizing the DMAIC approach for a systematic framework for effective communication. The DMAIC approach stands for Define, Measure, Analyze, Improve, Control. The plan should identify the key steps according to the following approach:

Define what information the project group wants and needs to share with the stakeholders. This includes the objectives of the communication, the key messages towards the stakeholders, and the overall goals of the communication. It should also be defined what different stakeholders need to know at various stages of the handover.

Measure the frequency of how often the communication should happen. The project group should measure how often updates should be sent out to the stakeholders to ensure efficient and clear communication, to mitigate misunderstandings and to maintain transparency.

Analyze what information the stakeholders expect to receive, in other words, understand the stakeholders' perspectives. By analyzing the stakeholder needs, the project group can plan the communication to efficiently meet stakeholder requirements and expectations.

Improve the communication channels that are the most suitable for the stakeholder. For example, emails, meetings, reports, dashboards, or other digital platforms are viable sources of information sharing. The goal of this step is to ensure that the stakeholders get relevant information at the right time, via viable channels. This stage should also continuously refine the communication channels to ensure that the most efficient channels are used for the current situation.

Control and monitor that all parties have received correct information according to the set plan. It is beneficial to implement follow-ups and checks with the stakeholders to ensure that they are up-to-date and have received accurate information, and follow-ups allow for addressing any potential gaps and misunderstandings.

The workshop participants agreed that the Lean Six Sigma approach is sufficient for the communication needs of Company X. By applying this approach, Company X can create a clear and effective communication strategy with all stakeholders, which potentially leads to a more collaborative environment and supports a successful project handover.

Resource management

Then follows, as the presented theory suggests, it is crucial to define the responsibilities of the project members and how to reach them. This gives the core project members a clear understanding of their tasks and the project's expectations of how the resources are used. Each team member's responsibility is clearly defined and what part of the handover they oversee, such as project management, technical support, documentation, training, stakeholder engagement, etc.

Also, as an addition to this sheet is the hardware specification. This part details what hardware is taken into use during the handover and who is responsible for installing, controlling, and managing the hardware. Examples of hardware can be servers, workstations, scanners, and readers, that are used in and after the handover.

This sheet gives a comprehensive overview of the project members' responsibilities and the technical infrastructure required for the handover. This level of detail mitigates the risks of forgetting critical equipment and ensures that project members know what is expected of them.

Training plan

The training plan included in the handover template is also based on the Lean Six Sigma theory presented, with some additional steps added to suit the needs of Company X.

Firstly, it is specified who is responsible for the training, preferably a subject expert from the project team. Then the person or group receiving the training is identified.

The purpose of the training should be clearly outlined, explaining to the end-users why the training is necessary and what it aims to achieve.

The content of the training should give a detailed description of what is being trained, covering all topics and skills that should be taught. It is beneficial to add instructions and process guidelines, or any other relevant information to the training content.

The plan specifies what type of training is given, such as lectures, practical hands-on training, or a combination of both. The type of training should be chosen depending on the complexity of the material and tasks.

Further, it is crucial to ensure that constructive feedback has been provided throughout the training process, in order for the trainees to understand whether they are performing well or need more training.

The post-training environment in which the trainee will apply their new skills is included in the plan, to ensure that they have the possibility and resources to apply their newly gained skill in practice. Subject to the complexity of the handover, it should be analyzed what kind of supportive post-training environment is set up.

The training status is tracked, to ensure that project members and stakeholders know what departments and groups have received the necessary training. A completion date for the training is specified to show that the training is conducted within the given timeline.

It was concluded in the workshop that the trainees must know what channels are available for them to give feedback in case of issues, the support channels available, and easily accessible, clear instructions for the product.

Furthermore, the trainee should be allowed to put the new knowledge into use as soon as possible after the training is completed, as it allows for the new skills to root themselves in the work culture and new ways of working. The trainees should also have the opportunity to test the new software or machine in a safe environment where possible, before being allowed to operate by themselves. This is subject to the severity of the impact of the new software or machine.

This training approach creates a comprehensive training plan based on Lean Six Sigma principles, and ensures that end-users are prepared for their new routines and responsibilities. Having a structured training plan facilitates a smooth transition and addresses specific training needs. Furthermore, it gives an opportunity for development for involved end-users, and the training occasions allow for discussions and feedback.

Post-handover plan

The next step in the plan is to specify the post-handover responsibilities, which involves defining who will take over defined tasks and which project member is responsible for handing over the task to the concerned end-user. This defines and details specific roles within the organization to avoid confusion and unclear job descriptions.

