

Exploring the Agile Project Manager

- A Case Study at Scania R&D

Master Thesis by

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Preface

This thesis concludes my Master of Science degree in Industrial Engineering and Management with a specialization in Supply Chain Management at Lund University, Faculty of Engineering. This thesis is conducted as a part of a degree project course at LTH and as a case study within a department of Scania R&D. This case study was made possible through the supporting and engaged employees at YS, whom I like to thank. I extend a special thanks to my coworkers at YSFP and my company supervisor Lisa Linhardt, for their time, for helping me understand the organization, and for making me feel like a part of the team. I would also like to take the opportunity to thank my supervisor at LTH, Dag Näslund, for sharing valuable knowledge and providing crucial guidance and feedback during the process.

Abstract

Title: Exploring the Agile Project Manager

Background: Organizations implement agile methodologies with the aim to increase their ability to respond quickly and adapt to changing environments. Agile transformations include changes in the organizational structure, processes, and roles. Most agile frameworks and approaches introduce new leadership roles, such as the scrum master and product owner; however, the project manager role is not addressed. As the project manager contributes to the success of many project management methods, researchers call for research to address the agile project manager role. The absence of the project manager role in agile frameworks has also created uncertainty about if there is a need for the agile project manager role and what the role should entail for the case company, which is transitioning to agile.

This single case study explored the agile project manager role at the R&D department YS within Scania. First, CSFs in agile were identified to provide factors that are important to consider for understanding the need for the agile project manager role. Then, the need for the agile project manager and factors that affect the need for the role were explored. Last, the definition of the agile project manager was explored by investigating the role's key responsibilities and competencies.

Purpose: The purpose of this thesis is to explore the need and definition of the agile project manager role at YS.

Research Questions:

RQ1. What are the most prominent critical success factors in agile?

RQ2. What does the need for the agile project manager role look like?

RQ3. How should the agile project manager role be defined?

Methodology: Holistic single case study.

Conclusion: The theoretical and empirical study findings show that no conclusion can be drawn regarding the general need for the agile project manager role. A discrepancy was identified regarding sources stating that there is a great need for the role while other sources mean that there is no need for the role. However, the study found six factors that affect the need for the role:

- Organizational aspects
 - Agile organizational maturity
 - Organizational structure
- Process aspects
 - Hybrid of traditional and agile project management process
- Project aspects
 - Level of cross-functional requirements
 - Project size
 - Project complexity

The study found that the main responsibilities and competencies of the agile project manager correspond to the traditional project manager. However, an overlap of responsibility areas for the agile project manager and agile roles was identified, such as coordinating and facilitating communication. Agile framework competency and servant leadership skills were found to be extra important for a project manager in an agile setting.

Keywords: critical success factors (CSFs); agile methodology; agile project management; agile project manager; project manager competencies; project manager responsibilities

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List of Abbreviations

CSF – Critical success factor

KPI – Key performance indicator

PD - Product development

R&D - Research and development

RQ – Research question

SAFe - Scaled agile framework

VCT - Value creation team

VCF – Value creation flow

YS - R&D department Vehicle Service Information at Scania

1 Introduction

The introduction chapter presents the background of the thesis. The case study organization and the issue of the study are presented, as well as the formulated research purpose and questions.

1.1 Background

The interest in agile methodologies has increased in academia and practice in the past years (Lappi et al., 2018; Uludag et al., 2022). Agile methods have historically mainly been applied and studied in the fields of information technology, information system, and software development, however, the interest is increasing in other industries (Lappi et al., 2018). Increased uncertainty, complexity, and innovative levels have led to the adoption of agile project management methods in physical product development projects (Schuh et al., 2018; Atzberger et al., 2019), and in large-scale interdisciplinary projects (Hennel and Dobmeier, 2020; Uludag et al., 2022).

Agile can refer to a change method for project management or a change method for transforming entire organizations (Lappi et al., 2018; Uludag et al., 2022). The definition of the word agile is that something is flexible and responsive (Chow and Cao, 2008), and accordingly, organizational agility can be described as the ability to quickly respond and adapt to changing environments (Chow and Cao, 2008; Lappi et al., 2018; Naslund and Kale, 2020). Agile practices aim to achieve high responsiveness through self-organizing teams, planning and development in small iterative phases, and embracing change and feedback at any stage in the development process (Bass, 2016; Hennel and Dobmeier, 2020).

Agile transformations often include changes in the organizational structure, processes, and roles (Sadeh et al., 2022). Despite the increasing practical and academic interest in agile methods, researchers have identified a gap between agile theory recommendations and practical agile implementations regarding which functions are required in agile projects (Shastri et al., 2021). Most agile approaches introduce agile roles, such as the scrum master and product owner, while the project manager role is not addressed (ibid.). Shastri et al. (2021) state that “the role of the project manager in an agile project is somewhat of an unknown” and request future research to explore which factors influence management’s choice to utilize an agile project manager. Gandomani et al. (2020) and Sadeh et al. (2022) propose that the project manager role in agile organizations is likely to be “structurally different from the traditional role of the project manager in terms of responsibilities and duties”.

The leadership of the project manager is crucial for project success (Anantatmula, 2010), and understanding the role of the project manager will build an understanding of the central function of project management, which contributes to an organization’s ability to achieve its goals (Sadeh et al., 2022). Therefore, it is important to understand the role of the project manager in agile organizations (ibid.). This case study aims to explore the agile project manager role at an R&D department within Scania. Scania R&D is transitioning to agile, and the absence of the project manager role in agile frameworks has created uncertainty about if the project manager is required in the agile organization, and what the project manager role then should entail for the agile organization.

1.2 Case Company Presentation

Scania is a world-leading provider of transport solutions, including heavy transport applications such as trucks, buses, and industrial and marine engines. The company has a global presence with around 55 000 employees in more than 100 countries. Scania works towards their purpose and goal which is defined as “driving the shift towards a sustainable transport system, and creating a world of mobility that is better for business, society and the environment”. Scania uses research to achieve this purpose which is carried out in-house and in collaboration with strategic partners, universities, and customers.

This thesis is a single case study of one of Scania’s R&D departments: Vehicle Service Information (YS). YS consists of 22 subdepartments with around 300 employees, structured into five different departments. YS has two main focuses, to develop and deliver service information to Scania’s workshops, and to work with product impact. YS develops products and services for Scania’s workshops (referred to as service information), such as maintenance programs, troubleshooting and diagnosis, repair instructions, parts catalogs, rebuild support and special tools. YS also has an important responsibility regarding product impact mainly during the conceptual stage, which is to provide knowledge, guidance, and requirement specifications to constructors during the development process so that all solutions are designed for repairability and maintainability.

Scania R&D is going through a transformation from a traditional/lean strategy towards a lean/agile strategy, and the organization uses the Scaled Agile Framework (SAFe) as inspiration for the transformation. The agile transformation at Scania R&D includes changes in the organizational structure, the project management and development process and roles. The organizational structure will change from a traditional hierarchical organization to a value flow-based structure consisting of teams of teams. The organization has previously had a project flow of four large product introductions each year, where YS has participated based on a process-driven need in a stage-gate or waterfall-oriented development process. YS will instead participate in the agile process based on a value-driven need, where development will mainly consist of continuous small increments. Finally, the introduction of new agile roles and self-organizing teams includes changes in functions and responsibilities.

1.3 Problem Description

The introduction of new agile roles in the project management process and the absence of the project manager role in the SAFe framework have created uncertainty about what the project manager role should entail for YS in the agile organization. With all the changes included in the agile transformation, it is unclear if there is a need for the agile project manager role at YS and how the role should be defined if there is a the need for the role.

The uncertainty of the agile project manager role is not exclusive to the case company. A gap has been identified in the studied theory, showing that there is limited research on the agile project manager role. Based on the available studies, it is unclear what the need for the role looks like, or whether the project manager role is different in agile organizations compared to traditional ones. To address these challenges, critical success factors (CSFs) in agile will be investigated. CSFs in agile provide aspects that are important to consider for exploring the need for the agile project manager role. Then, the need for the agile project manager role and

the factors that affect the need for the role will be explored. Last, how the role should be defined will be investigated by focusing on the role’s key responsibilities and competencies.

1.4 Research Purpose

The purpose of this thesis is to explore the need and definition of the agile project manager role at YS.

1.5 Research Questions

The following three research questions have been formulated with the aim of fulfilling the purpose of the study. RQ1 aims to provide factors that are important to consider answering RQ2. In the same way, RQ2 is required to be answered in order to answer RQ3. The aim of RQ2 is to explore the general need for the agile project manager role, as well as factors that affect the need for the role. The aim of RQ3 is to propose how the agile project manager role should be defined by focusing on the role’s most important responsibilities and competencies. The aim of the study is to fulfill the purpose by exploring the RQs through studying prior theoretical knowledge, as well as answering the RQs from the perspective of YS.

RQ1: What are the most prominent critical success factors in agile?

RQ2: What does the need for the agile project manager role look like?

RQ3: How should the agile project manager role be defined?

1.6 Focus and Delimitations

This thesis is limited to studying the project manager role and the processes at the R&D department YS. Since the purpose of the study is to explore the agile project manager, other agile roles will be addressed, but not as thoroughly as the project manager role. Further, the study focuses on agile methods in general, and the information presented will thus not distinguish between specific agile frameworks. The focus of the study is illustrated in *Figure 1.1*, where the main focus is on the agile project manager shown in the intersection.

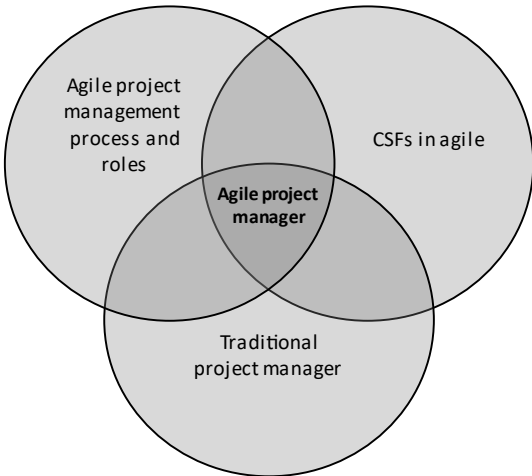


Figure 1.1 Focus of the thesis.

1.7 Structure of the Report

The following part of the thesis is structured into 5 chapters, which are described in brief below.

2. Methodology

The methodology chapter presents the research method used for the study. The research design choices of the thesis will be described, followed by a discussion of the quality of the study.

3. Frame of Reference

The frame of reference chapter presents previous theoretical research on the studied phenomenon. First, the agile methodology is introduced by describing the agile process and roles. Then, CSFs in agile discovered in literature are shown. Last, the project manager role and the findings of the need for the agile project manager role are presented, as well as the role's main responsibilities and competencies both for a traditional and an agile setting.

4. Empirical data

The results of the empirical study are presented in this chapter. First, the organizational structure, roles and process at YS are described. Then the findings from the empirical data collection of CSFs in agile, the need for the agile project manager and the role's responsibilities and competencies are presented.

5. Analysis

The analysis chapter presents the analysis that has been conducted of data collected through the theoretical and empirical studies. Pattern matching has been conducted to compare the information found through the studies. The chapter is structured accordingly to the RQs, and discussion is provided at the end of each section.

6. Conclusion

The conclusion chapter presents recommendations to the case company, answers to the research questions, and discussion of the limitations of the thesis as well as highlighting future research areas.

2 Methodology

The methodology chapter presents the research strategy and method used for the study. The research design choices of the thesis will be described, followed by a discussion of the quality of the study.

2.1 Research Strategy

Yin (2009) means that the characteristics of the research purpose and questions are important to consider for determining an appropriate research methodology. Yin (2009) states that there are three common research categories: exploratory, descriptive, and explanatory research. Exploratory research aims to explore and understand a phenomenon in order to develop hypotheses and propositions, descriptive research aims to describe and define the incidence or prevalence of a topic, and explanatory research aims to explain operational links and why phenomena work the way they do (Yin, 2009). This thesis is of exploratory nature, as the purpose of the thesis is to explore the need for the agile project manager role and propose the role's most important responsibilities and competencies. The following parts of this subsection will describe the research approach and design choices applied for the exploratory research study. *Table 2.1* shows a summary of the methodology design choices of the thesis.

Table 2.1 Overview of methodology design choices.

Methodology category	Design choice of the thesis
Research strategy	Exploratory
Research approach	Abductive
Research design	Case study
Case study design	Holistic single
Sources of evidence	Interviews, workshop, documents
Interview design	Semi-structured

2.1.1 Research Approach

There are three main research approaches: deductive, inductive, and abductive. A deductive research approach aims at building knowledge through using data to test theory (Eisenhardt and Graebner, 2007). An inductive research approach aims at building knowledge by using data to build theory and is therefore appropriate for phenomenon-driven research questions that address a topic that has a lack of applicable existing theory (Eisenhardt and Graebner, 2007). The third approach, abductive research, aims to build theory through an iterative process where empirical data and theory-building phases overlap each other (Spens and Kovacs, 2006). An abductive research approach was selected for this thesis as it fits research where the prior theoretical knowledge plays an important role, even if it cannot thoroughly explain the phenomenon (Spens and Kovacs, 2006).

2.1.2 Research Design

The research method used for this thesis is a case study. Case studies are suitable for exploratory and theory-building research (Meredith, 1998; Voss et al., 2002). Furthermore, case studies are a suitable research method for research questions that address “how” and “why” in unexplored research (Eisenhardt and Graebner, 2007; Yin, 2009). However, a “what” formulated question can also be of exploratory nature and therefore appropriate for an

exploratory case study (Yin, 2009). A case study was selected as an appropriate method as the purpose of this thesis is of exploratory nature, even though the first two research questions are formulated as “what” questions. The advantages of case studies are that they have high relevance, provide understanding and an exploratory depth (Meredith, 1998). The disadvantages of case studies are that they can include access issues, require more resources in terms of time and have triangulation requirements (Meredith, 1998).

2.1.3 Case Study Design

The unit of analysis of the thesis is the agile project manager role at YS, and a holistic single case study was therefore applied. A case study can contain one single case or multiple cases. Single case studies are a good choice for exploring a significant phenomenon in greater depth, while multiple case studies are a better choice for creating stronger and more generalizable theories (Voss et al., 2002; Eisenhardt and Graebner, 2007; Yin, 2009). Furthermore, the case study could have a holistic or embedded design. An embedded single case study has more than one unit of analysis, while a holistic single case study has one unit of analysis. Embedded case studies can provide advantages such as extensive analysis and more insights, however the larger holistic perspective of the single case could be lost by focusing too much on the subunits (Yin, 2009).

2.1.4 Sources of Evidence

The data collection methods used for this thesis are documents, interviews, and a workshop. The advantages of documents are that they are stable, exact, have broad coverage and they are not created because of the study (Yin, 2009). Disadvantages of documents can be retrievability and access issues, and selection or reporting bias (Yin, 2009). The advantages of interviews are that they can be insightful and focus directly on the studied topic (Yin, 2009). The disadvantages are that interviews could result in biased data (Yin, 2009). Multiple sources of evidence can be complementary, and no method has a complete advantage over the others (Yin, 2009).

2.2 Research Process

The research process started with informal interviews and conversations with a manager and coworkers at YS, which led to the initial research purpose and research questions. Thereafter, the literature review was done to build an understanding of the prior theoretical knowledge of the studied phenomenon. The research purpose and questions were adapted based on the findings of the prior theoretical knowledge, and the methodology’s design choices were determined. Furthermore, the prior theoretical knowledge from the literature review provided a base for constructing the interview guide for performing the empirical study.

The empirical data collection was conducted after the literature review. The first phase of the empirical data collection consisted of interviews, and the second phase consisted of a workshop. The workshop was conducted to validate and discuss the findings from the interviews. The process’s next step was to analyze the theoretical and empirical study findings. The case study analysis methodology used for this thesis is pattern matching.

Pattern matching is a technique that compares empirically based patterns with a predicted pattern, where the internal validity is strengthened by matching patterns. (Yin, 2009). Pattern

matching was conducted to reveal CSFs in agile, factors that affect the need for the agile project manager, and to identify important responsibilities and competencies of the role. Furthermore, the analysis conducted after the data collection phases provided insights into areas in the theoretical framework that required deeper investigation. Therefore, the theoretical framework was complemented throughout the abductive research process. The research process of the thesis is summarized in *Figure 2.1*.

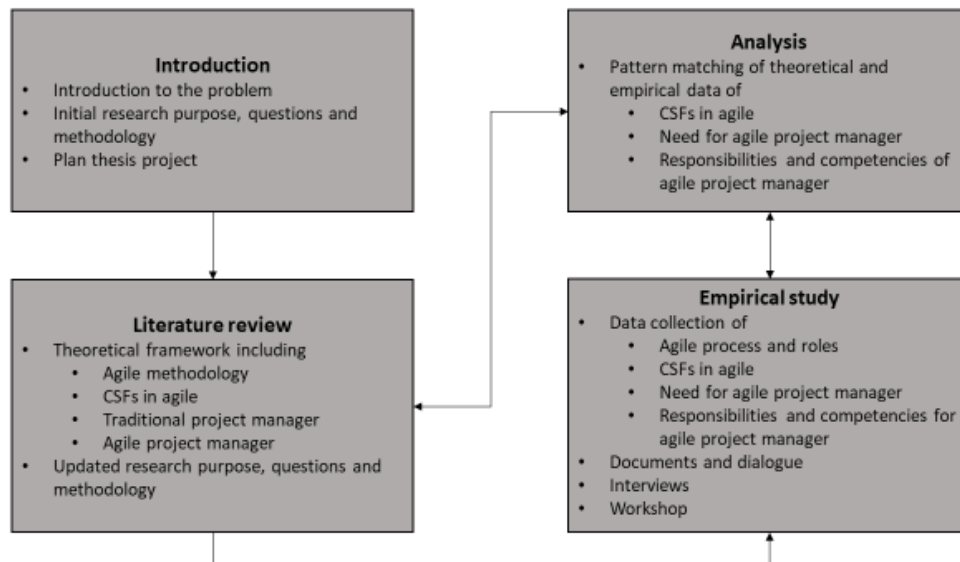


Figure 2.1 The working process of the thesis.