Each task should be clearly defined, which includes a detailed description, scope, objectives, and requirements, together with specific instructions for the task. The person receiving new tasks should fully understand what is expected of them and be able to perform the task independently, or as a team if there are several people acquiring the tasks.

There should be a deadline set for the handover of each task, to reduce the risk of leaving the responsibility to an outgoing project member. A clear deadline also helps to manage the expectations of the timeline and ensures that the parties are aware of what time schedule is expected of them. Further, it helps the person taking over to request more training and time to get acquainted with the new role.

The criteria for completing the handover should be mutually understood by all parties that are concerned with the handover. Hence, there should be clear, measurable criteria that define when a handover is completed and the new person responsible is accountable for the new role. The criteria can be some kind of formal sign-off from both parties, where there is mutual agreement that the handover is completed, based on agreed-upon metrics. Such metrics can be, for example, completed training or a supervised hands-on test session.

When the handover is completed there should be continuous follow-up with the new responsible by the project member, to ensure that the new responsible are managing their tasks in the intended way and allowing the new responsible to raise any issues or questions. Furthermore, support, and if necessary, additional training should be given to the new responsible person if they require it or the project member considers it is needed.

The post-handover plan mitigates the risks of uncertainty in new roles and responsibilities and ensures that the tasks are transitioned efficiently to the new responsible parties. The project management should also inform stakeholders of the new responsible persons, to avoid outgoing project members being brought back into the responsibilities.

Time schedule

The handover template includes a basic Gantt Chart in Excel format for the time schedule of the tasks. It allows the project members to fill in tasks involved in the handover process. For each task, a responsible person is specified for the task completion and allows project members to understand their roles and what is expected of them.

The chart tracks the progress of the tasks, indicating in what stage the tasks are, and visually showcasing the handover progress to the stakeholders. The task durations are displayed on a timeline for a visually comprehensive purpose, as it allows allocation of appropriate timeframes for task completion.

A basic Gantt Chart in Microsoft Excel provides a useful starting point for project management and task scheduling, but is not sufficient for more complex detailing of task progress. It is recommended to use a more sophisticated time management tool for more thorough follow-up and additional functions that may be needed in specific cases. For example, Microsoft Project is a user-friendly project management tool that offers many functions that facilitate the management work, for example, advanced scheduling and dependencies of tasks, milestones, resource management, progress monitoring and reporting via dashboards, collaboration, and integration for seamless communication, among other useful project management tools.

Risk analysis

Going further into the template, there is a risk analysis consisting of basic, core elements in project management theory:

The risk area identifies specific areas of risks that may arise during the handover. Risk areas are, for example, core functional, development, support, exceptions, user requirements, etc. Identifying risk areas allows the project management and stakeholders to systematically address potential problems and create a mitigation plan.

Impact of the risk identified describes how the risk affects the handover and allows for evaluation of the consequences of the described risk.

Probability and severity allow the project team to evaluate the probability of the defined risk and the severity of damage the risk may cause the handover. Based on the rating generated from these aspects, the project group develops appropriate mitigation measures.

Risk mitigating actions are usually risk-specific and include preventive measures and plans to reduce the impact and severity of the identified risks. It is beneficial to analyze different scenarios and create specific plans to manage the identified scenarios.

Status indicates whether the actions concerning the risks are started, in progress, completed, or closed.

The owner of handling the risk is a project member assigned to manage the risk and fulfill the mitigation actions. This ensures that there is a person accountable for the task and clarifies who is responsible for the actions and documentation.

The overall benefit of including a risk analysis in the handover template is to give the project members clarity of potential scenarios that may occur during the handover and allow for well-informed decision-making to mitigate the risks. It may also give the stakeholders confidence in the handover process, showing that risks are identified and managed.

Lessons learned

The final part of the handover template consists of a lessons learned sheet, which is supposed to be completed after the handover is completed. This is one of the core elements of Lean Six Sigma and APM, to continuously learn and improve the operations of the company. It allows to systematically capture and analyze experiences from a project handover and bring forth valuable knowledge to the rest of the organization. The purpose of this sheet is not only for the project members to express newly gained experiences, but also to present to the PMO to share the experience among other projects, both ongoing and future investments.

Organizational and continuous learning are the core benefits of presenting the lessons learned from the handover to the PMO and other project managers, as it fosters an organization that allows to learn both from mistakes and from success, driving sustained success and growth.

8.3 Project Management Office feedback

The template created in Chapter 7.2. in collaboration with project managers of Company X was presented to the Project Management Office. The PMO consists of higher managers from different departments of the company.

The overall feedback from the PMO was positive, however, it was requested that one main component, a change log, should be added to the handover template, which is required to

fulfill the needs of the company. The change log allows for documentation of changes made due to the handover, as well as enhances the control and communication of what has been done. Furthermore, it eases the follow-up requirements for the phase-gate presentations and closing of the project.

The PMO also highlighted the need for in-depth planning in the training plan, to not risk that certain areas are left out. However, it was noted that Company X does not have any standardized training plans, hence each project group relies on their skills and experience in creating a comprehensive, well-structured training plan.

During the walkthrough of the handover template with the PMO, it was noticed that there is a need for continuous training in project management for the project managers of Company X. It was discussed that though much of the presented theory in this thesis is often self-evident, such as clear communication and stakeholder engagement, many project managers do not consider the background of the theories and the benefits of the presented project management tools in practice. This may lead to an oversight of using project management tools, leading to inconsistent documentation, communication, and follow-up.

8.4 Finalization of the handover template

This sub-chapter presents the action points taken after the presentation to the Project Management Office. The continuous project management training for the project managers of Company X is not considered in this thesis and is instead presented as a topic for further research later in the thesis.

Handover template instructions

As a part of the handover template, the PMO requested detailed instructions for completing the template. These instructions are designed to guide project managers and project team members through the different sections of the template and ensure that the information is comprehensive for all. The instructions include a general overview of the handover template and explaining its purpose. In addition, a filled-out example is provided to the PMO, to serve as a reference that can be applied to different projects.

Furthermore, as per requirement from the PMO, all project managers of Company X will receive continuous project management training, in line with Lean Six Sigma principles. Continuous project management training enhances the usability of the project handover template, as the project managers receive up-to-date training in modern project management theory, and also further promotes continuous development of Company X.

Changelog sheet

The requested changelog consists of the following elements:

- **Type of change** categorizes each change and gives a comprehensive overview, for example; bug fix, feature, process change, routine. This element creates clarity for the stakeholders to quickly understand the nature of each change, without having to go into details.

- **Description** provides a detailed description of the changes made and serves as documentation for future reference.

- **Impact** describes how various changes affect the organization. Based on the severity of the impact the project group can define and assess resources needed.

- **Status** gives an indication to the stakeholders of the current state of the change, for example, planned, in progress, completed, etc. This allows for tracking the progress of the changes and provides an overview of how many change actions are ongoing.

- **Initiator**, can be called responsible or owner also, specifies who is accountable for the change and allows stakeholders to reach the correct person.

- **Approval date** when the change is implemented and allows for tracking for future reference when something has been decided and implemented.

The changelog gives stakeholders a historical record of the implemented changes in the handover. It also allows for future backtracking in case there are changes in responsible personnel. Furthermore, it facilitates continuous improvement, as per Lean Six Sigma theory, by documenting the impact and outcomes of the handover, which allows teams to learn from past experiences and facilitate decision-making in future projects.

9 Discussion

The thesis aims to analyze current ways of working in project handovers in Company X and to create a robust handover template applicable to different projects. Similar theses show that there are common project management pitfalls in different companies and Company X suffers from the same experiences as many others.

Project handovers are critical phases in the project lifecycle and consist of elements that are significant for project success, however, they are often set aside or disregarded. Whether it is due to apathy, ignorance, or lack of knowledge has not been identified in this thesis. There is now a common understanding in Company X that the project managers require training and continuous education in modern project management tools, to ensure higher competence to facilitate project success.

In the theoretical framework of this thesis, a conclusion of how the theories of APM, Lean Six Sigma, and Stakeholder Management contemplate project handovers can be presented in three basic elements that can be further debated. A brief summary of project handovers consists of scope, transfer, and integration. In the case studies presented, the common pitfall in these three elements was identified, being the lack of clear communication and poor documentation. The same pitfall was identified in the case company in this thesis as well.

Therefore, as a first step of any project handover, there should be a clear scope statement that identifies the critical areas of the handover and determines what areas are crucial to the current handover. The scope statement should be agreed upon with all stakeholders of the project, and it is crucial to ensure that there is a common understanding. This is supported both by presented theories, which all repeatedly highlight the need for stakeholder communication, collaboration, and engagement, as well as the two presented case studies and also this thesis author's observations made in Company X. When all stakeholders are informed about the scope of the handover, it reduces the risks of disengagement of and miscommunication with stakeholders.

The transfer of responsibilities and application of new routines should be thoroughly planned, by identifying handover stakeholders, their impact and risk areas. Further, both explicit and tacit knowledge should be included in the training plan for the end-users. The

theoretical framework suggests clear communication and feedback channels between stakeholders and end-users, as well as a concrete training plan. Communicating the objectives and responsibilities of the handover were common pitfalls in both case studies and also Company X. Understanding the objectives and responsibilities facilitates the handover process and contributes to project advancement.