2.3 Literature Review

Theory development is an important step to conduct in the design phase of a case study regardless of the choice of research approach or purpose (Yin, 2009). The purpose of literature reviews is to build an understanding of the theoretical concepts and terminology, to validate the need for the study and to provide guidance for determining the case design (Rowley and Slack, 2004; Yin, 2009). The literature study started from a wide perspective by covering the agile process and roles to build knowledge of the methodology. Thereafter, CSFs in agile were identified to build an understanding of factors that are important to consider for exploring the need for the agile project manager role. Last, the literature study narrowed down to review the need, responsibilities, and competencies of the agile project manager role, and how the role relates to the traditional project manager.

Scania uses the SAFe framework as inspiration for the agile transformation. However, the focus of the literature review was to study agile methods in general, and the literature review was thus not limited to studying one particular agile framework or method. This choice is justified by the literature review which showed that many core practices of agile are similar in different agile approaches, and that there is a limited theoretical framework of scholarly and research journal articles covering the SAFe framework. Therefore, articles studying agile methods in general will be included, as well as articles that analyze one particular or multiple specific agile methods.

The agile process as well as other agile management roles can affect the need for the project manager role, and how the role’s responsibilities and competencies should be defined. However, the focus of the thesis is to study the project manager role. Therefore, the agile process and agile roles will be introduced and described, even if the process and agile roles will not be the main focus of the study. Likewise, the traditional project manager role will also be analyzed, but the depth of the study will lie with the agile project manager role.

Table 2.2 presents the searches and search terms used in the literature study. The search engine used was Web of Science. However, one search was done in Google Scholar due to few relevant and useful results of articles analyzing the agile project manager. The searches were mainly sorted by relevance, since sorting by highest citation rate resulted in irrelevant articles. The articles were scanned by reading the title and abstract to determine the relevance of the search results. Relevant articles were read through to identify articles that could be useful for the purpose of this thesis. Additional search terms were identified during the process to adapt the searches to find relevant articles.

Table 2.2 The search terms used in the literature review.

Search engine	Keywords	Sorting	Result	Used	Scanned
Web of Science	agile AND (“development process” OR “sprint process” OR “project management process”)	Relevance	1 089	7	150
Web of Science	process AND (scaled agile OR large scale agile OR scrum of scrums)	Relevance	1 789	5	150
Web of Science	agile AND (“critical success factors” OR “success factors” OR motivators)	Citation highest first	55	12	55
Web of Science	“project manager” AND (competencies OR skills OR capabilities)	Citation highest first/Relevance	286	8	100
Web of Science	agile “project manager”	Relevance	69	9	69
Google Scholar	agile “project manager”	Relevance	47 300	6	150

2.4 Empirical Data Collection

An interview could be conducted in an unstructured or a more structured manner (Yin, 2009). An unstructured or in-depth interview is a flexible method of asking questions similar to a conversation. A structured interview produces more quantitative data by asking questions similar to a formal survey. A third approach is to conduct semi-structured interviews, which consist of both open and closed questions and enables both structure and flexibility. Semi-structured interviews were chosen for this thesis since the purpose is to explore the subject area without analyzing other topics of a broader nature. It is important to avoid leading questions, and it can be helpful to follow a certain set of questions for semi-structured interviews (Yin, 2009). The interview guide in *Appendix A* presents the questions used for the semi-structured interviews. Interviews were performed with nine different interviewees. The interviews were conducted with project managers involved in five different projects, and middle managers within different units of YS.

Furthermore, a workshop was conducted with the aim of validating the results from the data collected in the interviews. The participants in the workshop consisted of project managers

within YS, and one middle manager. A workshop or focus group is a good method for e.g., creating new ideas, exploring, or describing a phenomenon, or validating hypotheses (Fern, 2001 p. 6). The information gathered through a focus group may be subject to bias, and the moderator should ensure an atmosphere of inclusion to obtain different views from participants (ibid). The findings of the interviews were presented through a PowerPoint presentation during the workshop, to enable discussion for gathering further insights, and for evaluating the reliability of the results.

2.5 Quality of Research Design

Yin (2009) states that four common tests can judge the quality of the research design. The first test, construct validity, refers to the ability to develop correct operational measures for the concept being studied without subjective judgments for collecting data. A high construct validity can be obtained by using multiple sources of evidence, and having key informants review the draft report. Data triangulation was used in this study to increase construct validity, by using different respondents for the empirical data collection. Two different roles were interviewed, project managers and middle managers. Gathering data from various roles increases construct validity by providing different perspectives and knowledge of the studied phenomenon. The project managers interviewed were chosen to gather insights from as many different projects as possible, and the project managers were involved in five different projects.

A higher construct validity could have been obtained by interviewing more participants, and more different roles from different subdepartments, such as scrum masters, release train engineers, product owners and product managers. Two factors affected the choice to only interview nine persons within two different roles. First, the time limitation of the thesis limited the opportunity to conduct more interviews. Second, the focus of the thesis was to study YS, and at the time of writing the thesis there were limited agile roles at YS applicable for participating for the purpose of the thesis.

The second test, internal validity, is mainly important for explanatory studies. High internal validity is obtained when conclusions of casual relationships are trustworthy, and methods for this can e.g., be pattern matching (Yin, 2009). Pattern matching was performed in this thesis to identify matching patterns in the literature review and empirical data collection.

The third test, external validity, refers to if and how the results of the study can be generalized beyond the case study (Yin, 2009). Single cases can be subject to low external validity. Higher external validity in single case studies can be obtained by using theory, and a literature review has been conducted in this thesis to increase the external validity.

The fourth test, reliability, relates to the demonstrating of operations of a study, so that the same result will be obtained by repeating the process. Higher reliability can be achieved by using a case study protocol and a case study database (Yin, 2009). An interview guide has been utilized in this study; however, a case study protocol could have been formulated to increase the reliability of the research.

3 Frame of Reference

The frame of reference chapter presents previous theoretical research on the studied phenomenon. First, the agile methodology is introduced describing the agile process and roles. Then, CFSs in agile discovered in literature are shown. Last, the project manager role and the findings of the need for the agile project manager role are presented, as well as the role's key responsibilities and competencies both for a traditional setting and an agile setting.

3.1 The Agile Methodology

Agile methods and management concepts evolved as a response to the inflexibility that traditional project management methods were experienced to cause (Hennel and Dobmeier, 2020). To be able to react and adapt to quickly changing environments, agile methods prioritize flexibility and autonomy over strict control (ibid.) There are many different frameworks for agile methodologies, and among the most popular methods are feature-driven development, scrum and extreme programming (Bass, 2016; Mucambe et al., 2020). Additional agile methods have evolved to address agile practices for a large-scale environment, such as SAFe, large-scale scrum and scrum of scrums (ibid.).

Common principles of agile methodologies are self-organizing teams, planning and developing in small iterative phases, and embracing change and feedback at any stage in the development process (Bass, 2016; Hennel and Dobmeier, 2020). To maximize value, agile principles also encourage early and continuous delivery and to involve customers to achieve fast feedback loops (Dingsoyr et al., 2012). Large-scale agile frameworks, such as SAFe, normally include practices for product release and portfolio processes, while small-scale frameworks mainly describe the sprint process. Large-scale agile frameworks also typically include additional agile roles compared to small-scale methods. The following parts of this subsection will describe the overall agile process, the sprint process, and the roles in agile.

3.1.1 The Agile Process

Agh and Ramsin (2021) and Bass (2015; 2016) described the agile process on three levels, see the overall agile process illustrated in *Figure 3.1*. The portfolio/program process describes the process of developing and managing product line releases at a strategic level. Multiple product release processes are nested within the portfolio process, which describes the process of developing products. Product increments are developed in the sprint process, which is nested in the product release process.

Each process at each level begins with a planning phase, where the corresponding backlog is defined or updated. A backlog is an agile artifact consisting of a prioritized list of items or features that should be developed and implemented during the project (Paasivaara et al., 2009; Betta et al., 2019). The sprint backlog is derived from the product backlog, which in turn can be derived from the portfolio backlog. The product backlog is subject to change at any stage in the process (Betta et al., 2019; Agh and Ramsin, 2021). Therefore, the portfolio, product, and release planning can be considered ongoing activities (Agh and Ramsin, 2021). *Figure 3.2* presents a description of these potentially ongoing phases, including the roles that commonly participate in the activities. The following two subsections, 3.1.2, present the sprint process, and the agile roles will be described in section 3.1.3.

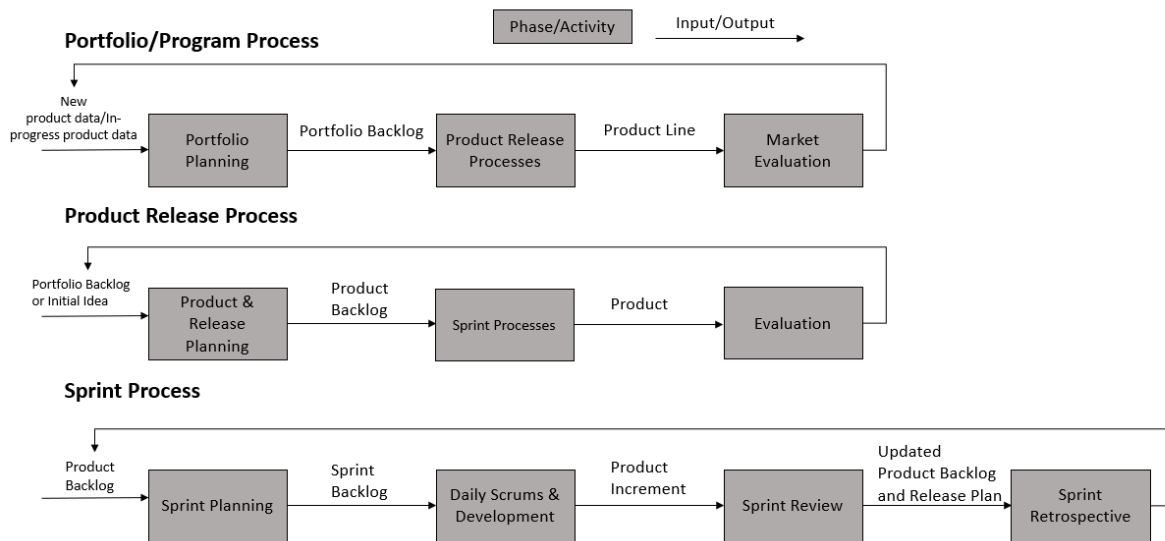


Figure 3.1 The agile project management process (adapted from Bass (2015; 2016) and Agh and Ramsin (2021)).

Program and Product Level	Portfolio Planning	Product Planning	Release Planning
	<p>Participants Internal stakeholders, Product Owners, Senior architects, technical leads.</p> <p>Description Create and define a portfolio backlog based on new -product data or in -process data. Ongoing activity, can occur before or after product planning.</p>	<p>Participants Product Owner, Internal stakeholders, Scrum Master, Dev Team, Other (e.g., specialists).</p> <p>Description Create and define product vision, high-level product backlog and product roadmap. Ongoing activity, duration depends on envisioned product.</p>	<p>Participants Product Owner , Internal stakeholders, Dev team, Scrum Master.</p> <p>Description Create and define release plan, Review constraints and minimum releasable features. Ongoing activity, initially conducted after product planning.</p>

Figure 3.2 Program and product level activities (based on Bass (2015; 2016) and Agh and Ramsin (2021)).

3.1.2 The Sprint Process

Figure 3.3 describes the four main activities in the sprint process. The sprint process is iterative, and each sprint has a duration of 2 to 4 weeks (Bass, 2015; Mucambe et al., 2019; Agh and Ramsin, 2021). The agile organizational structure consists of multiple cross-functional agile teams of 3 to 9 members, and each team is involved in the sprint activities (Agh and Ramsin, 2021). The sprint activities can be performed at a team level and a multi-team level. The team level activities are always performed in order to plan, synchronize and evaluate the team’s progress each sprint. The multi-team level activities can be performed in addition to the single team level activities based on the project’s coordination needs (Kalenda et al., 2018; Bass et al., 2019; Mucambe et al., 2019; Agh and Ramsin, 2021). The purpose of the multi-team level activities is to coordinate, synchronize, and enable communication and knowledge sharing across different agile teams. It is not clearly established when multi-team level or scaled agile activities should be utilized, but they can for example be used when more than three teams are working on the same product backlog (Agh and Ramsin, 2021).

The roles in the agile team are often involved in all team level activities in the sprint process, however the agile teams’ participation in the multi-team level activities differs. It is reported

that too many participants in these activities can lead to too long meetings, and to instead let a team representative or a leadership role from the agile team to attend the multi-team meetings can mitigate this issue (Agh and Ramsin, 2021).

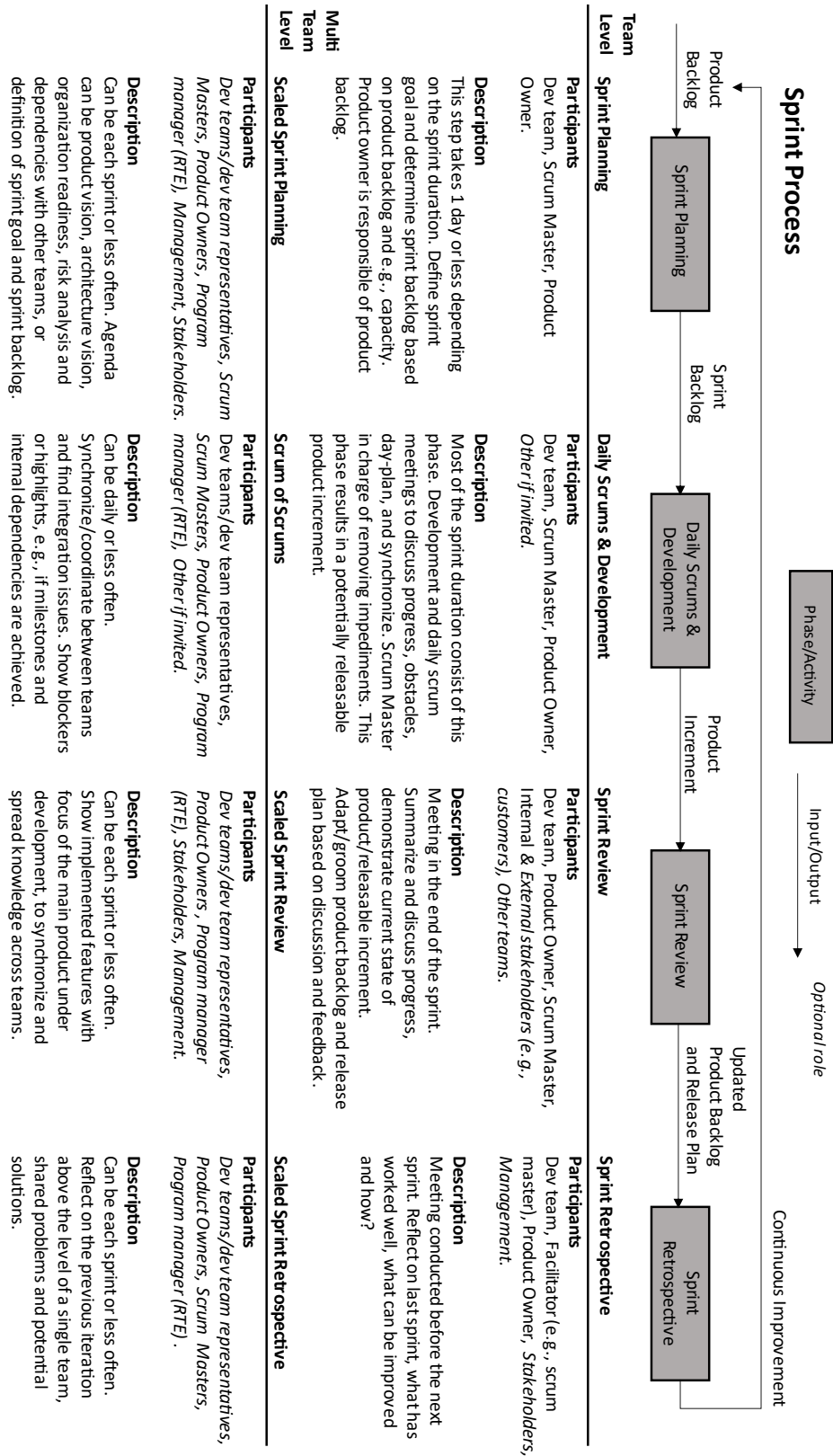


Figure 3.3 The sprint process (based on Paasivaara et al. (2009), Sommer et al. (2015), Bass (2015; 2016), Kalenda et al. (2018), Betta et al. (2019), Diebold et al. (2019), Mucambe et al. (2019), Rodriguez et al. (2019), Cruz et al. (2020), Freedrikson (2020), Theobald et al. (2020), Agh and Ramsin (2021), Tona et al. (2021)).