The objective of the project is to integrate new, more cost-efficient processes or hardware to the company operations. The theory presented in this thesis highlights the need for feedback channels and feedback loops, and also the need to foster a culture of continuous improvement. The task of the project is to deliver a specific asset, whereas after the project disbands, the operations are responsible for continuously integrating and improving the assets. However, as has been identified in the presented theories and the case studies, there is a need for post-handover support and follow-up, which has also been considered in the handover template created in this thesis.

The theories of APM, Lean Six Sigma, and stakeholder management each offer valuable insights into efficient and sustainable project handover management. These insights and theories are further strengthened by the key takeaways of the analyzed case studies by Lithonius and Laine, who both identified project management pitfalls in their respective case and suggested concise project management tools and approaches for both case companies. Focusing on the three core elements of scope, transfer, and integration as the content of the suggested handover template, project managers of Company X can improve the success of project handovers and mitigate common pitfalls of poor communication, lack of documentation, and lack of retention after completed handover.

Continuous training and education in project management theory, as has been recommended for Company X, is crucial for the future success of projects in Company X and allows project managers to adapt to the dynamic challenges of digital project management. Adapting the project handover template developed in this thesis allows project managers of Company X to conveniently access current project management tools based on the most recent project management theory, and to get an overview of what is required to evaluate and analyze the needs of the project handover.

9.1 Research value

The research value of this thesis, applying Agile Project Management, Lean Six Sigma, and Stakeholder Management theory into a standardized project handover process at Company X generates both business value for the case company and contributes to academic knowledge.

Primarily, the thesis contributes to enhancing operational efficiency in Company X, mitigating project management pitfalls, and providing actionable solutions that can directly be implemented in the organization. Furthermore, it increases stakeholder satisfaction, and the theoretical framework provides a brief summary of the core elements of each theory that can be used to educate the project managers on current project management theory.

The thesis contributes to academic knowledge by applying these three theories interdisciplinarily, leveraging the strengths of each methodology to develop a robust and comprehensive solution. The three theories can be synergically applied to contribute to discussions on best practices in modern project management and organizational development.

Furthermore, other organizations can learn and adopt the principles presented in this thesis to enhance their own project management and handover processes. It can be argued that this contributes to the overall knowledge in project and process management, by providing a real-world case study and a comparative analysis that offers lessons learned that can be referenced by organizations facing similar challenges.

In conclusion, this thesis offers a valuable contribution to both academic research and practical project management by applying interdisciplinary theories and their respective core principles.

9.2 Limitations and challenges

This study provides valuable insights into the development of a standardized project handover process in a specific organization, by implementing Agile Project Management, Lean Six Sigma, and Stakeholder Management theory. However, several limitations and challenges are acknowledged and presented below.

Scope of the case study

The primary limitation is focusing on a single organization, in this case, Company X, which might limit the generalizability of the findings to other organizations. Including two external case studies for comparison strengthens the validity of the results, however, the unique characteristics and environment of Company X may differ from other organizations in terms of internal processes, industry standards, and project management culture. This impacts the applicability of the handover process template developed in this study; however, each organization could apply the findings to its own context.

Data collection methodology

The data collection was qualitative, utilizing focus group workshops consisting of project experts at Company X. Even though qualitative data provides in-depth insights into the challenges of project handovers, it may also include bias, as the participant focus lies primarily on experiences in Company X, which might affect the generalizability of the case study. To increase the generalizability of the case study, the scope should be broader, including several companies. However, the aim of this study was to improve the project management processes of Company X, a broader scope would not have been applicable in this case.

This study does not include quantitative data or use statistical analysis, hence it lacks empirical, quantitative evidence, which might affect the reliability of the findings. Future studies could incorporate quantitative methods if viable, to improve statistical generalization to balance the qualitative insights with statistical generalization.

The subjective nature of qualitative research, the potential researcher bias as an employee of the case company, as well as interpretation of focus group workshops, may present a limitation to the academic validity of the research. To mitigate this limitation, the study followed a systematic approach to data analysis, verifying the conclusions with the focus group participants, as well as cross-referencing the case study findings with the presented theoretical framework.

Generalization

As already mentioned, a significant challenge to the validity and reliability of this research is the ability to generalize the findings outside Company X. A comparison with other case studies increases the validity and reliability, however, the findings of this research are shaped by the specific characteristics within the context of Company X, limiting the transferability to different organizations and industries. Future research could validate the result of implementing the developed handover template across multiple companies to improve generalizability and thus prove that the research findings are consistent and applicable.

Time constraints

Due to time constraints, the research could not observe the impact of the new handover template by application to different projects in Company X. Furthermore, the time constraints limited the scope of research to the specific focus groups at Company X. Without an extended timeframe, the project management performance of Company X could not be analyzed. Further, the full benefits and potential drawbacks of the project handover template developed by this study remain speculative.

Financial implications

The study did not extensively cover the financial implications of implementing a standardized project handover process. Future research could investigate the cost-benefit analysis of implementing the handover process developed in this study and assess the direct impact on organizational efficiency and project return on investment.

9.3 Further research

A key challenge faced in the process of this thesis is the research gap of stakeholder management in both Lean Six Sigma and Agile Project Management. It would be significant to provide tangible examples of stakeholder management incorporated in both theories, as now these provide only brief introduction to stakeholder management topics, without providing any concrete methodologies for it. In other words, a framework that deeply

integrates stakeholder management theory into Lean Six Sigma and Agile Project Management, in comparison to this thesis that applies the theories side by side.

Many of the presented theories discuss effective project management during projects, however, they oftentimes lack the post-handover aspect of projects in their discussions, which also has proven to be a real-world issue in project management. For this research it was proved hard to find academic sources that cover the handover topic in depth, as well as sustaining project results over longer periods of time.

Managerial research for Company X

This thesis only creates a project management tool in the form of a handover template for Company X, however, it was observed that some project managers of the company were not familiar with APM. One recommendation for further research for Company X would be the role of project managers and what standardized project management tools are provided by the case company. Furthermore, it would be beneficial to investigate the performance metrics of projects in Company X that work according to APM versus projects that work according to traditional project management.

During the presentation of the template to the PMO, it was observed that Company X lacks standardized training plans as tools for project managers. This shows that there exists a gap in what tools are available to project managers of the company. It would be advantageous for both project managers and end-users to use standardized training plans when new ways of working are introduced, to reduce confusion and miscommunication. Should the employees be used to a standardized way of training new skills, it would mitigate the risk of discouragement from uncertainties regarding new routines.

As a third recommendation for further research, it would be beneficial for Company X to train project managers in APM and create in-depth instructions for the PMBOK gates and their contents used in Company X. During the thesis process, it was observed that many project managers were not familiar with the requirements of the PMBOK gates and many times, in general, the gate model is not applied when the project is considered too small. It is recommended that there are clear specifications when projects may take shortcuts

through the gate model to reduce bureaucracy and when a stricter approach should be applied.

These recommendations of further research aim to improve the project management practices at Company X, leading to increased clarity in communication, making project management more consistent and efficient, and in the end, should hypothetically generate more successful project outcomes.

9.4 Final thoughts

This thesis encapsulates the key principles of Agile Project Management, Lean Six Sigma, and Stakeholder Management, to create a robust foundation for a comprehensive project handover template for Company X. A standardized project handover template provides a practical solution for Company X to address existing project management pitfalls and inefficiencies. At the same time, insights from this research generate both academic significance and an example of real-world application of presented theories. By implementing the recommendations presented in this study, Company X can enhance the success of project handovers, ultimately fostering a culture of continuous improvement and greater stakeholder engagement.

References

Agbejule, A., & Lehtineva, L. (2022). The relationship between traditional project management, agile project management and teamwork quality on project success. *International Journal of Organizational Analysis, 30*(7), 124-136. doi:10.1108/IJOA-02-2022-3149

Antony, J., Sunder M, V., Laux, C., & Cudney, E. (2020). *The Ten Commandments of Lean Six Sigma: A Guide for Practitioners* (1 ed.). Bingley: Emerald Publishing Limited. Retrieved December 30, 2023, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/reader.action?docID=5979624&query=lean+six+sigma

Badakhshan, P., Conboy, K., Grisold, T., & vom Brocke, J. (2019). Agile business process management: A systematic literature review and an integrated framework. *Business Process Management Journal, 26*(6), 1505-1523. doi:10.1108/BPMJ-12-2018-0347

Bai, L., Kang, S., Zhang, K., Zhang, B., & Pan, T. (2022). Modeling for external stakeholder risk assessment of project portfolios. *Engineering, Construction and Architectural Management*. doi:10.1108/ECAM-01-2022-0010

Barnes, C., & Walker, R. (2010). Improving corporate communications: Lean Six Sigma science has broad reach. *Journal of Business Strategy, 31*, 23-36. doi:10.1108/02756661011012750

Baškarada, S. (2013). *Qualitative Case Study Guidelines.* Australian Government Department of Defence. Victoria: Joint and Operations Analysis Division, DSTO Defence Science and Technology Organisation. doi:DSTO-GD-0773