3.1.3 Roles in Agile

Table 3.1 presents an overview of the identified agile management roles on different process levels. The roles in the flow area are responsible for the workflow and for facilitating activities in the agile process. The roles in the product area are responsible for managing the backlog and thus prioritizing what and when different requirements should be developed for a product. The roles in the architect area are responsible for communicating a shared technical and architectural vision of the products being developed.

Table 3.1 Roles in agile.

Level	Area	Role	Description	Source
Sprint/ team	Flow	Scrum Master/Team Lead	Responsible for facilitating dev team sprint activities and processes and encouraging the dev team to follow agile practices.	Betta et al. (2019), Rodriguez et al. (2019), Gustavsson (2017).
Sprint/ team	Product	(Area) Product Owner	Responsible for maximizing the value of a product/part of a product. Manages (area) product backlog.	Mucambe et al. (2019), Bass (2014), Kalenda et al. (2018), Gustavsson (2017), Lueg and Drews (2022), Tkalich et al. (2022), Uludag et al. (2017)
Product Release /Multi- team	Flow	Program Manager/Rel ease Train Engineer	Responsible for facilitating multi-team sprint activities and processes. Encourages the teams to follow agile practices. Has connection with top-level and also facilitates coordination with product owners.	Mucambe et al. (2019), Gustavsson (2017), Lueg and Drews (2022), Uludag et al. (2017)
Product Release /Multi- team	Product	Chief Product Owner/ Product Manager	Responsible for maximizing the value of a product. Manages the overall product backlog and the product roadmap. Area product owner coordinates multiple product owners, through e.g., product owner sync meetings.	Mucambe et al. (2019), Bass (2014), Kalenda et al. (2018), Gustavsson (2017), Lueg and Drews (2022), Tkalich et al. (2022), Uludag et al. (2017)
Product Release /Multi- team	Architect	System/solut ion/informati on architect	Responsible for defining and communicating a shared technical and architectural vision of the product/solution on a multi-team level. This role could be scaled to an architecture team.	Kalenda et al. (2018), Gustavsson (2017), Uludag et al. (2017)

Three roles are most commonly introduced in agile organizations. These three roles are a part of the agile team: developers (referred to as development team), a scrum master and a product owner. The development team is self-organizing and responsible for developing the items in the sprint backlog (Betta et al., 2019; Rodriguez et al. 2019). The scrum master or team lead is a servant leader that facilitates and encourages the team to follow agile practices (Betta et al., 2019; Rodriguez et al., 2019). Another name for the scrum master/team lead can be agile coach according to Miller (2019), however Sadeh et al. (2022) mean that an agile coach is another role meant to help the organization to learn agile principles. The product owner is responsible for maximizing the value of a product, and creates, prioritizes and maintains the product backlog (Betta et al., 2019; Rodriguez et al., 2019). The product owner should maximize the value of the product through understanding the customer (ibid).

Additionally, there are other agile roles that can be utilized in agile organizations apart from the roles in the agile team. These additional roles are often applied in large-scale agile

implementations. One common practice is to scale the product owner role into multiple area product owners and a chief product owner or product manager, so that each area product owner is responsible for a subpart of a product’s features. Furthermore, introducing a program manager or release train engineer can be done to manage the coordination of multiple teams.

3.2 Critical Success Factors in Agile

Critical success factors are factors that are necessary for an organization in order to achieve its objectives. For the purpose of this thesis, CSFs in agile can provide parameters that are important to consider in order to understand the need for the agile project manager role. *Table 3.2* shows the sources used for the identification of CSFs in agile in this study.

Table 3.2 Sources used for identifying CSFs in agile.

Source	Article number	Focus
Abrar et al. (2019)	1	Agile management and large-scale projects
Hennel and Dobmeier (2020)	2	Agile management
Sithambaram et al. (2021)	3	Agile governance and management
Chow and Cao (2008)	4	Agile software development
Stankovic et al. (2013)	5	Agile software development
Aldahmash et al. (2017)	6	Agile software development
Naslund and Kale (2020)	7	Agile transformations
Khan et al. (2021)	8	Large-scale agile
Khoza and Marnewrick (2021)	9	Agile software development
Edison et al. (2022)	10	Large-scale agile
Dikert et al. (2016)	11	Large-scale agile
Kalenda et al. (2018)	12	Large-scale agile

Table 3.3 shows the identified CSFs based on the articles presented in *Table 3.2* CSFs that were identified by more than two articles have been included in the table. CSFs mentioned by more than six articles are marked in bold, which illustrates the seven most frequently mentioned CSFs in the literature review. A further description of the CSFs identified in the literature review is presented in the following sections of this subchapter.

Table 3.3 CSFs in agile mentioned in searched literature.

Category	CSF	Source
Managerial	Strong management support	1, 3, 5, 6, 7, 8, 9, 10, 11, 12
	Leadership	1, 2, 7, 8, 9, 10, 11, 12
	Changes to adaptive/light-touch/servant leadership	2, 4, 7
	Management knowledgeable in agile	2, 3, 4, 12
Organizational	Organizational culture	1, 3, 5, 6, 7, 8
	Understanding and acceptance of agile method values and principles	2, 3, 4, 7, 9, 11
	Define and communicate agile roles	2, 7, 12
	Customizing agile approach to organization	2, 7, 9, 10, 11, 12
People	Agile experience	1, 8, 12
	Training and education	1, 2, 4, 6, 7, 8, 9, 10, 11, 12
Communication and collaboration	Strong communication	1, 2, 3, 4, 6, 8, 9, 11, 12
	Collaboration/cooperation/teamwork	1, 3, 7, 8, 12
	Transparency	2, 7, 9, 10, 11, 12
	Knowledge sharing	1, 7, 8, 10
	Face-to-face meetings	1, 4, 8
	Customer collaboration/involvement	1, 3, 4, 5, 6, 7, 8
Process	Agile-oriented requirement management	1, 3, 4, 8, 9, 11
	Follow agile-oriented project management process	4, 5, 6
	Regular delivery of software and delivering the most important features first	4, 5, 6
Technical	Use of automated/appropriate software tools	1, 3, 7, 8, 12
Team	Team competence	1, 2, 3, 4, 5, 6, 8, 12
	Team autonomy/self-organizing teams	1, 4, 7, 9, 10, 11
	Team engagement/commitment/motivation	3, 4, 7, 8, 9
	Small teams	4, 7, 12
	Co-located teams	4, 7, 10

Managerial

Strong management support was the factor with the highest number of citations in the reviewed literature, and this factor is often mentioned as a CSF for most change methods (Naslund and Kale, 2020). Strong top and middle management support are crucial since they have the authority and power to remove impediments and address challenges that arise during the change effort (Dikert et al., 2016; Edison et al., 2022). Management support is thus vital for a successful transformation through enabling other critical success factors, such as strong communication of the change effort, motivating people, sufficient resource allocation, and training and education (ibid). Leadership is also a factor that is mentioned as a CSF for most change efforts (Naslund and Kale, 2020). Good leadership skills are important for motivating and engaging team members and for impacting the organizational culture (Khan et al., 2021). Dikert et al. (2016) argue that it is important to appoint change leaders to lead and coach people in the change effort.

Three articles specifically identified the CSF that the management style must change to an adaptive, light-touch or servant leadership style. It could be argued that this CSF can belong to the CSF leadership, however the two CSFs have been listed separately in the table to distinguish the articles that mean that the leadership style must change to a servant leadership style. A change towards a servant leadership style could have the same benefits as the leadership factor, such as motivating team members, but also enabling autonomy of teams (Hennel and Dobmeier, 2020).

Organizational

Organizational culture was frequently mentioned in the articles, which is a factor that also is commonly mentioned for most change efforts (Naslund and Kale, 2020). The organizational culture can enable a positive and open mindset towards change (ibid.). The organizational culture should be dynamic and cooperative with an agile mindset for achieving a successful agile transformation (Chow and Cao, 2008). Naslund and Kale (2020) state that changing the organizational culture is a difficult challenge that will require time, transparency, and persistence. Other factors within the organizational category are to create a common understanding of agile values, principles, and roles throughout the organization. Further, customizing the agile methodology is important for meeting the specific needs of the organization. Dikert et al. (2016) mean that a by-the-book agile implementation often is not feasible, however just skipping practices can prevent real necessary changes in the process and mindset. They argue that introducing new vocabulary is beneficial for changing ways of thinking.

People

Training and education from the people category are also one of the most frequently mentioned CSFs. Studies have shown that training and coaching in change efforts improve the chances of a successful transformation (Dikert et al., 2016). Training is important for communicating the purpose of the change efforts, as well as communicating practices, roles, and tools (Dikert et al., 2016; Naslund and Kale, 2020). Training and education can therefore ensure both competence and motivation amongst management and the workforce which can enable an agile and new way of working (ibid.). As previously mentioned under the managerial category, appointing change leaders or coaches can be useful for efficient training. Dikert et al. (2016) emphasize the importance of using both internal and experienced external coaches for a smooth agile transformation.

Communication and collaboration

Another CSF identified in the literature review is strong communication. Different articles had different interceptions of what strong communication refers to. Some articles meant that strong communication refers to effective communication and transparency of the change effort, while others described strong communication as effective cross-functional communication and knowledge sharing in the processes of the organization (Dikert et al., 2016; Aldahmash et al., 2017). To have strong communication of the change effort can enable other factors such as changes in organizational culture and creating an understanding of the agile methodology. To communicate the agile transformation should not only be done internally, it is also important to communicate the agile transformation to stakeholders externally (Naslund and Kale, 2020; Edison et al., 2022). Dikert et al. (2016) mean that it can be beneficial to educate stakeholders on agile practices to enable short-term planning while ensuring good relationships.

One commonly mentioned challenge in agile is coordination of autonomous teams in a multi-team environment (Dikert et al., 2016; Dingsoyr et al., 2018; Santos and Carvalho, 2021; Uludag et al., 2022), which can emphasize the need for strong cross-functional communication and effective knowledge sharing. Chow and Cao (2008) amongst others emphasize the importance of daily face-to-face meetings to ensure effective knowledge

sharing and coordination, while Uludag et al. (2022) and Kalenda et al. (2018) request solutions for how to reduce the number of meetings in the agile process. Kalenda et al. (2018) found that large-scale agile practices can result in too large and too many meetings, causing inefficient knowledge sharing and employees that might skip meetings or avoiding bring up issues.

Customer collaboration is also a commonly cited CSF in agile. Customer involvement is crucial for understanding customer needs (Kalenda et al., 2018), and will therefore affect project success (Chow and Cao, 2008). Edison et al. (2022) state that customer collaboration could be improved by scaling the product owner role.

Process and Technical

None of the CSFs mentioned in the process or technical category was among the most frequently mentioned factors. Factors identified in the process category are following agile oriented processes for project management, requirement management, and delivery strategy. Stanovic et al. (2013) mean that it is important to follow an agile project management process with a plan with few details and by embracing and incorporating changes into the project plan.

Challenges in requirements management have been identified in agile, such as ill-defined project requirements (Chow and Cao, 2008), and managing the gap between high-level requirements and requirements handled by a team level (Dikert et al., 2016). Therefore, it is important to follow an agile requirement management process with initial requirements defined at a high level and leaving room for adaptation (Chow and Cao, 2008; Abrar et al., 2019). Investing in learning to refine requirements and to recognizing the importance of the product owner role can enable a successful requirement process (Dikert et al., 2016). The delivery strategy should be to continuously deliver valuable and working software in short time scales, and to deliver the most important features first (Chow and Cao, 2008). Using efficient software tools is a factor that is important for efficient knowledge sharing and inter-team coordination (Abrar et al., 2019).

Team

That team members have high competence in agile development is also a commonly referred CSF (Abrar et al., 2019; Hennel and Dobmeier, 2020). Team competence is important for following agile-oriented processes (Chow and Cao, 2018). Team autonomy or self-organizing teams is also a factor mentioned in the studied articles. Naslund and Kale (2020) found a discrepancy between articles mentioning autonomy of teams as a CSF and some articles meaning that the autonomy of employees must be balanced with some remaining centralized decision-making. Other mentioned factors in the team category are motivated team members, small and co-located teams.

3.3 The Project Manager Role

This subchapter presents theory of the project manager role. First, the traditional project manager role and the role's common responsibilities are described. Then, previous research regarding the need for the agile project manager role and factors that affect the need is presented. Last, the responsibilities and competencies of the agile project manager role are

identified. The traditional project manager role's most mentioned competencies are also provided, to be able to identify changes.

3.3.1 The Traditional Project Manager

The project manager role is assigned by an organization to lead, manage, and coordinate a project (IEEE, 2004). The project manager is an important role in traditional project management methods (IEEE, 2004; ISO, 2020), and the project manager's leadership can be considered a CSF for traditional project management (Bergmann and Karwowski, 2019). Anantatmula (2010) means that the project manager's leadership is crucial for project success by motivating the team and creating an effective working environment.

Project management is accomplished through processes such as initiating, planning, executing, controlling, and closing, which are performed in the different areas of project management (IEEE, 2004; ISO, 2020). The project manager can be responsible or involved in almost all processes and project management areas (IEEE, 2004; ISO, 2020). However, the project manager's authority and responsibilities differ depending on the specific organization and project, and the project manager role can be more of a coordinator or expediter than a manager in organizations with mainly functional and less projectized characteristics (IEEE, 2004).

The main responsibilities that commonly lie with the project manager are presented in *Table 3.4*. The traditional project manager's responsibilities are based on the generally accepted Project Management Body of Knowledge (PMBOK) guide by IEEE (2004) and the ISO standard Guidance on project management (ISO, 2020). Fitsilis (2008) and Rosenberger and Tick (2018) state that the PMBOK framework provides a comprehensive overview of commonly used project management processes and techniques without being too specific. Papke et al. (2010) also analyzed traditional project management practices based on the PMBOK, but state that they believe that most project management standards capture a majority of what are considered the best practices in project management.

Table 3.4 Traditional project management practices.

Project management knowledge area	Description of project management activities	Traditional project manager's responsibilities
Integration management	Plan development and execution.	Review the governance and management requirements. Build on the project's initial plan, and add details such as activities, deliverables, and outputs.
	Integrated change control.	Control, manage and communicate authorized project changes.
Scope management	Initiation, scope planning, definition, verification and change control.	Define the scope of work, and targets for the team. Monitor progress against the project's scope.
Time management	Activity definition, sequencing, duration and schedule development and change control.	The schedule is developed under the direction of the project manager as it is an integrated part of the project plan. Dependencies of activities should be described.
Quality management	Quality planning, assurance, and change control.	Collect and analyze progress and performance of quality of work.
Resource management	Organizational planning, team leadership and development and change control.	Motivate project team and provide day-to-day supervision and leadership. Update and escalate resource requirements.
Communication management	Communication planning, information distribution, administrative closing. Communication change control.	Ensure communication and information distribution.
	Performance reporting.	Monitor the status of phases, work packages and activities. Validate deliverables and outcomes provided by the project. Forecast and report progress and performance against the project plan.
	Information and documentation management.	Maintaining the integrity and availability of information and documentation.
	Stakeholder engagement.	Ensure stakeholder engagement and communication takes place as planned. Monitor the status of planned and forecasted stakeholder engagement.
Risk management	Risk management planning, identification, analysis and risk response planning. Risk monitoring and change control of risks.	Identify, manage, communicate and report risks and issues.

3.3.2 The Need for the Agile Project Manager

Cohn and Schwaber (2003) already addressed the uncertainty regarding the agile project manager role two decades ago. Even though authors have addressed the agile project manager role for the last two decades, Shastri et al. (2021) stated more recently that “the role of the project manager in an agile project is somewhat of an unknown, because many agile frameworks and approaches do not address the role of the project manager”. None of the studied articles in this literature review has identified an agile framework that includes a project manager role. Despite the recommendation from agile framework theory, to not have an agile project manager, studies have found that the project manager title still exists in agile projects in practice.

Shastri et al. (2016) conducted a survey and found that 67% of the respondent's agile software projects had a project manager. Miller (2019) also conducted a survey and found that a project manager was present in 58% of the agile projects. However, Miller (2019) points out that the

survey results show that the product owner and scrum master only were utilized in 53% respectively 49% of the agile projects, indicating that the agile methodology was not rigorously applied in the respondent's projects. Therefore, based on the articles studied in this literature review, it can be concluded that it is not clear in theory how often the project manager role is utilized in agile projects and organizations.

Table 3.5 shows the articles used for exploring the need for the agile project manager role. Seven of the eleven sources used focused on analyzing the agile project manager role, while the other articles brought up information regarding the role even if their research focus were not in fact the agile project manager. Most of the studied articles took the self-organizing team, scrum master and product owner role into consideration when analyzing the agile project manager role, some articles mentioned the agile coach and product manager role, and only one of the articles mentioned the release train engineer role.

Table 3.5 Sources used for exploring the need for the agile project manager role.