Binci, D., Cerruti, C., Masili, G., & Paternoster, C. (2022). Ambidexterity and Agile project management: an empirical framework. *The TQM Journal, 35*(5), 1275-1309. doi:10.1108/TQM-01-2022-0011

Ciric Lalic, D., Lalic, B., Delic, M., Gracanin, D., & Stefanovic, D. (2022). How project management approach impact project success? From traditional to agile. *International Journal of Managing Projects in Business, 15*(3), 494-521. doi:10.1108/IJMPB-04-2021-0108

Cobb, C. (2011). *Making Sense of Agile Project Management: Balancing Control and Agility.* Hoboken, New Jersey: John Wiley & Sons, Inc. Retrieved December 17, 2023, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/reader.action?docID=661483&query=agile+project+management

Elias, A. (2016). Stakeholder analysis for Lean Six Sigma project management. *International Journal of Lean Six Sigma, 7*(4), 394-406. doi:10.1108/IJLSS-11-2015-0046

Eskerod, P., Lund Jepsen, A., & Dalcher, D. (2013). *Project Stakeholder Management.* Oxon: Routledge. Retrieved December 31, 2023

Fallah, M., Kermani, M., Moini, A., & Mashayekh, J. (2023). Identification and evaluation of collaborative relationships of internal project stakeholders: a social network analysis approach. *Kybernetes*. doi:10.1108/K-12-2022-1648

Foster, D., & Jonker, J. (2007). Towards a third generation of quality management: Searching for a theoretical re-conceptualisation of contemporary organisations based on the notions of stakeholders and transactivity. *International Journal of Quality & Reliability Management, 24*(7), 683-703. doi:10.1108/02656710710774674

Gillham, B. (2000). *Case Study Research Methods.* Bloomsbury Publishing Plc. Retrieved October 30, 2024, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/reader.action?docID=564247&query=case+study+methods

Head, B. (2022). *Wicked Problems in Public Policy - Understanding and Responding to Complex Challenges.* London Borough of Camden: Palgrave Macmillan Cham. doi:https://doi-org.ezproxy.novia.fi/10.1007/978-3-030-94580-0

Institute of Leadership & Management. (2003). *Achieving Quality* (4th ed.). Oxford: Taylor & Francis Group. Retrieved December 30, 2023, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/reader.action?docID=294520

Kuada, J. (2012). *Research Methodology.* Frederiksberg: Samfundslitteratur. Retrieved January 7, 2024

Laine, M. (2012). Best Practices for Project Handover in Middle-Sized Organizations. Helsinki. Retrieved January 6, 2024, from https://www.theseus.fi/handle/10024/504201

Levy, M. (2011). Knowledge retention: minimizing organizational business loss. *Journal of Knowledge Management*, 582-600. doi:DOI10.1108/13673271111151974

Libiao, B., Shuyun, K., Kaimin, Z., Bingbing, Z., & Tong, P. (2024). Modeling for external stakeholder risk assessment of project portfolios. *Engineering, Construction and Architectural Management, 31*(2), 737-766. Retrieved 10 30, 2024

Lithonius, L. (2021). Creation of project management framework : towards more structured, effective and common way of working on projects in the case organization. Turku. Retrieved January 6, 2024, from https://www.theseus.fi/handle/10024/504201

Misra, S., & Singh, V. (2015). Conceptualizing open agile software development life cycle (OASDLC) model. *International Journal of Quality & Reliability Management, 32*(3), 214-235. doi:10.1108/IJQRM-08-2013-0127

Paquette, P., & Frankl, M. (2016). *Agile Project Management for Business Transformation Success.* New York, New York: Business Expert Press, LLC. Retrieved December 26, 2023, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/reader.action?docID=4307174&query=agile+project+management

Project Management Institute, Inc. (2017). *Agile Practice Guide.* Newtown Square, Pennsylvania: Project Management Institute, Inc. Retrieved December 9, 2023, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/detail.action?docID=5180850

Raval, S., Kant, R., & Shankar, R. (2018). Revealing research trends and themes in Lean Six Sigma: from 2000 to 2016. *International Journal of Lean Six Sigma*, 399-443. doi:10.1108/IJLSS-03-2017-0021

Raval, S., Kant, R., & Shankar, R. (2021). Analyzing the critical success factors influencing Lean Six Sigma implementation: fuzzy DEMATEL approach. *Journal of Modelling in Management, 16*(2), 728-764. doi:10.1108/JM2-07-2019-0155

Ray, S. (2023). Moving Towards Agile Leadership to Help Organizations Succeed. *IUP Journal of Soft Skills, 17*(1), 5-17. Retrieved December 9, 2023, from https://www.proquest.com/scholarly-journals/moving-towards-agile-leadership-help/docview/2810211005/se-2