Source	Research focus	Project characteristics
Shastri et al. (2016)	Agile project manager	Agile software development
Shastri et al. (2021)	Agile project manager	Agile software development
Sadeh et al. (2022)	Agile project manager	Agile projects
Gandomani et al. (2020)	Agile project manager	Agile software development
Miller (2019)	Project management tasks in agile projects & agile project manager	Agile projects
Noll et al. (2017)	Scrum master & project manager	Software development & scrum
Lappi et al. (2018)	Agile project governance	Agile projects
Agh and Ramsin (2021)	Scrum process	Software development & scrum
Alsaqaf et al. (2018)	Agile quality requirements engineering	Large-scale agile projects
Cohn and Schwaber (2003)	Agile project manager	N/A
Cornelius (2014)	Agile project manager	Large-scale agile (SAFe)

Table 3.6 presents a summary of what the studied articles shown in *Table 3.5* have proposed or mentioned regarding the need for the agile project manager role.

Table 3.6 Propositions of the need for the agile project manager identified in the searched literature.

Aspects of the need	Description	Source
Project managers should adopt another role due to overlap of responsibilities	Project manager should adopt the scrum master, agile coach, or product owner role.	Noll et al. (2017), Cornelius (2014), Agh and Ramsin (2021)
	Project manager should adopt the release train engineer role.	Cornelius (2014)
Role less important	Role is less important due to the team and agile roles taking on responsibilities.	Lappi et al. (2018), Sadeh et al. (2022)
Increased workload of role	Project manager role's workload can increase due to autonomous teams, increased risks and requirements of coordination.	Lappi et al. (2018), Sadeh et al. (2022)
Utilizing the role can affect agile practices	The frequency of agile practices that require coordination increased with a project manager present, while other agile practices were reduced.	Shastri et al. (2021)
Project manager required (generally)	Essential for project management tasks outside of team operations.	Miller (2019)
	Project manager is an important role as a servant leader.	Cohn and Schwaber (2003)
	Project manager is required; however, it might be structurally different from the traditional role.	Gandomani et al. (2020)

Studies have identified that the project manager frequently takes on both the project manager role and another agile role. The project manager role is stated to commonly take on the scrum master role (Noll et al., 2017; Miller, 2019; Shastri et al., 2022), sometimes the product owner role (Shastri et al., 2021) or a member of the development team (Cohn and Schwaber, 2003). The fact that the project manager also acts as other agile roles could indicate that there is an overlap of responsibilities, and that one person is sufficient for taking on the responsibilities of e.g., both the scrum master and project manager role. However, the duality of the role could also depend on other factors. Shastri et al. (2021) state that the duality of the role often is due to organizational resource constraints, or that the organization is transitioning to agile and that the project manager might be interim. Sadeh et al. (2022) found that it is more common that the agile project manager also functions as a scrum master in small organizations.

The required traditional project management tasks are modified or distributed to the development teams and agile roles, in the absence of a project manager role (Noll et al., 2017; Miller, 2019; Gandomani et al., 2020). Dingsoyr et al. (2018) mean that introducing extra roles can be a threat to the autonomy of the agile teams. Therefore, three of the studied sources state that the project manager role could adopt another agile role. Noll et al. (2017) mean that project managers should preferably adopt the product owner role. Cornelius (2014) means that the scrum master role could be comparable to traditional project manager responsibilities, and that the release train engineer role could be compared to a senior project manager role. He mentions that the project manager also could transfer to the product owner role.

On a similar note, studies have proposed that there is a reduction in the importance of the agile project manager role, due to new agile roles and autonomous teams (Lappi et al., 2018; Sadeh et al., 2022). A reduction of importance for the role implies that there is less need for

the role. However, the same two articles also refer to articles or respondents that mean that the workload of the agile project manager could potentially instead increase in the context of autonomous teams, increased risks, and requirements for coordination (Lappi et al., 2018; Sadeh et al., 2022). An increased workload of the agile project manager would instead imply a great need for the role. However, Sadeh et al. (2022) conclude that it is more likely that there is a reduction in the importance of the agile project manager role.

Miller (2019) means that other roles informally take on the project management tasks in the absence of a project manager, and that the agile project manager role is essential for the project management tasks that may be outside of team operations. Cohn and Schwaber (2003) and Gandomani et al. (2020) also argue that the project manager role is important in the majority of agile projects. Multiple articles have identified a need for the role depending on different factors, which will be elaborated on in the following subchapter.

3.3.3 Factors Affecting the Need for the Agile Project Manager

Shastri et al. (2021) state that future research is required to understand which factors influence management's choice to utilize a project manager. *Table 3.7* presents factors affecting the need for the role identified through the sources shown in *Table 3.5* in the previous chapter.

Table 3.7 Factors affecting the need for the agile project manager identified in searched literature.

Factors affecting the need	Description	Source
Agile organizational maturity	Project manager is required for immature agile teams.	Alsaqaf et al. (2018)
	Project manager is required during transition to agile from waterfall.	Shastri et al. (2021)
Organizational structure	Project manager is important for hierarchical and bureaucratic organizations.	Lappi et al. (2018)
Hybrid of agile and traditional project management process	Project manager is required when traditional project management practices still are required that are missing in agile methodologies.	Shastri et al. (2021)
	Required when agile is used at team level and traditional project management approach above team level.	Shastri et al. (2016)
	Required when agile is just applied to parts of a large project.	Agh and Ramsin (2021)
Team size	Higher probability of having a project manager for a larger team size (could be 5-10 members, or >25 members) due to increased management and coordination needs.	Shastri et al. (2016)
Distributed teams	Higher probability of having a project manager for distributed teams due to higher coordination and facilitation needs.	Shastri et al. (2016)
Multi-team project	Project manager might be required for multi-team projects.	Shastri et al. (2021)
Project size	Project manager required for large development efforts.	Agh and Ramsin (2021), Shastri et al. (2021)
Project complexity	Project manager required for complex development efforts.	Agh and Ramsin (2021)

Multiple articles propose that the need for the agile project manager role depends on different factors. One factor is the agile organizational maturity level. Alsaqaf et al. (2018) mean that

immature agile teams need a management role to coordinate, while mature agile teams will be less productive with a management role present. Similarly, Shastri et al. (2021) propose that the project manager role might be interim while the organization is transforming to agile. Shastri et al. (2016; 2021) and Alsaqaf et al. (2018) further mean that the agile project manager is required when a hybrid process of traditional and agile practices is utilized, since the agile roles will be insufficient for taking on the responsibilities of traditional project management practices.

Lappi et al. (2018) suggest that the project manager role is important for hierarchical and bureaucratic organizations. Shastri et al. (2016) state that larger teams or distributed teams have a higher probability of having a project manager role, indicating that there is a larger need for coordination and facilitating of these characteristics. Shastri et al. (2021) suggest that project size and multi-team projects may affect the choice to have an agile project manager. Agh and Ramsin (2021) mean that a project manager should be assigned to large and complex development projects, and that the project manager's responsibilities should be performed by another agile role otherwise. To conclude the factors found through the study, the reasoning of the articles is that factors that increase the need for coordination and facilitation increase the need for the agile project manager role.

3.3.4 Responsibilities of the Agile Project Manager

Studies have reported that an agile project manager mainly has traditional project management responsibilities (Miller, 2019; Shastri et al., 2021; Sadeh et al., 2022). *Table 3.8* shows the identified responsibilities and activities of the agile project manager. However, due to a limited set of articles presenting information on the subject, the table does not give a comprehensive overview of the common agile project manager responsibilities.

Table 3.8 Responsibilities of agile project manager mentioned in the searched literature.

Responsibilities	Source
Clearing obstacles and issues	Shastri et al. (2021), Sadeh et al. (2022)
Facilitation	Shastri et al. (2021), Lappi et al. (2018)
Increasing process efficiency	Shastri et al. (2021)
Ensuring quality control	Shastri et al. (2021)
Mentoring/Educating the team and stakeholders in agile practices	Shastri et al. (2021)
Coordination collaboration between customers, teams, technical specialists	Shastri et al. (2021), Lappi et al. (2018),
Protecting (Shielding the team from external interference)	Shastri et al. (2021)
Tracking project/team progress	Shastri et al. (2021), Sadeh et al. (2022)
Reporting on project status	Shastri et al. (2021)
Budgeting and forecasting	Shastri et al. (2021)
Managing personnel	Shastri et al. (2021)
Negotiating	Shastri et al. (2021)
Coordinating project logistics, such as release of deliverables	Shastri et al. (2021), Lappi et al. (2018)
Administration	Lappi et al. (2018)
Project planning	Lappi et al. (2018)
Deciding on requirements	Lappi et al. (2018)
Mediator between project and parent organization	Lappi et al. (2018)

Miller (2019) means that the agile project manager performs activities in all areas of traditional project management and provides no specific responsibility areas. Miller (2019) identified some overlaps, such as scope and stakeholder management, and means that these areas should be the product owner role’s focus according to agile frameworks. Lappi et al. (2018) mention that the agile project manager is responsible for administration, project planning, deciding on requirements, and that the role could be considered crucial as a mediator between the project and parent organization.

Shastri et al. (2021) state that an agile project manager performs activities such as facilitating (e.g., clearing obstacles and issues), mentoring (e.g., educating the team and stakeholders in agile practices), coordinating (coordinating collaboration between customers, teams, specialists), and protecting (shielding the team from external interference). All these activities are the scrum master’s responsibilities according to the scrum guide (Shastri et al., 2021). Other activities performed by the agile project manager, that are not a responsibility for a scrum role, are tracking project progress, reporting on project status, budgeting, and forecasting, managing personnel, negotiating, and coordinating project logistics (such as release of deliverables) (ibid.).

3.3.5 Competencies of the Agile Project Manager

Table 3.9 presents the articles used for identifying the competencies of the traditional and agile project manager. The articles presenting agile project manager competencies were scarce, and with no comprehensive list of ranked competencies. Most of the articles analyzing the agile project manager mentioned competencies that were subject to change, or extra important in an agile setting. Therefore, the traditional project manager competencies might still be of great importance in agile, even though they were not mentioned in the presented articles analyzing the agile project manager.

Table 3.9 Articles used for identifying project manager competencies.

Traditional		Agile	
Source	Article number	Source	Article number
Ribeiro et al. (2021)	1	Shastri et al. (2021)	9
Fisher (2011)	2	Ashan and Ho (2023)	10
Brill et al. (2006)	3	Tripathi and Goyal (2014)	11
Alvarenga et al. (2020)	4	Sutling et al. (2015)	12
Liikamaa (2016)	5	Mikhieieva et al. (2022)	13
Dillon and Taylor (2015)	6	Uwadi et al. (2022)	14
Moradi et al. (2020)	7	Cottmeyer (2013)	15
Ashan et al. (2013)	8	Lappi et al. (2018)	16

Table 3.10 shows commonly cited competencies of traditional and agile project managers based on the articles presented in Table 3.9. Traditional project manager competencies identified by more than two articles have been included in the table. Competencies that were identified by one single article have been included for the agile project manager, due to the scarcity of data. If one competency was identified for the agile project manager, then the articles that mentioned the competency for the traditional project manager have been included, even if the traditional project manager competency was mentioned less than three times. Table 3.10 is categorized based on the categories used by Ribeiro et al. (2021). The competencies marked in bold are the nine most stated competencies for the traditional project

manager role. The competencies marked in cursive are the ten most commonly stated competencies for the agile project manager role.

Table 3.10 Competencies of the traditional and agile project manager identified in the searched literature.

Category	Competence	Traditional	Agile
Influencing skills	Leadership	1, 2, 3, 4, 5, 6, 7, 8, 9	10, 12
	<i>Servant/facilitator leadership</i>	-	11, 15, 16
	Influence/persuasion	1, 2, 4, 6, 7, 9	-
	Motivating others	1, 2, 9	12, 14
	Conflict management	1, 2, 4, 5, 7, 9	9, 10, 13, 14
	<i>Negotiation</i>	1, 4, 6, 9	9, 10, 14
	<i>Mentoring/coaching</i>	-	9, 12, 15
Communication skills	Effective communication	1, 2, 3, 4, 5, 6, 7, 8, 9	10, 12, 13
Team working skills	<i>Collaboration/ Cooperation/Teamwork</i>	1, 4, 5, 6, 7	10, 11, 12, 13, 15
	Developing others	1, 5, 6	-
	Team building	1, 2, 8, 9	12, 15
	Delegation	1, 4, 8	-
	Trustworthiness	1, 2, 5, 9	12, 13
	Relationship building	4, 5, 6	11
Emotional skills	Interpersonal skills	1, 4, 6, 8	-
	Empathy	1, 5, 6	-
	Self-awareness	1, 4, 5	-
	Self-motivation	1	10
	Stress management/ emotional resilience	1, 2, 4, 5, 9	13
Contextual skills	Contextual awareness	1, 2, 3, 4, 5, 6, 9	10
	Flexibility/adaptability	1, 4, 5, 6, 7, 8	9, 11, 13
	Strategic alignment	1	12, 14
	Cross-functional focus	-	10, 13
Management skills	General management skills	4, 5, 6, 8	-
	Planning	1, 6, 8, 9	12
	Organization	1, 4, 5, 6, 8	-
	<i>Coordinating</i>	1	9, 10, 14
	Facilitating	-	9, 15
Cognitive skills	Problem-solving	1, 3, 4, 6, 7, 8	10, 12
	Decision-making	1, 4, 5, 6, 7, 8, 9	1, 14
	Analytical skills	3, 4, 5, 6, 7, 8	10
	Learning	1	13
Knowledge and experience	Technical expertise	1, 4, 8	-
	Experience	1, 4, 6, 7	10
Project management knowledge	Cost management	1, 7, 9	-
	Time management	1, 4, 7, 8	10
	Stakeholder management	1, 4, 6, 8	10, 12
	Project management methods	1, 6, 7	14
	Quality management	1, 7	9, 10
	Resource management	1, 7	14
	Change management	1	10, 15
	<i>Agile framework competency/ Knowledge of agile values, principles and methods</i>	-	10, 11, 12, 15
Personal skills and attributes	Achievement orientation	1, 4, 5, 6, 7	12
	Commitment	1, 4, 5, 6	-
	Initiative	1, 4, 5, 6	-
	<i>Innovative/creative</i>	1, 7	12, 13, 14
	Confidence	1, 5, 6	12
	Openness/Honesty	1	12, 13
	Agile mindset	-	10

Ashan and Ho (2023) identified agile project manager competencies based on job applications and found that the competencies with higher demand are the same as for traditional projects. The table shows that the influencing category got the highest citations of competencies for both the traditional and agile project manager. One difference in the influencing category is that influence or persuasion was one of the most frequently mentioned competencies for the traditional project manager, while a competency only identified for the agile project manager is mentoring or coaching skills.

Leadership is the most frequently stated competency for the traditional project manager, and for the agile project manager if the leadership and servant leadership competencies were combined. The traditional project manager's leadership skills can be considered a CSF for project success (Ashan et al., 2013). Fisher (2011) means that the leadership style for traditional project managers should be appropriate for the specific situation, and the leadership could e.g., be situational, charismatic, transitional, or visionary. Further, depending on the situation, the leadership could be directive, firm or demanding (ibid.). The literature review did not identify the servant leadership competency for the traditional project manager. It is stated that it is important that the leadership style of project managers changes from a command-and-control management style to a collaborative/adaptive/servant leadership style in agile projects (Cottmeyer, 2013; Tripathi and Goyal, 2014, Lappi et al., 2018). A servant leader acts as a facilitator that empowers and guides teams to reach their own conclusions, and similarly an adaptive leader facilitates and collaborates to continuously adapt their leadership (ibid). The concept of the servant leader is over two decades old and emphasizes the importance that the project manager serves and leads the teams rather than managing the project (Cohn and Schwaber, 2003).

Communication skills were amongst the 10 most frequently stated competencies for both the agile and traditional project manager. Likewise, the team working category was amongst the highest cited categories for both the agile and traditional project manager. One difference is that communication was one of the most frequently stated for the traditional project manager, while collaboration was the most common for the agile project manager. Cottmeyer (2013) means that the agile project manager must gain an understanding of the significance of collaborating with stakeholders and the team, however collaboration was still a competency identified for traditional project managers.

Other new competencies mentioned for the agile project manager are a cross-functional focus, facilitation, agile method knowledge, and an agile mindset. Agile method knowledge was one of the most frequently mentioned competencies for the agile project manager. Ashan and Ho (2023) and Tripathi and Goyal (2014) mean that a great understanding of agile principles is required for a successful agile project manager and to enable an agile mindset. Traditional project management practices were still identified for the agile project manager. However, Cottmeyer (2013) and Tripathi and Goyal (2014) mean that an agile project manager must adapt their approach to managing traditional project management practices, by taking a servant leadership and facilitation approach focusing on fostering collaboration.

3.4 Summary

The frame of reference chapter has presented information in three sections. First, the agile methodology was introduced, including the agile process and roles. Then, CSFs in agile were identified. Last, the project manager role was presented. The project manager chapter introduced traditional project manager practices, followed by the need for the agile project manager role and factors that affect the need for the role. The project manager chapter ended with responsibilities of the agile project manager role, and competencies of the project manager role in a traditional and agile setting. The three sections together provide a foundation of knowledge for exploring the agile project manager role. The need for the role and the definition of the role depends on the other two sections, shown in *Figure 3.4*. As a reminder, the focus of the study lies with the agile project manager role.

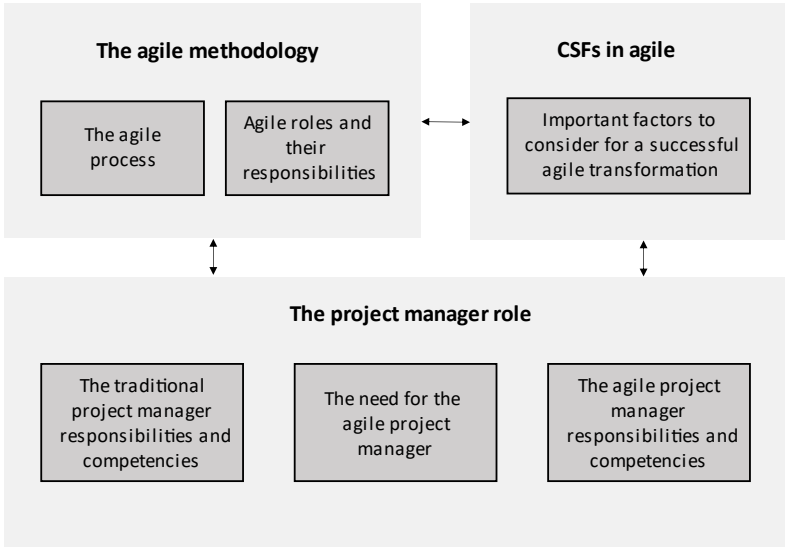


Figure 3.4 Illustration of the contents of the frame of reference chapter.

The agile methodology chapter introduces the reader to the agile process and roles. This section describes the agile principles, where the project manager is absent. This section builds knowledge for the agile methodology, so that an understanding of the need for and definition of the agile project manager role can be elaborated on.

The CSFs in agile chapter presents factors that are important to consider for a successful agile transformation. The most commonly mentioned CSFs in the literature review were strong management support, leadership, organizational culture, training and education, strong communication, customer collaboration and team competence. Understanding the CSFs in agile provides a foundation for understanding the need for the agile project manager role.

The project manager chapter gives the reader information on the need for the agile project manager role, and factors that affect the need according to the literature. Further, the key responsibilities and competencies of a project manager in a traditional and agile setting are presented, in order to identify differences between the traditional and agile project manager. The key findings from the project manager chapter are summarized in *Figure 3.5*.

Need for agile project manager	Traditional project manager	Agile project manager
<p>Need for the agile project manager</p> <ul style="list-style-type: none"> • Proposition: Role not required, role less important due to shared responsibilities with agile roles and self-organizing teams • Proposition: Role required, increased workload of role due to increased risks and requirements of coordination <p>Factors affecting the need for the role</p> <ul style="list-style-type: none"> • Agile organizational maturity • Organizational structure • Hybrid of agile and traditional project management process • Project size • Project complexity • Team size, distributed teams, multi-team projects 	<p>Key responsibilities</p> <ul style="list-style-type: none"> • Build on the project's initial plan • Control project changes • Track and forecast progress • Ensure communication • Validate deliveries • Motivate and lead project team • Reporting • Information and documentation • Ensure stakeholder engagement • Report risks and issues <p>Key competencies</p> <ul style="list-style-type: none"> • Leadership • Influence/persuasion • Conflict management • Effective communication • Contextual awareness • Flexibility • Problem-solving • Decision-making • Analytical skills 	<p>Key responsibilities</p> <ul style="list-style-type: none"> • Traditional project management practices, such as • Coordination • Facilitation • Clearing obstacles and issues • Tracking project and team progress <p>Key competencies</p> <ul style="list-style-type: none"> • Leadership/servant leadership • Mentoring/coaching • Conflict management • Negotiation • Effective communication • Collaboration • Flexibility • Coordinating • Agile framework competency • Innovative/creative

Figure 3.5 Summary of the project manager chapter.

4 Empirical Data

The results of the empirical study are presented in this chapter. First, the organizational structure, roles and processes at YS are described. Then the findings from the empirical data collection of CSFs in agile, the need for the agile project manager and the role's responsibilities and competencies are presented.

4.1 Vehicle Service Information

To explore the need for the agile project manager role at YS, the organizational structure, roles, and process have been investigated and are presented in this subchapter. The information presented in this subchapter has been collected through dialogue, interviews, and documents.

4.1.1 Organizational structure

The agile transformation includes a reorganization of YS. Scania R&D will change from a traditional hierarchical organization to a value flow-based structure, see *Figure 4.1*. The team is the smallest unit in the new landscape, consisting of five to twelve people that addresses a specific part of the value pull. A team should have all the competencies and skills to perform a common task. Six to ten teams are structured into a value creation team (VCT), synchronized to work towards the same value pull. The VCT should be large enough to have true cross-functional competence. The value coordination flow (VCF) coordinates four to ten VCTs to deliver the value of a critical development area for Scania. How YS will be organized in the agile organizational structure is not yet determined. However, there are discussions regarding if it might be appropriate if parts of YS should restructure to a VCT for developing service information.

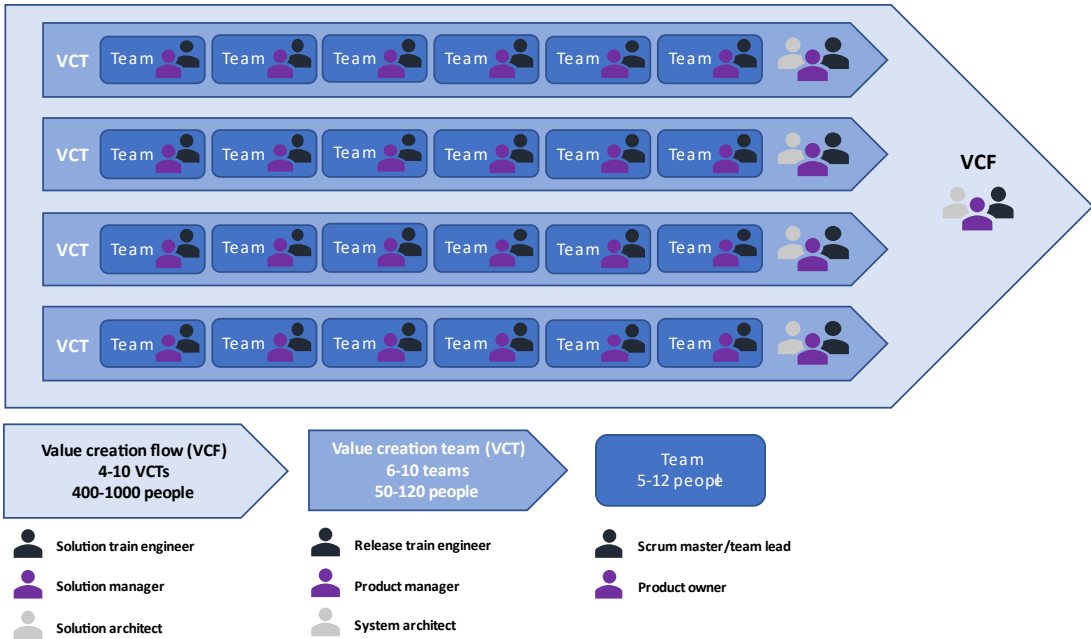


Figure 4.1 The organizational structure of the agile value flow at Scania.

4.1.2 Management roles

The management roles involved in YS's project management process vary in different projects and departments. Larger and more complex projects have been assigned project managers, while smaller projects do not always have project managers. Some organizational units and projects have introduced agile roles, while others have not. The project manager role is still included in some projects that are mainly following an agile process. Agile management roles that have been introduced, or are planned to be introduced, are scrum master and product owner at a team level, and release train engineer, product manager and architects at a VCT level.

Appendix B presents the agile roles that in some cases have been introduced, or are planned to be introduced at Scania R&D. The appendix is based on guidelines from internal documents. These roles and their responsibilities are in line with the agile roles presented in the literature review, however the appendix includes more information compared to the findings of the literature review. The guideline is to have one scrum master and one product owner per team, however sometimes these roles can manage more than one single team depending on the circumstances. It is also proposed that there should be one of each management role at a VCT level per VCT. Additionally, corresponding roles to the VCT management will be introduced at a VCF level and will thus manage projects from a portfolio perspective.

4.1.3 Product Development Process

This subsection will provide information on YS's current product development process as well as the agile process.

PD process

Scania R&D uses a product development (PD) process similar to a stage-gate or waterfall method for many projects, see *Figure 4.2*. The PD process describes the decision points, timelines, milestones, meetings, documentation, and deliveries that guide each project. The PD process has multiple subprocesses, describing the process for different departments and functions. YS has its subprocess and is mainly involved in the concept and product development phases of the PD process, called yellow and green arrow. YS's subprocess has its own milestones, activities, decision points, documentation and deliveries which all are coordinated after the PD process's general milestones. Targets, such as uptime repairability and maintainability and repair and maintenance costs, are defined in the assignment directive at the start of the green arrow, and then followed up during the project.

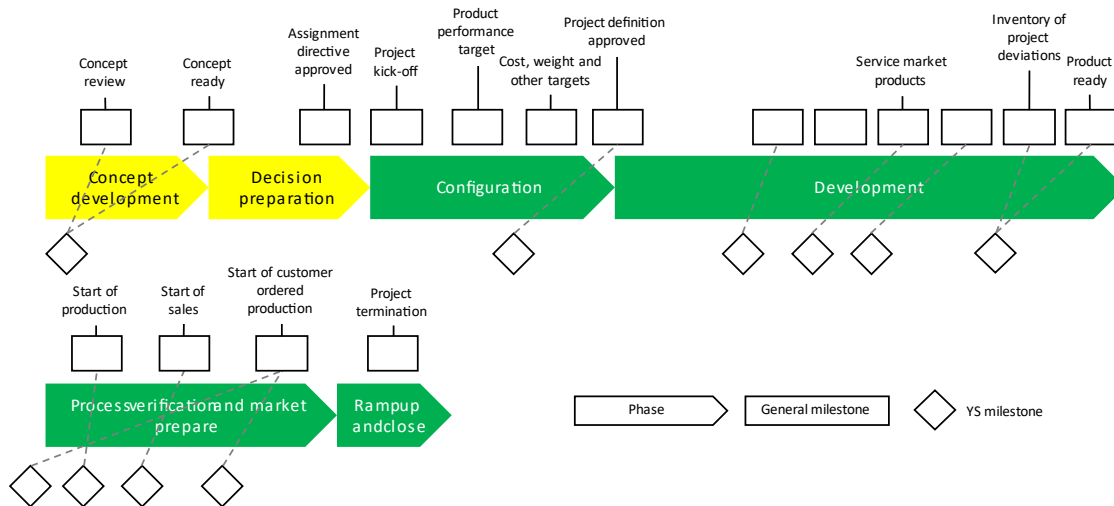


Figure 4.2 The PD process at YS.

The PD process illustrates integration points between different functions, providing a basis for coordinating deliveries. Different projects have different requirements for integration and cross-functional communication. YS communicates and coordinates with other R&D units, purchasing, sales and marketing, production, and market representatives or customers. YS delivers to purchasing for planning sourcing of e.g., spare parts or special tools. YS has deliveries to sales and marketing, who manages pricing and information such as deliveries and methods to workshops. YS integrates with different construction development units within R&D and the project office. YS sometimes also cooperates with production e.g., testing. Additionally, some projects have close contact with markets.

Agile process

One aim of the agile transformation is to drive development as value streams instead of projects. The terminology for agile-driven development is a flow initiative. Multiple flow initiatives are coordinated into a strategic program, which can be compared with a project portfolio. However, the term project will be used for agile-driven development as well as traditional-driven development in this thesis.

The agile transformation includes changes in the product development process, and the agile process has been introduced for some projects. The agile development process at YS is proposed to consist of iterative time periods with a horizon of ten weeks. Each period of ten weeks is called a program increment, and planning and evaluation are therefore conducted on a ten-week basis and can be compared to the multi-team sprint activities presented in the literature review. One program increment consists of five sprints of two weeks each, where planning and evaluation also are conducted each sprint. The agile process is illustrated in *Figure 4.3*.

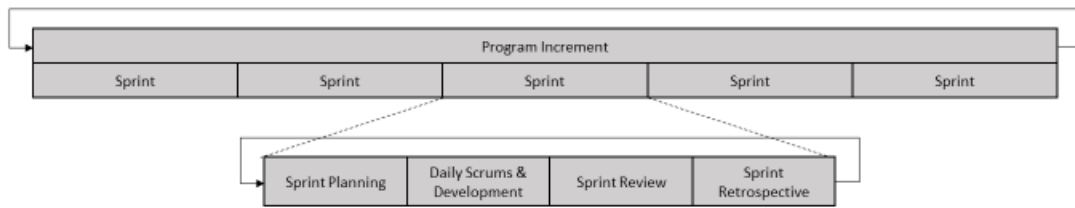


Figure 4.3 The agile process at Scania R&D.

Even though the agile process is aimed to be introduced for all projects, it is currently stated that the PD process and subprocesses still will be the general guide, and base for scaling initiatives. Therefore, current guidelines mean that the PD process will be kept in the agile organization, however it might be modified and adaptable depending on different projects.

Scania has introduced a mindset model to complement to the PD process to support an agile strategy. The model describes that all initiatives should be scaled and configured after their specific demands and criteria such as size, time, complexity, and risks, in order to minimize resources and time. Important aspects of the agile mindset are cross-functional collaboration, customer interaction, minimum viable product, continuous integration, and incremental development. This mindset aims at enabling a more flexible PD process and reducing waste for projects that might not be required or appropriate to follow the entire generic PD process.

4.2 Interview Results

The findings from the interviews are presented in this subchapter. The findings from the interviews have been validated through a workshop. This subchapter is structured according to the order of the RQs, so that CSFs in agile are first presented, followed by the need for the agile project manager role, and last the responsibilities and competencies are presented.

4.2.1 CSFs in Agile at YS

Table 4.1 presents the 14 CSFs identified through the interviews. The CSFs listed in bold are factors mentioned by more than three interviewees, and CSFs listed in cursive are factors that have not been identified in the literature review. The found CSFs are explained below the table.

Table 4.1 CSFs in agile from the data collection.

Category	CSF	Description	Frequency
Managerial	Strong management support	Management supports the change effort and addresses managerial challenges and more.	3
	Management knowledgeable in agile	Management understands and accepts agile method values and principles.	3
	Mindset change to servant leadership	Management style should change to a servant leadership style.	1
	Leadership	Have people with the right competence in management roles.	1
Organizational	Clarity of purpose, organizational structure and process	Define and clearly communicate the purpose and process on a strategic and operational level.	5
	Define and communicate agile roles	Define and clearly communicate the agile roles, and the roles' responsibilities and authorities.	4
	<i>Aligning the organization to the needs</i>	Reorganize and align the organizational structure based on the needs of the development process.	2
Communication and collaboration	Transparency and strong communication	Ensure transparency and strong communication internally and externally.	4
	Efficient cross-functional collaboration	Efficient cross-functional collaboration is required to ensure efficient synchronization and coordination between functions.	4
	Customer focus and collaboration	Focus on customer value throughout the process and collaborating with customers is important.	3
Process	<i>Sufficient long-term perspective of goal and plan</i>	Ensure a sufficiently long-term perspective of goals and plan for activities with longer lead-time.	2
	<i>Risk management</i>	A sufficient risk management process to identify risks, ensure a cohesive overview of risks and their consequences.	1
	<i>Agile planning</i>	Plan work so that time and resources are available for unforeseen activities and changes in each sprint.	3
Financial	<i>Ensuring availability of resources</i>	Ensure needed resources are available. Have dedicated team members that can work focused in each sprint.	6

Managerial

Strong management support and that management is knowledgeable in agile were mentioned by three respondents respectively. Interviewees stressed the importance that management must support, understand, and accept agile values and principles. Respondents mentioned that for management to correctly support agile values, they must be knowledgeable in agile. Management has a strong impact on designing the future agile process, and that management both supports and understands agile values are therefore important. One interviewee stated that: "Management must understand that an agile process is not meant for following a set time plan and scope, it is meant for being agile".

Leadership and a change towards a servant leadership style are factors that were mentioned once in the interviews. One respondent stated that it is crucial to have the right competence in leadership roles, regardless of which roles will be utilized. A change toward servant

leadership style was perceived as important for enabling agile principles such as adapting quickly to changes. One respondent mentioned that it is important to define ownership and responsibilities of certain activities and deliveries, since it might be difficult for a manager to adapt to a servant leadership style if they are held responsible for the success and outcome of a delivery.

Organizational

One of the most frequently mentioned factors in the interviews was clarity of purpose, organizational structure, and processes. This CSF could be considered a reformulated factor from the literature review: understanding and acceptance of agile method values and principles. However, the reformulating was done to reflect the interview results more correctly, where interviewees stressed the importance of defining and ensuring a common clearly understood purpose and process at YS, rather than just understanding agile method values and principles. One respondent stated that it is important that a common understanding of the process is achieved for all units, so that different units work according to the same principles. One respondent mentioned that different units seem to have applied agile differently, which could be due to different needs, or an unclear definition of the process.

Furthermore, defining and communicating agile roles was one of the most mentioned factors in the interviews. Interviewees stated that they are not sure of what the agile roles entail, and that responsibilities and authorities should be clearly defined and communicated. In some cases, the interviewees have contact with agile roles such as product owners, architects and release train engineers in their projects, but with a lack of understanding of the roles. Multiple respondents stated that they thought it was difficult to provide answers to some questions in the interview, due to a lack of clarity and understanding of the future process and poorly understood agile roles.