Sachdeva, J. (2008). *Business Research Methodology.* Mumbai: Himalaya Publishing House PVT.LTD. Retrieved January 7, 2024

Snee, R. (2010). Lean Six Sigma – getting better all the time. *International Journal of Lean Six Sigma, 1*(1), 9-29. doi:10.1108/20401461011033130

Taghizadegan, S. (2006). *Essentials of Lean Six Sigma.* Burlington, Massachusetts: Elsevier Inc. Retrieved December 30, 2023, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/reader.action?docID=270378&query=lean+six+sigma

Taghizadegan, S. (2014). *Mastering Lean Six Sigma: Advanced Black Belt Concepts.* New York, New York: Momentum Press, LLC. Retrieved December 30, 2023, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/reader.action?docID=1319109&query=lean+six+sigma

Thamhain, H. (2000). Accelerating product developments via phase-gate processes. Houston, TX: Project Management Institute Annual Seminars & Symposium. Retrieved July 6, 2024, from https://www.pmi.org/learning/library/phase-gate-processes-promising-complex-547

Wysocki, R. (2013). *Effective Project Management: Traditional, Agile, Extreme* (7th ed.). Indianapolis, Indiana: John Wiley & Sons, Inc. Retrieved December 10, 2023

Wysocki, R. (2019). *Effective Project Management: Traditional, Agile, Extreme, Hybrid* (8th ed.). Indianapolis, Indiana: John Wiley & Sons, Inc. Retrieved December 14, 2023, from https://ebookcentral-proquest-com.ezproxy.novia.fi/lib/novia-ebooks/reader.action?docID=5747804

Yin, R. (2014). *Case study research: design and methods.* Los Angeles: Sage Publications. Retrieved October 30, 2024

Zwikael, O., Salmona, M., Meredith, J., & Zarghami, S. (2023). Enhancing project stakeholder communication under insufficient knowledge of project

management concepts. *Engineering, Construction and Architectural Management, 30*(10), 5007-5029. doi:10.1108/ECAM-02-2022-0154

Appendix 1 – case study protocol

1 Introduction

This case study protocol presents the process of conducting the case study to analyze the current state of project handovers in Company X and to develop a standardized handover template suited for Company X based on the research findings. The case study findings will be validated through triangulated with two other case studies to ensure that the proposed frameworks address the key challenges in project handovers.

This case study protocol outlines a clear research process for conducting the case study. The protocol ensures consistency and reliability in the research, allowing for replicability of the study.

2 Purpose and research question

The purpose of this case study is to explore how Agile Project Management (APM), Lean Six Sigma, and Stakeholder Management principles can be applied to create a standardized handover process for projects in Company X. Hence, the research question that has appeared is:

How can the principles of Agile Project Management, Lean Six Sigma, and Stakeholder Management theory be applied to streamline and enhance the development of a standardized handover process at Company X?

The aim of this study is to:

- Identify inefficiencies in the current handover process.
- Analyse best practices for project handovers based on theoretical frameworks and case study comparisons.
- Develop a comprehensive project handover template for Company X.

3 Case study design

3.1 Case selection

The case study is referred to as Company X, due to the request to be anonymous. The company is a market leader in its industry. Company X faces challenges in project handovers, leading to inefficiencies, inconsistencies in project handovers, and disengaged stakeholders. The study aims to develop a framework that works in both software and hardware projects within the company.

In addition to this case study, two external case studies will be analysed for comparison:

1. Nord Pool Spot AS: The case study explores issues related to poor communication and lack of resources in project handovers.

2. Another organization referred to as Anonymous Company: This study focuses on how a lack of structured project management impacts project results.

3.2 Data sources

The data for the case study will be collected through:

- Focus group workshops: The workshops consist of key project experts at Company X, to gather qualitative insights into the current handover practices.

- Internal documentation: Company X's existing project management tools.

- Case study reviews: Analysis of and key takeaways from the case studies used for comparison.

3.3 Data collection and analysis

The goal of the focus group workshops is to understand the current processes of Company X, and the pitfalls of project handovers experienced in Company X. The discussions are recorded and transcribed, and the conclusion of the workshops are presented to the participants to ensure that the results are understood correctly by the researcher.

The documentation review allows the researcher to analyse existing project management processes to identify gaps and inconsistencies in the process.

The analysis of external case studies brings valuable insights into this research, by being able to compare challenges and pitfalls other organisations face, as well as the presented recommendations and key learnings from the studies.