The third CSF in the organizational category, aligning the organization to the needs, refers to the importance of restructuring the organization depending on the needs of the development process. This factor can be compared to the factor found in the literature review: customizing the agile approach to the organization. Rather than customizing the agile approach to the organizations, two respondents stated that it is important to align the organization based on the needs. The two interviewees saw benefits of transforming the organization but stated that it is important to dare to restructure the organization and process based on the needs.

Communication and collaboration

The two CSFs, transparency and strong communication and efficient cross-functional collaboration are interrelated. Both relate to the ability to share knowledge between different units and are two of the most frequently mentioned factors in the empirical study. Effective communication and collaboration are stated to be crucial to coordinate work for responding to changes quickly. Also, to collaborate with the customer and ensure a customer focus in the process is identified as a CSF. One respondent mentioned that it should be clear in the process how to ensure customer communication. One interviewee also stated that it is especially important to not forget the workshops as customers in the agile process with iterative development and a shorter planning horizon, since the primary customers find high value in a vehicle that is easily maintained and repaired.

Process and financial

Two respondents mentioned that someone should have the responsibility of ensuring a long-term perspective of the goal and plan to avoid bottlenecks that might occur by having a too short planning horizon. Concern was expressed regarding the focus of iterative short-term planning in the agile process, since YS deals with projects that have activities with a lead-time of over ten weeks, such as ensuring the availability of test resources. One respondent meant that it is important to ensure an efficient risk management process, to identify risks, and ensure a cohesive overview of risks and their consequences.

A CSF mentioned by three respondents is agile planning, which refers to planning each sprint with buffer capacity to be able to embrace unforeseen activities and changes that might occur. However, one of the respondents stated another solution to this issue can be to plan sprints without buffer capacity, and to not allow changes in priorities throughout the specific sprint. Furthermore, one respondent mentioned that currently it is seldom possible to plan sprints less than 100%. This could relate to the financial CSF ensuring availability of resources.

Ensuring availability of resources was the most frequently mentioned factor in the interviews. Most respondents stated that it is not clear how some roles, such as method engineers, will be able to participate as required in the agile process. Two respondents stated that it is not clear how some roles should be able to participate in multiple different VCTs and with the high number of required meetings. One respondent thought that it might be an issue of too few resources, or an ineffective agile process, or potentially a combination of the two.

4.2.2 Need for the Agile Project Manager Role at YS

To build an understanding of the need for the agile project manager, the interviewees were asked to grade the need for the role and motivate their answer, see the interview guide in *Appendix A*. It was perceived as difficult to grade the need for the role for most respondents, and not all respondents were confident to provide a quantitative figure. Many respondents stated that they did not have a sufficient understanding of the future process, organizational structure, or roles, which made it difficult to provide a grading. Therefore, the grades alone do not reflect a fully representative result of the need for the role. *Table 4.2* shows the results of the grading, where six out of nine interviewees provided a grading. The factors that affect the need for the project manager role were found through open questions in the interview guide, and thus a different number of respondents have provided a grading for different factors.

Table 4.2 Scoring of the need for the agile project manager role at YS from the empirical study.

Need for an agile project manager role	Average scoring	Variance	Number of respondents
Low agile organizational maturity	4,5	0,5	2
Hybrid of stage-gate/waterfall and agile project management	3	-	1
Small and uncomplex projects with no cross-functional requirements	1	0	2
Large and complex projects with cross-functional requirements	4,5	0,5	2
Agile – in general	2,63	3,56	4

The respondents provided very similar results in the first four rows of the table. However, the responses of the need for the role in an agile setting in general had high variance, and the responses differed between very low scores and high scores. Half of the respondents graded

the need as one (no need for the role), meaning that agile roles and autonomous teams will make the role unnecessary. The other half graded the need as four or higher (great need for the role), meaning that the role still will be important for e.g., ensuring a cohesive perspective of deliveries and time-plan. The variances in the responses might be affected by the interviewees' attitude towards agile, and previous knowledge regarding the method. The variances in responses could also be affected by the characteristics of the projects that the interviewees are involved with.

Although the interview results provided quantitative data with high variance, and a different number of answers for different factors, a better understanding of the need for the agile project manager role was enabled by combining the rankings and discussions of the interview questions. *Table 4.3* presents the factors that affect the need for an agile project manager based on the discussion and ranking combined. Further, the results presented in the table have been validated through a workshop. The factors that affect the need for the agile project manager are interrelated, so the total need for the role depends on the combined factors.

Table 4.3 Factors affecting the need for the agile project manager at YS based on the empirical study.

Category	Factors	Measure of factor	Need for agile project manager	Description
Organizational aspects	Agile organizational maturity	Low	Greater	There is a great need for an agile project manager role during the transformation journey to agile and when the organization has a low maturity level in agile without clearly defined and understood roles and processes.
		High	Smaller	There is a smaller need for an agile project manager role when the organization has obtained high agile maturity.
	Organizational structure	N/A	N/A	The need for the agile project manager role depends on the organizational structure.
Process aspects	Hybrid of traditional and agile project management	Mainly hybrid process	Greater	If YS keeps many parts of their stage-gate/waterfall process in a project there is a greater need for an agile project manager role compared to when only an agile project management process is applied.
		Mainly agile process	Smaller	If YS keeps few or no parts of the stage-gate/waterfall process in a project, there is a smaller need for an agile project manager role.
Project aspects	Level of cross-functional requirements	Low	Smaller/no need	Projects that do not require a lot of cross-functional coordination with other functions or VCTs have a smaller or no need for an agile project manager role.
		High	Greater	Projects that require a lot of cross-functional coordination with different functions or VCTs have a greater need for an agile project manager role.
	Project size	Small	Smaller/no need	A small project size with a short timeline, few teams and few employees have smaller or no need for an agile project manager role.
		Large	Greater	A large project size with a long timeline, many teams and many employees have a greater need for an agile project manager role.
	Project complexity	Low	Smaller/no need	A project with low complexity has a smaller or no need for an agile project manager role.
		High	Greater	A project with high complexity has a greater need for an agile project manager role.

Organizational aspects

The empirical results show that the need for the agile project manager depends on the agile organizational maturity level, which was a factor also found through the literature review. With a high maturity level, other agile management roles will have been introduced with clearly understood responsibilities, and a clearly understood process will be in place. Interviewees thought that the need for the role would then be decreased. Respondents discussed that a lower agile maturity level would increase risks and issues due to unclear responsibility areas of different roles and an unclear process, which creates a need for the role. One respondent meant that the need for the project manager role might even increase during the transformation journey compared to the traditional PD process due to increased uncertainties and issues.

Two respondents mentioned that the need for the project manager role depends on how YS will be organized. It is not yet determined how units of YS will be structured, and which units that will be transformed into a VCT or VCF, and whether some functions will be divided into teams structured into different VCTs. One respondent stated that it is difficult to understand the need for the role before it is determined how the organizational structure will look like. However, the respondents did not provide further statements regarding exactly how the organizational structure affects the need for the role.

Process aspects

Another factor that affects the need for the role was found to be if a hybrid process of a stage-gate or waterfall and agile process is introduced. This factor was found both through the empirical and theoretical studies. If the PD process is supposed to be kept but adapted to the requirements of specific projects, the need for the project manager role is greater compared to if projects are mainly agile-driven. Respondents answered that one very important competence of the project manager role that is missing in other agile roles is PD process competence, which creates a need for the role in the case of a hybrid process. They argued that other agile roles would have a too high workload by also handling the activities and responsibilities required in a hybrid process, creating a need for the project manager role.

Project aspects

Other factors that affect the need for the role were found to be project specific, such as cross-functional requirements. A project that requires a lot of cross-functional coordination has a greater need for an agile project manager, while projects that are mainly driven in a specific flow such as a single VCT were stated to not require a project manager role. Respondents argued that the agile management roles at a VCT level would not be sufficient for projects that require a lot of coordination with other VCTs. The factor cross-functional requirements was not identified in the literature review, however articles stated that when coordination needs are higher, then the need for the project manager is higher.

Respondents meant that a large project size and a high project complexity also have a higher need for a project manager role. These factors were also found in the literature study. Respondents were not sure how to define a large project size or high project complexity. However, a large project size was stated to include multiple teams, many employees, and a longer timeline. The project size factor therefore also relates to the factor multi-team projects found through the literature review.

One respondent stated that the need for the project manager role depends on how well the project is progressing. They meant that if parts of a project have a lot of issues, then there is a larger need for the project manager role for stepping in and helping teams that experience difficulties. The following statement from one interview illustrates the explained reasoning: “A project manager is never required if everything is working as it should, however that is never the case”.

4.2.3 Responsibilities of the Agile Project Manager Role at YS

The interviewees were asked to grade and explain how well the areas of project management were fulfilled in the agile process without a project manager, see the interview guide in *Appendix A*. The purpose was to discuss and identify which areas of project management might be of importance to have a project manager role. Again, it was perceived as difficult for many respondents to provide a grading, but the discussion combined with the ratings enabled insights into the question.

Stakeholder engagement was the project management area that got the lowest grading. Interviewees identified a risk of insufficient stakeholder engagement without a project manager, with the reasoning that it is not clear which other role the responsibility lies with to identify and ensure communication and collaboration with stakeholders, and that teams might work too focused within the team and VCT. Thereafter, planning and reporting also got a lower ranking. A risk was identified of insufficient long-term planning. Another risk identified was insufficient planning with consideration of integration points and coordination needs. Further, it was stated that if a hybrid process were introduced, there would be a risk of insufficient reporting without a project manager role. It was perceived that risks and issues management also could benefit from having a project manager role, due to the risk of an insufficient overview of aggregated risks.

Table 4.4 presents the most important responsibilities of an agile project manager role according to the interviews. The results show that the agile project manager’s main responsibilities should include coordination, ensuring communication, facilitation, planning, escalating risks and issues, administration and removing obstacles. These responsibilities are in line with the main responsibilities of a traditional project manager at YS today. To ensure a cohesive perspective of deliveries and time-plan was stated to be even more important in an agile setting, and respondents argued that no other agile role takes on that responsibility. Other mentioned responsibilities are to ensure reporting, ensure a long-term perspective, process development, and help to track key performance indicators (KPIs). Two interviewees emphasized that the responsibilities of the project manager role depend on the needs of the specific project.

Table 4.4 Responsibilities of the agile project manager identified in the empirical study.

Responsibilities	Frequency
Coordinate/synchronize	4
Ensure a cohesive perspective of deliveries and time-plan	4
Ensure communication	3
Facilitate	3
Planning	2
Escalate risks and issues	2
Administration	2
Remove obstacles	2
Ensure reporting	1
Ensure long-term perspective	1
Process development	1
Help to track KPIs	1

4.2.4 Competencies of the Agile Project Manager Role at YS

Table 4.5 presents the results of the most important competencies of an agile project manager based on the interviews. Competencies that were stated to be especially important for an agile project manager compared to a traditional one is agile, agile method competency, and servant leadership skills. One respondent mentioned that being structured might be of higher importance in an agile setting compared to a traditional setting, in order to handle increased uncertainty and changes.

The other competencies were found to be important for a project manager both in an agile as well as traditional setting, whereas effective communication, interpersonal skills, and leadership skills were frequently mentioned. Some respondents meant that sometimes it is sufficient if a project manager has access to another role with a certain competency, and thus that the project manager themselves does not have high requirements of obtaining the competency, such as structured and technical expertise. Another finding is that even though collaboration and servant leadership skills only were mentioned once respectively in the interviews, the importance of these two competencies was stressed in the workshop.

Table 4.5 Competencies of an agile project manager role identified in the empirical study.

Competencies	Frequency
Effective communication	6
Agile/flexible	5
Interpersonal skills	4
Leadership skills	3
Structured	3
Agile method competency	2
Collaboration	1
Servant leadership skills	1
Analytical	1
Motivate others	1
Technical expertise	1
Problem-solving	1
Project management process competence	1

5 Analysis

The analysis chapter presents the analysis that has been performed of data collected through the theoretical and empirical studies. Pattern matching has been conducted to compare the information found through the studies. The chapter is structured accordingly to the RQs, and a discussion of the analysis is presented at the end of each subchapter.

5.1 Critical Success Factors

The analysis of the CSFs was done through pattern matching of data collected through the theoretical and empirical study. The complete lists of CSFs identified through the theoretical and empirical study are presented in *Table 5.1*.

Table 5.1 CSFs in agile identified in the theoretical and empirical studies.

Category	CSF	Frequency literature review (out of 12 articles)	Frequency interviews (out of 9 interviewees)
Managerial	Strong management support	11	3
	Leadership	8	1
	Changes to adaptive/servant leadership	3	1
	Management knowledgeable in agile	4	3
Organizational	Organizational culture	7	-
	Understanding and acceptance of agile method values and principles/Clarity of purpose, organizational structure and process	6	5
	Define and communicate agile roles	3	4
	Customizing agile approach to organization	6	-
	Align the organization to the needs	-	2
People	Agile experience	3	-
	Training and education	10	-
Communication and collaboration	Strong communication	9	4
	Collaboration/cooperation/teamwork	5	4
	Transparency	6	4
	Knowledge sharing	4	-
	Face-to-face meetings	3	-
	Customer collaboration/involvement	7	3
Process	Agile-oriented requirement management	6	-
	Follow agile-oriented project management process	3	-
	Regular delivery of software and delivering the most important features first (minimum viable product)	3	-
	Sufficient long-term perspective of goal and plan	-	2
	Risk management	-	1
	Agile planning	-	3
Technical	Use of automated/appropriate software tools	5	-
Financial	Ensure availability of resources	-	6
Team	Team competence	8	-
	Team autonomy/self-organizing teams	6	-
	Team engagement/commitment/motivation	5	-
	Small teams	3	-
	Co-located teams	3	-

Managerial

All four CSFs in the managerial category were identified both in the literature review and the empirics, strengthening the validity of the factors. However, strong management support and leadership were two factors that were amongst the most frequently mentioned factors in the literature review, while they were not as frequently mentioned in the interviews. The literature therefore ranks these two managerial factors higher compared to the empirics. The literature stated that strong management support is important for e.g., addressing challenges, enabling strong communication of the change effort, and sufficient resource allocation. The discussions in the interviews also revealed that management support is important for enabling an efficient and successful agile process, since management has impact and power over the requirements put in the process. Furthermore, good leadership skills are important for e.g., motivating and engaging people according to theory, but the empirical study mentioned the importance of leadership skills for ensuring efficient communication and collaboration in the development process. One factor that was more commonly mentioned in the empirics was that management is knowledgeable in agile, to achieve appropriate management support.

Organizational

Organizational culture is one of the most frequently stated factors in the literature review that was not identified in the empirical study. The organizational culture is important for reducing resistance to change and to achieve an agile mindset and can be impacted by the factors strong communication of the change effort and training. Even though organizational culture was not mentioned as a CSF in the interviews, respondents still discussed that one challenge is not daring to change the organization and processes thoroughly. The factor of customizing the agile approach to the organization was also not mentioned as a CSF in the interviews. However, respondents still discussed the importance of customizing the agile approach to specific development efforts.

The factors to create clarity of purpose, organizational structure, and process, and to define and communicate agile roles were factors that were amongst the most frequently mentioned in the interviews. These factors were more frequently stated in the empirics compared to the literature. The literature emphasizes the importance of understanding agile values and principles, while the respondents focused more on the importance of a common definition and understanding of the purpose, process and roles applied at YS, regardless of it is agile or not. The interview results especially emphasize the importance of communicating agile roles and their responsibilities. These factors also relate to the factor's strong communication of the change effort and training and education, which can enable clarity of the purpose, process, and organizational structure and roles.

People and Communication and collaboration

The factor training and education was the second most frequently mentioned factor in the literature review, while it did not appear once in the interviews. However, training and education highly relate to other factors mentioned by the interviewees. Training and education can enable clarity in purpose, organizational structure, and process, understanding of roles, and that management is knowledgeable in agile. Factors such as strong communication, transparency, and collaboration were frequently mentioned in both the empirical and theoretical studies. Strong communication is, just like training and education, highly related to

other factors. Communication can refer to both efficient communication of the change effort, as well as efficient communication and knowledge sharing in the development process.

The empirics especially emphasized the importance communication and collaboration have for coordinating and synchronizing work between different teams, as well as sharing information with stakeholders. Multiple articles stated that one challenge in agile is coordination of autonomous teams in a multi-team environment, which correlates with the findings from the empirical study, and stresses the importance of these factors. However, a discrepancy was identified in the literature on how to ensure efficient knowledge sharing. Some articles mentioned that face-to-face meetings should be applied for efficient knowledge sharing, while some articles requested solutions for how to reduce the number of meetings. Regardless, respondents stressed the importance of a clear process for ensuring efficient cross-functional communication.

Process

The three factors, to follow agile-oriented project management and requirements processes, and to use an agile delivery strategy, were not identified in the interviews. However, one respondent stated that one challenge is that the processes will stay in a hybrid form, and thus not follow agile-oriented processes and principles thoroughly.

Factors that were only identified in the interviews were to ensure a sufficient long-term perspective of the goal and plan, an efficient risk management process and agile planning. Risks were identified with mainly focusing on the short-term perspective of a development effort. The factor agile planning refers to planning each sprint with room for changes. This factor relates to following an agile-oriented project management process, which also includes an agile plan which can embrace changes. However, a pattern identified is that the empirics stressed the importance of agile planning in particular. Furthermore, to ensure an efficient risk management process that has an overview perspective of all risks was mentioned by one respondent due to increased risks with frequent and quickly applied changes in the process and decentralized decision making.

Technical, financial and team

The factor to use automated software tools was not identified in the empirical study. However, two respondents discussed the importance of having efficient platforms that enable efficient knowledge sharing. The most stated factor in the interviews was to ensure availability of resources. This factor was not identified in the literature review. However, the literature stated that management support is important for ensuring sufficient resource allocation. Respondents saw difficulties in how some roles should participate in processes in different VCTs. This is in line with the literature where two articles discussed challenges such as too many meetings in large-scale agile projects.

None of the factors in the team category was mentioned in the interviews. Team competence was one of the most frequently mentioned factors in the literature review, which enables agile practices to be followed. One pattern identified is that respondents stated that it is important that management roles are knowledgeable in agile, rather than focusing on that team members must acquire some certain competence.

Discussion

The analysis shows that factors found through the empirical study have a large overlap with the factors identified in the literature review. However, some commonly mentioned factors were only identified in either the literature or the empirics. Factors from the communication and collaboration category were of high importance in both studies, both regarding efficient knowledge sharing as well as collaborating with the customer.

Two of the most mentioned factors in the literature review were not identified in the interviews: organizational culture, and training and education. Furthermore, the literature review had a higher frequency of strong management support and leadership. Organizational culture, training and education, management support and leadership are factors that can enable other factors to be achieved, such as clarity of purpose, process and roles, strong communication and ensuring availability of resources. Since interviewees were asked through an open question to identify the three most important factors, it seems that respondents focused on these latter factors that are required for a successful agile project, rather than stating factors that can enable these factors. This suggests that the organizational culture, training and education, management support and leadership still can be considered essential factors, even though they were not identified or as frequently mentioned in the empirics.

One difference from theory is that the empirical study had a higher frequency of clarity of purpose, organizational structure, and process, and to define and communicate agile roles. Agile has historically mainly been applied in smaller software projects. When agile is applied at large-scale, it might create a greater need for a common understanding of the purpose, process, and roles, in order to coordinate between different units and to divide responsibility areas for different functions and roles. Furthermore, the frequent mention of these factors could indicate that the current state of the process and applied roles are poorly understood. To apply agile de-centralized according to the needs of specific units are in line with agile values. However, if different units apply agile differently, integration points and coordination may suffer since the unit may apply the process according to their own main focus and interests.

The three factors from the process category identified in the literature were not mentioned in the interviews, i.e., to follow agile-oriented project management and requirement processes and an agile delivery strategy. These three factors all relate to following agile principles, and the reason for them not being mentioned in the empirics could be that interviewees assumed that the future process would follow agile principles. These factors from the literature could indicate the importance of applying agile thoroughly in the organization and avoiding a hybrid process. One respondent mentioned that one challenge is in fact that the process will stay in a hybrid form, which could strengthen the importance of thoroughly applying an agile process.

Agile planning is a factor that was not identified in the literature. Literature stressed the importance of following agile-oriented processes, however the empirics contribute to theory by emphasizing the importance of following agile-oriented planning practices. This factor could be related to the factor to ensure availability of resources which also was only identified in the empirics. To ensure availability of resources could be an issue of both too few resources or an inefficient process, and with limited resources it might be difficult to embrace changes in the plans and enable agile planning. Another factor that was only identified in the empirics was to ensure a long-term perspective of the goal and plan. This factor might be of

extra importance at the case company since they are working with hardware and have activities with a long lead time. Many of the studied articles focused on software development, which is more flexible than hardware, which might reduce the importance of ensuring a long-term perspective of the plan.

Furthermore, the empirics stressed the importance that management is knowledgeable in agile. On the other hand, team competence was not mentioned once in the interviews, despite the fact that this factor was amongst the most frequently mentioned in the literature. The interviewees consisted of project managers and middle managers, and one explanation behind this could be that interviewees mentioned factors relevant to their position. Team competence in agile could be important for achieving self-organizing teams. Autonomy of teams was commonly mentioned in the literature, while it was not identified in the empirics. Autonomy of teams is enabled through the factor servant leadership, which is a factor identified both in the empirics and literature. However, servant leadership was not as frequently mentioned in the studies. Therefore, it is surprising that the frequency of these factors distinguishes. This could correlate with the finding of Naslund and Kale (2020) that there is a discrepancy between articles mentioning autonomy of teams as a CSF and some articles meaning that the autonomy of employees must be balanced with some remaining centralized decision-making.

5.2 Need for the Agile Project Manager

The literature review shows that there was limited theoretical knowledge regarding the agile project manager role. Eleven articles were found that provided information regarding the need for the agile project manager, however only seven of the articles included a focus on analyzing the agile project manager role. Furthermore, the applicability of the studied articles for the agile process at YS is limited. YS will implement a large-scale agile methodology, inspired by the SAFe framework. Most of the studied articles focused on agile methods similar to scrum, which includes fewer agile roles compared to large-scale agile methods.

A pattern identified in both the empirical and theoretical study is that some sources or respondents state that there is a low or no need for the agile project manager, while other sources state that there still is a great need for the role. In the literature review, articles proposed contradicting results such as a reduction of importance for the role due to new agile roles, while also suggesting that the workload of the role would increase due to greater coordination needs. Likewise, in the empirical study, some interviewees identified no need for the role, while others identified a great need. Therefore, no conclusion can be drawn regarding the general need for the agile project manager role.

However, a more thorough analysis can be conducted based on the results regarding factors that affect the need for the agile project manager role. *Table 5.2* shows the factors affecting the need for the role based on the theoretical and empirical studies. All factors found through the empirical study are included in the table, however the frequency of the mentioned factors is not presented since the factors were identified from discussions in the interviews, and validated through a workshop, making the frequency of the factors less relevant. The additional factors found through the literature are presented in the last category of the table, however the validity of these factors is lower, since they were only identified by one source respectively. The table also includes related CSFs in agile for the aspects that affect the need

for the agile project manager. The following parts of this subsection will provide analysis of the factors, as well as how the factors that affect the need for the role relate to CSFs in agile.

Table 5.2 Factors affecting the need for the agile project manager role identified in the theoretical and empirical studies.

Category	Factor	Frequency literature	Related CSFs
Organizational aspects	Agile organizational maturity	2	Organizational culture, Understanding of purpose, structure, process Define and communicate agile roles
	Organizational structure	1	Align the organization to the needs
Process aspects	Hybrid of traditional and agile project management	3	Follow agile-oriented processes and principles, such as agile planning
Project aspects	Level of cross-functional requirements	-	Communication and collaboration
	Project size	2	Communication and collaboration
	Project complexity	1	Communication and collaboration
Other factors only identified in literature	Distributed teams	1	Communication and collaboration, Co-located teams
	Multi-team project	1	Communication and collaboration
	Team size	1	Communication and collaboration, Small team size

Organizational aspects

The agile maturity level is an organizational factor that affects the need for the agile project manager role. This factor was identified both through the literature and theory. It was found that as the organization reaches a higher agile maturity level, the need for the project manager will decrease. The agile maturity level relates to the CSFs organizational culture and clarity in purpose, organizational structure, processes, and roles. An appropriate organizational culture is required for implementing the changes of the agile transformation and will thus affect how quickly the organization will mature in agile. Factors that enable the organizational culture and a common understanding are management support, leadership, training and education and strong communication of the change effort. Therefore, these enabling factors could also relate to the agile organizational maturity level.

It was also found that the organizational structure could affect the need for the role. One article stated that hierarchical and bureaucratic organizations could have a greater need for the agile project manager. Respondents stated that the need for the agile project manager role would depend on how the organizational structure will look like, however they were not sure exactly how the structure will affect the need. The organizational structure is related to the factor found through the empirical study, to align the organization to the needs.

Process aspects

If the future process consists of a hybrid process of both agile and traditional project management, the need for the project manager will be greater. This factor was most commonly stated according to the theory, and also identified in the empirics. This aspect relates to the CSF to follow agile-oriented processes, such as an agile project management process and agile planning. Therefore, with an agile process with minimal reliance on traditional project management practices, the probability of a successful agile transformation

is higher and the need for the project manager is smaller. However, if a hybrid process is introduced, the need for the project manager role is greater for managing project management practices missing in agile methodologies, and for facilitating and coordinating requirements from both agile and traditional practices.

Project aspects

Factors found through the empirics and the theory are that a larger project size or a more complex project has a greater need for the agile project manager role. Factors identified only in the literature are multi-team projects, distributed teams, and team size. Project size could be considered to include the aspect multi-team projects identified in the literature, since respondents discussed that a larger project size usually has multiple teams. Distributed teams and a large team size are proposed to have a higher need for the role according to one source respectively, and co-located teams and a small team size are CSFs identified in the literature review.

An additional factor only identified in the empirical study is the level of cross-functional requirements for a project. Despite the fact that this factor was not identified in the literature, this factor is in line with the reasoning from the literature, which states that the need for the agile project manager is higher when there are higher coordination and facilitation needs. Greater requirements for cross-functional collaboration and communication of a development effort increase the need for coordination and facilitation. The same reasoning can be concluded for the other project aspects, since the literature and empirical study argued that a large and more complex project has greater coordination needs.

It can be concluded that the agile project manager is required when there is a greater need for coordination and facilitation of a project. This is not exclusive to agile projects since a traditional project manager also is utilized for these project characteristics. The coordination requirements relate to strong communication, collaboration, and efficient knowledge sharing.

Discussion

The contradicting results regarding the general need for the agile project manager can be affected by previous knowledge of the agile method, subjective attitude towards agile, or specific organizations and agile implementations characteristics. However, since it was found that the need for the role depends on different factors, it is not surprising that it is difficult to generalize the need for the agile project manager role. All except one of the factors that affect the need for the role found in the empirical study were also identified in the literature review. These results increase the validity of the factors found in the empirical study.

Many of the factors that were found to affect the need for the agile project manager role relate to identified CSFs in agile. For example, a low agile organizational maturity, a hybrid process, and greater coordination and facilitation needs for a specific project increase the need for the role. These factors relate to the CSFs organizational culture, clarity of processes and roles, following agile-oriented processes, and strong communication and collaboration. Therefore, if some of these CSFs are not achieved, the need for the project manager is greater. Or differently put, the agile project manager therefore seems to be able to contribute to enable all these factors. However, one great risk identified with assigning an agile project manager is that the role could prevent implementing agile principles such as the CSF autonomy of teams. Shastri et al. (2021) found that the frequency of agile practices that require coordination

increased with a project manager present, while other agile practices were reduced. Therefore, while an agile project manager could contribute to improving many CSFs in agile, the role could also potentially prevent some agile principles. The CSF servant leadership could therefore be very important to achieve to ensure agile values when utilizing an agile project manager. Also, that project managers have high competence in agile values and principles can be of importance to enable necessary agile changes.

5.3 Responsibilities

Table 5.3 shows the identified most important responsibilities of the agile project manager. The responsibilities presented in the table are the ones identified in the empirical study. There was a lack of data found through the literature review of common or important agile project manager responsibilities. Additional responsibilities were identified in the literature with a frequency of only one article respectively, and these are therefore not included in the table. This choice is also justified by the fact that even if there are common practices of the traditional project manager role in theory, the responsibilities differ according to the specific organization and project. Activities such as budgeting and managing personnel are for example not performed by the traditional project managers today at YS.

Many of the identified responsibilities from the empirical study were also mentioned in the studied literature, such as coordination, facilitation, and planning. Ensuring a cohesive perspective of deliveries and time-plan of a development effort was a frequently mentioned responsibility in the interviews, which was not identified in the literature. Also, to ensure a long-term perspective was only identified in the interviews. Furthermore, communication management and escalating risks and issues were also only identified in the interviews, however these are common responsibilities of the traditional project manager role. It can be concluded that the empirically identified responsibilities of the agile project manager are also common practices for the traditional project manager, which is in line with the findings in the literature review. Additionally, *Table 5.3* also presents identified overlaps of responsibilities with agile roles, which will be discussed below the table.

Table 5.3 Responsibilities of the agile project manager from the theoretical and empirical studies.

Responsibilities	Frequency literature (out of 3)	Frequency interviews (out of 9)	Comment overlap
Coordination/ synchronization	2	4	Scrum master and release train engineer manage dependencies, coordinate and align within the flow and with other flows. Product owner and product manager align work stakeholders.
Ensure a cohesive perspective of deliveries and time-plan	-	4	-
Communication management	-	3	Scrum master and release train engineer manage facilitate communication and align within the flow and with other flows. Product owner and product manager align work stakeholders.
Facilitation	2	3	Scrum master responsible for facilitating team sprint activities. Release train engineer responsible for facilitating multi-team sprint activities.
Planning	1	2	Schedule planned by team, scrum master and release train engineer. Roadmap and backlog planned by product owner and product manager.
Escalating risks and issues	-	2	Scrum master and release train engineer have the main responsibility of managing risks.
Administration	1	2	-
Removing obstacles	2	2	Scrum master and release train engineer have the main responsibility of removing obstacles.
Ensure reporting	1	1	-
Ensure long-term perspective	-	1	-
Process development	1	1	-
Help to track progress/KPIs	2	1	-

Discussion

Ensuring a cohesive and long-term perspective of development efforts was only identified in the empirical study. An explanation for that can be that the articles presenting agile project manager responsibilities studied small-scale software development projects. Since the case company implements large-scale agile and develops physical products that have activities with longer lead-time, the importance of these responsibility areas might be greater. One risk identified in the empirical study is that the agile roles might have the main focus within their team and VCT. A project manager could therefore be appointed to ensure a cohesive perspective of development efforts across flows as well as a long-term perspective of development efforts. Planning was a project management area identified in the empirical study which could benefit from having a project manager to ensure these other two aspects. Furthermore, the empirical study identified a risk of insufficient stakeholder engagement without an agile project manager, however stakeholder management was not mentioned as an important responsibility of the agile project manager in the interviews. This could be due to the fact that interviewees reasoned that stakeholder engagement is a part of the coordination

or communication responsibility, and stakeholder engagement could thus still be considered an important responsibility of the agile project manager.

Overlaps of responsibility areas are found for coordination, communication management, facilitation, planning, escalating risks, and issues, and removing obstacles. Additionally, an overlap of stakeholder engagement is also identified. According to the literature, it is stated that the main responsibility of facilitation, coordination and aligning with other flows, removing obstacles, and managing risks and dependencies lie with the scrum master and release train engineer roles. However, the focus of the scrum master is within the team, making the overlap with this role less relevant. It is also stated that the product owner and product manager roles have the main responsibility of planning development through creating and prioritizing the backlog and roadmap, aligning work with stakeholders, and ensuring that the backlog is transparent and clear to all stakeholders.

The overlaps in responsibility areas do not necessarily mean that the agile project manager is not required to manage the mentioned activities, since the analysis of RQ2 found that the need for the agile project manager depends on multiple different factors. Furthermore, the main principles for knowledge sharing in agile are through the roadmap, backlogs, and multi-team activities (especially demos). The backlog should be understandable for all stakeholders, and relevant stakeholders should be invited to demos. Stakeholders in this context refer both to external stakeholders such as customers, as well as internal such as the project office or other R&D teams. With frequent changes and incremental planning, it could require a lot of resources in terms of time to keep track of multiple backlogs, and it might be insufficient with too many meetings across flows to identify changes or progress relevant to a specific unit. Therefore, the workload of the agile roles and how well the development effort is progressing could be analyzed to understand if an agile project manager is required. If there is insufficient knowledge sharing internally or externally leading to insufficient coordination of a development effort, then it could be suitable to appoint project managers. Another solution of this issue could be to scale the release train engineer and product manager role into multiple roles.

5.4 Competencies

Table 5.4 shows identified competencies of the agile project manager based on the theoretical and empirical study. All competencies identified from the empirical study are included in the table, as well as competencies mentioned by more than two sources in the theoretical study.

Table 5.4 Competencies of the agile project manager identified in the theoretical and empirical studies.

Competencies	Frequency literature (out of 8)	Frequency interviews (out of 9)
Effective communication	3	6
Agile/flexible	3	5
Interpersonal skills	-	4
Leadership skills	2	3
Structured	-	3
Agile method competency	4	2
Collaboration	5	1
Servant leadership skills	3	1
Analytical	1	1
Motivate others	2	1
Technical expertise	-	1
Problem-solving	2	1
Project management process competence	1	1
Conflict management	4	-
Negotiation	3	-
Mentoring/coaching	3	-
Coordinating	3	-
Innovative/creative	3	-

Most of the competencies found in the empirical study overlap with findings from the literature, such as effective communication, flexibility, collaboration and agile method competency. Leadership and servant leadership skills were identified in both the empirical and theoretical studies. Only three competencies that were stated for the agile project manager in the empirical study were not identified in the literature: interpersonal skills, structured and technical expertise. However, interpersonal skills and technical expertise were also mentioned for the traditional project manager. Structured were only identified in the empirics, and one interviewee meant that this competency is of extra importance for an agile project manager. Other skills that are stated to be more important for an agile project manager compared to a traditional one is servant leadership skills and agile method competency. The empirical results also indicated that agile or flexible is a competency extra important in an agile setting, however this competency was among the most frequently mentioned for the traditional project manager.