3.4 Validation of findings

To ensure the validity of the case study findings:

- Comparison: The two external case studies validate the findings from Company X, ensuring that the developed project handover template is relevant to the context.
- Review with participants: The focus group participants are presented with the conclusion of the workshops, to ensure that results are understood correctly.
- Stakeholder feedback: The handover template is presented to the Project Management Office of Company X for feedback and further iterations of the template.

3.5 Ethical considerations

This study follows the following ethical research principles:

- Confidentiality: Company X has requested to be anonymous, hence the name and business area is not presented. All sensitive information is excluded from the study.
- Informed consent: All participants of the focus group workshops are informed of the purpose of the study and consent for use is obtained before participation. The participants may leave the workshop at any time would they wish to.
- Data security: All collected data is securely stored and only accessible to the researcher.

3.6 Reporting

The case study report includes:

- An introduction to the study and the research objectives.
- A summary of findings from the focus group workshops.
- The development and presentation of a standardised project handover template for Company X.
- Recommendations for further research and improvements in project management processes.

Project handover template

Created 05-02-2024

Write here the scope for the handover.

NAVIGATION

Stakeholder Analysis

Last updated: 05-02-2024

Stakeholder name	**Impact level** (low, medium, high)	**Priority** (low, medium, high)	**Needs / Requirements**	**Actions to be taken**	**Engagement stategy**

Communication Plan

Last updated:

Stakeholder name	**Define** What information to deliver	**Measure** Frequency of communication.	**Analyze** Assess the issues and needs of the stakeholder.	**Improve** Communication channel used to meet the requirements of stakeholders.	**Control** Ensure that stakeholder requirements are met and feedback channels are available and known.

Handover team

Resource	Responsibility	Contact info

Hardware

List	Location	Responsible	Checked

Training plan

Last updated:

Responsible trainer	Trainee	Purpose Objectives and outcomes	Content	Type of training Lecture / practical / hybrid	Constructive feedback given Yes / no	Post-training Feedback channels, support, instructions	Status	Completion date

Post-handover plan

Last updated:

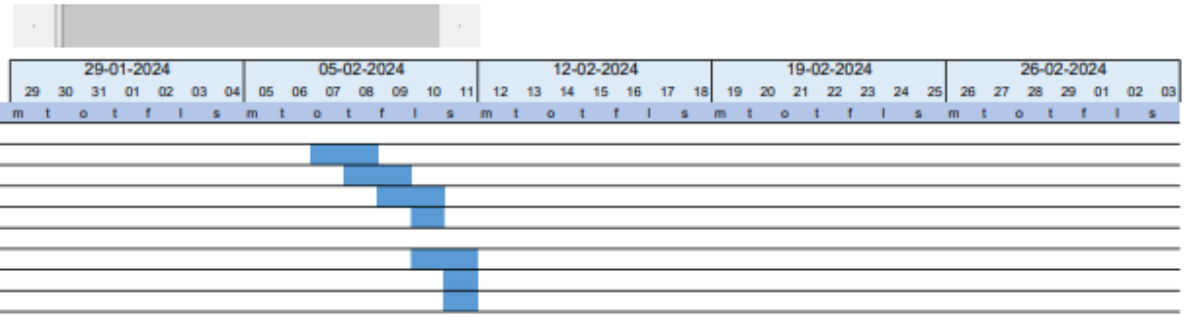
Person taking over	Responsible for giving over	Responsibility / task	Time plan for take over (Weeks / days)	Take over criteria	Responsible for following up	Follow-up by (date)	Comments

Time Schedule

Note: for detailed task plan, it is recommended to use, for example, Microsoft Project.

Project start: tor, 01-02-2024
Display week: 1

TASK	ASSIGNED TO	PROGRESS	START	END
Phase 1 Title				
Task 1.1		50 %	07-02-2024	08-02-2024
Task 1.2			08-02-2024	09-02-2024
Task 1.3			09-02-2024	10-02-2024
Task 1.4			10-02-2024	10-02-2024
Phase 2 Title				
Task 2.1			10-02-2024	11-02-2024
Task 2.2			11-02-2024	11-02-2024
Task 2.3			11-02-2024	11-02-2024



RISK ANALYSIS

Last updated

No.	Date Raised	Raised By	Risk Area (choose from drop down)	Impact	Type of risk (choose from drop down)	Probability rating (choose from drop down)	Impact Rating (choose from drop down)	Weight (Scale 1-5)	Risk Score	Actions to prevent / Mitigate risk	Status (choose from drop down)	Owner	Due Date	Outcome
									0					
									0					
									0					
									0					
									0					
									0					
									0					
									0					

Lessons learned

Last updated:

Raised by	**Type of lesson** (choose from drop down)	**Event** (what happened)	**Category** Positive or negative	**Warning signs**	**Recommendation** (how to approach in the future)