Competencies more commonly mentioned for the agile project manager in the literature that were not identified in the interviews were conflict management, negotiation, mentoring, coordinating and innovativeness. Mentoring, coordination, and innovative skills were more frequently mentioned for the agile project manager compared to the traditional project manager, indicating that these are of greater importance for the agile project manager.

Discussion

It can be concluded that many of the most important agile project manager competencies correspond to the traditional project manager. It seems that the specific leadership style of servant leadership is more important for an agile project manager compared to a traditional one, even though leadership skills in general are important for project managers regardless. Servant leadership was also an identified CSF in agile, increasing the importance of this competency. Influence of persuasion was commonly mentioned for the traditional project

manager, while they were not identified for the agile project manager. Instead, mentoring or coaching skills were only identified for the agile project manager. This could indicate a shift from influencing through persuasion skills to influencing through coaching skills for the agile project manager.

Some more commonly mentioned competencies for the agile project manager identified in the literature were not identified in the interviews, such as conflict management and negotiation. Since an agile process is not meant to be managed from the top down, but rather by decentralized decision-making through collaboration, there might be more room for discussing decisions. Then competencies such as conflict management and negotiation might be of higher importance in an agile setting. However, these competencies were also mentioned for the traditional project manager. This suggests that these competencies still are of high importance for the agile project manager, despite not being mentioned in the interviews.

Competencies mentioned more frequently for the agile project manager compared to the traditional project manager in literature were coordination and creativity. It might be that without a comprehensive process for integration points, coordination skills are of greater importance for an agile project manager. It could also be more important that an agile project manager is innovative or creative, for finding solutions how to integrate traditional and agile project management practices in a hybrid process.

6 Conclusion

The conclusion chapter presents recommendations to the case company, answers to the research questions, and a discussion of the limitations of the thesis as well as addressing future research areas.

6.1 Recommendations

This subchapter presents recommendations that can be of interest to the case company.

6.1.1 Consider Important CSFs

While all identified CSFs are important to consider ensuring a successful transformation, it is recommended to pay extra attention to a few. To achieve an appropriate organizational culture and an agile-oriented process, it is important that there is clarity in the purpose, organizational structure, and process as well as the roles and responsibilities. Currently, it seems that agile roles and processes have been introduced in some projects without a common understanding of responsibility areas and principles. This could result in inefficient coordination. Therefore, it is recommended that resources are prioritized for strong communication of the change effort, and training and education, which will affect factors such as clearly understood processes and roles, and team and management competence in agile.

The theoretical study emphasized the importance of training and education, and it was found that agile coaches can be useful. Furthermore, it is stated that the scrum master and release train engineer have the main responsibility of coaching and encouraging the teams to follow agile principles. If an agile project manager is applied, then it is also recommended that this role is knowledgeable in agile to both enable agile practices as well as coaching. Therefore, it is recommended that these roles have extra strong knowledge of the agile process and sufficient time for coaching the organization in agile. External agile coaches could also be beneficial during the agile transition.

6.1.2 When to Utilize an Agile Project Manager

This section recommends and provides propositions of when there is a need for the agile project manager role and suggests future steps for YS. The factors that affect the need for the agile project manager are illustrated in *Figure 6.1*. The factors are divided into organizational, process and project aspects, and *Figure 6.2* shows how the aspects are interrelated.

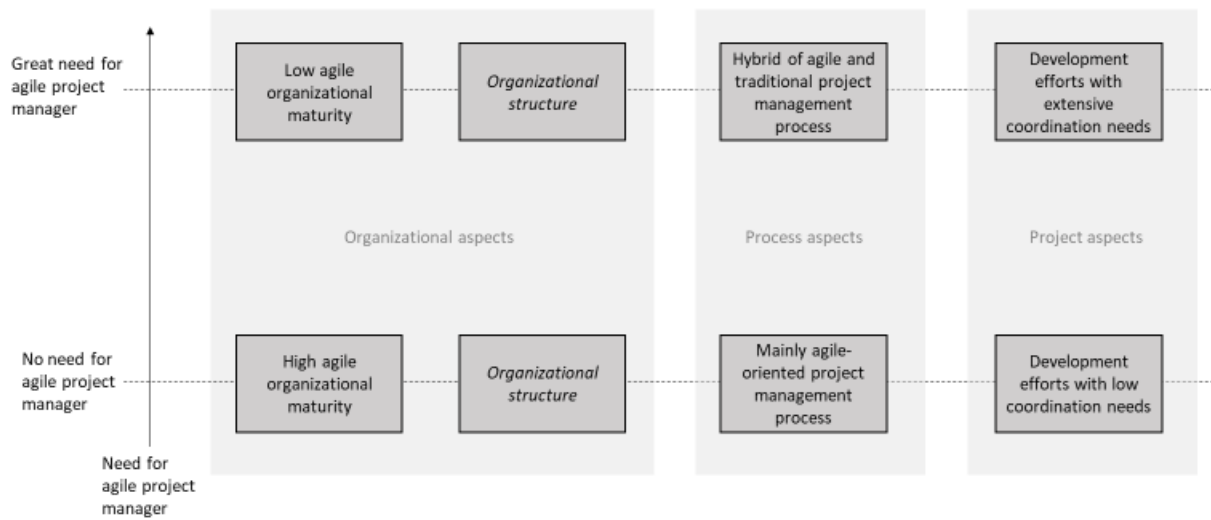


Figure 6.1 Factors affecting the need for the agile project manager role.

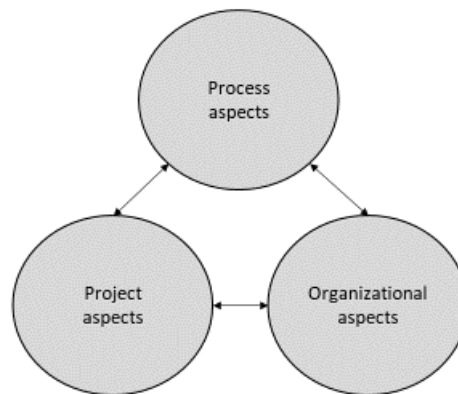


Figure 6.2 Relation between aspects that affect the need for the agile project manager.

Utilize agile project manager until high agile organizational maturity is achieved

It is recommended that the agile project manager role is kept until the organization has obtained a high agile maturity level. Without a high maturity level, the processes and roles will not be clearly understood and adapted to the needs of the organization, which can lead to increased risks, insufficient coordination, and conflicts in responsibility areas amongst units and roles. Then there will be a greater need for the agile project manager role in order to facilitate and coordinate dependencies. However, when sufficient agile maturity is achieved, the need for the agile project manager will decrease in the context of self-organizing teams and other agile management roles. High agile maturity is achieved through changes in the organizational culture, which develops over a long time. It can be difficult to evaluate agile organizational maturity, and different units and teams can obtain different maturity levels over time. Choosing and measuring suitable KPIs can be conducted to evaluate agile maturity.

Investigate how the organizational structure affects the need for the agile project manager

It was found that the organizational structure could affect the need for the agile project manager role. It was out of the scope in the study to investigate how the organizational structure at YS should be organized, and it is not yet determined how the organization will be restructured. Different scenarios of the organizational structure and the different structure's impact on the need for the agile project manager role were not covered in the thesis. It is recommended to investigate the organizational structure further, and to analyze how the need for the agile project manager is affected.

One proposition is that more complex and larger organizational structures have a greater need for the agile project manager role. Furthermore, it is stated that a VCT should include between 6-10 teams, or 50-120 people. One proposition is that development efforts in VCTs which include closer to 10 teams and 120 people and have a lot of interdependencies with other flows will have a greater need for the agile project manager role, since the agile management roles at a VCT level might be insufficient for these characteristics. However, one hypothesis is that the concentration of the project manager role could be decreased compared to the current organization, due to shared responsibilities of coordination with other agile management roles such as the release train engineer.

Utilize agile project manager if a hybrid process is introduced

It is suggested that the agile project manager should be utilized if the project management process will turn out to be a hybrid of a traditional process and agile process. An agile project manager will be required for project management practices that are missing in the agile process, such as tracking the progress of the milestone requirements, reporting milestones or for additional requirements of administration. The project manager will also be required for facilitating and coordinating requirements from both traditional and agile practices. The responsibilities from traditional project management practices are not included in the responsibilities of the agile roles, creating a need for the agile project manager.

Current guidelines from Scania state that the PD process will be kept, but adaptable depending on the requirements of specific development efforts. It is not clear in the current guidelines who should be responsible for identifying which parts of the PD process that is required for a specific development effort, and the requirements from the PD process might change over time for a specific development effort. The case could be that the adaptation of the PD process is determined at a high level at the project office. However, it could be determined that the adaptation of the PD process should be conducted at a more decentralized level at YS, which would align better with agile values. Then the need for the agile project manager role would also be greater in order to keep track or analyze how the PD process should be adapted for specific development efforts at YS.

Utilize agile project manager for development efforts with greater coordination and facilitation requirements

It is recommended that larger and more complex development efforts with many cross-functional requirements should be assigned a project manager role. Or differently put, an agile project manager should be assigned to development efforts with higher coordination and facilitation needs. It was found that the agile roles might have the main focus within their

team or VCT. Therefore, if the workload of the agile roles is too high, development efforts with extensive coordination needs will have a greater need for an agile project manager role to ensure a cross-functional and long-term perspective.

This is in line with current traditional practices, where a project manager is not assigned to all projects. The definition of a large or complex development effort, or what a high level of cross-functional requirements looks like, were not covered in this thesis. It is recommended that the definitions of these characteristics are formulated to understand when the need for the role might be greater. One proposition is that software development efforts will have a smaller need for the agile project manager role, while hardware development efforts have a greater need for the role. However, if the development effort has a lot of interdependencies with other flows, then software development might still have a great need for the role. Choosing and measuring suitable KPIs of development efforts can be done to evaluate the need for the agile project manager for specific development efforts.

6.1.3 Address Overlaps and Gaps of Responsibility Areas

This section will provide a discussion of responsibility areas that are recommended to be addressed due to identified overlaps or gaps with the project manager role, under the assumption that the agile process will be mainly agile-oriented, with few or no practices from the current PD process.

Address which role is responsible for identifying interdependencies and stakeholders

First, it is important that teams and VCTs continuously identify and understand which teams and functions have interdependencies with the development effort, and which stakeholders are of importance to collaborate or communicate with. The relevant stakeholders might not be known at the initial stage of a development effort, and they might change over time in line with incremental planning and the development progress. Crucial internal stakeholders could be other R&D teams or higher-level units such as the VCF, or other functions such as purchasing, sales and marketing, or production. External stakeholders could be market representatives or suppliers. According to the current role description, it is the scrum master and release train engineer that have the main responsibility for managing dependencies. However, without a comprehensive process that describes integration points, this could be a time-consuming task. Also, it is important to identify dependencies from a long-term perspective, and without only focusing on the interests within the team and VCT. This responsibility could be addressed by an appointed project manager if required. Regardless, it is recommended that it is clear whom the responsibility lies with to identify and monitor dependencies and communication requirements with external and internal stakeholders of a development effort.

Address which role is responsible for ensuring communication outside the VCT

After identifying important stakeholders, it is recommended that it is clear who is responsible for ensuring communication with specific functions outside of the VCT including external stakeholders. It is stated that the release train engineer and product management should coordinate and align work with stakeholders and outside of the flow. However, it is not clearly stated who is responsible for ensuring communication with specific stakeholders. Some sources mentioned that it is the release train engineer that should ensure communication with higher-level units, such as the project office.

The main artifacts or practices for knowledge sharing are through the roadmap, backlogs, and multi-team activities, especially demos. It is stated that the backlog should be understandable for stakeholders, and that relevant stakeholders should be invited to demos. However, with frequent changes and incremental planning, it could require a lot of resources in terms of time to keep track of multiple backlogs and it might be insufficient with too many meetings to identify changes or progress relevant to a specific unit. Therefore, if the workload of the agile roles is too high so that there is insufficient knowledge sharing internally or externally leading to insufficient coordination, then it could be suitable to appoint project managers. One additional comment is that ensuring an appropriate software platform that enables easy monitoring of multiple backlogs could be beneficial to monitor progress and changes relevant to stakeholders.

Address which role is responsible for ensuring customer collaboration

As customer collaboration is one of the most frequently mentioned CSFs, it is of extra importance to address which role is responsible for ensuring market representative communication in applicable cases. According to the literature, the main responsibility of customer communication should lie with the product owner role. Again, if the workload of this role is too high, then it could be beneficial to introduce an agile project manager to ensure communication with market representatives, or perhaps scale the product owner role depending on the needs of the process.

6.2 Research Questions

Three RQs were formulated with the aim of fulfilling the purpose of the thesis. First, CSFs in agile were identified to provide a basis of important aspects to consider when analyzing the need for the role. Then, the need and factors affecting the need for the role were explored. Last, how the agile project manager should be defined at YS was investigated by looking at the role's responsibilities and competencies. The findings of the RQs are presented below.

RQ1. What are the most prominent critical success factors in agile?

This thesis identified 30 CSFs with a variation of frequency through a literature review and empirical data collection. The complete list of CSFs identified is shown in *Table 5.1*, and some of the most frequently identified factors are presented below.

- Clarity of purpose, process, organizational structure, and agile roles
- Management support and leadership
- Communication and collaboration
- Customer collaboration
- Ensure availability of resources
- Training and education
- Organizational culture

RQ2. What does the need for the agile project manager role look like?

No conclusion can be drawn from the study regarding the general need for the agile project manager role. Contradicting results were obtained from both the theoretical and empirical study, where some sources identify no need for the role while other sources identify a great need. However, it was found that the need for the agile project manager role depends on

organizational aspects, process aspects as well as specific project characteristics. Six different factors found through the theoretical and empirical study that affects the need for the agile project manager are presented below. *Table 4.3* describes how factors affect the need for the role, and the table is illustrated in *Figure 6.1*.

- Organizational aspects
 - Agile organizational maturity
 - Organizational structure
- Process aspects
 - Hybrid of traditional and agile project management process
- Project aspects
 - Level of cross-functional requirements
 - Project size
 - Project complexity

RQ3. How should the agile project manager role be defined?

The responsibilities and competencies of the agile project manager were analyzed in order to provide defining requirements for the role. It can be concluded that the key responsibilities and competencies of the agile project manager correspond to traditional project managers. However, an overlap of responsibility areas was identified with other agile roles. Competencies that are of extra importance for a project manager in an agile setting compared to a traditional one are agile method competency and servant leadership skills. The most important responsibilities and competencies of the agile project manager identified in the theoretical and empirical study are presented below.

- Most important agile project manager responsibilities
 - Coordinate/synchronize
 - Ensure a cohesive perspective of deliveries and plan
 - Ensure communication
 - Facilitate
 - Planning
 - Escalate risks and issues
 - Administration
 - Remove obstacles
 - Ensure reporting
 - Ensure long-term perspective
 - Process development
 - Help to track KPIs/progress
- Most important agile project manager competencies
 - Effective communication
 - Agile/flexible
 - Interpersonal skills
 - Leadership skills
 - Structured
 - Agile method competency
 - Collaboration
 - Servant leadership skills
 - Analytical
 - Motivate others
 - Problem-solving
 - Project management process competence
 - Conflict management

6.3 Fulfillment of Purpose

The research purpose presented in the introduction of this thesis was formulated as follows:

“...to explore the need and definition of the agile project manager role at YS.”

The purpose of the thesis was fulfilled by providing factors that affect the need for the role as well as suggesting the main responsibility areas and competencies of the agile project manager role. Some findings could not be quantified or defined in the thesis, such as organizational structure and project size. However, since the RQs were of an exploratory nature, the findings fulfill the purpose of the thesis.

6.4 Contribution

A gap was identified in existing theoretical research regarding the need and definition of the agile project manager role. A limited set of scholarly and research journal articles were found in the literature review that elaborates and proposes factors that affect the need for the role, as well as changes in responsibilities and competencies. Despite the limited prior theoretical research, the empirical findings of this study are in line with the propositions and hypotheses identified in theory. This study therefore contributes to theory by confirming factors that affect the need for the agile project manager role, and important responsibilities and competencies for the role. Furthermore, this thesis also contributes to theory by highlighting areas within the subject that require more research.

The findings of this thesis could contribute insights to other departments at the case company, as well as to practitioners in organizations with similar characteristics as the case company. The practical contributions are especially applicable for organizations developing both software and hardware products and that are implementing large-scale agile inspired by the SAFe framework. The factors affecting the need for the agile project manager, as well as the suggested responsibilities and competencies are mainly elaborated in a cohesive perspective, which could make the findings applicable for external practitioners. However, even if the findings could provide insights outside of the unit of study, a single-case study provides theory with low generalizability.

6.5 Limitations

One main limitation of the thesis was the time constraint, which led to the use of mainly qualitative data. The time constraint limited the opportunity to conduct more interviews with different roles. More interviews with different roles would increase the construct validity of the study. The majority of the interviews were conducted with project managers, and the results could be subject to bias when analyzing the need for their current role. It would be extra insightful and increase the construct validity of the study to have conducted interviews with agile management roles. However, respondents in the project manager role usually obtain the greatest knowledge regarding the project management process and have an overview perspective of issues and requirements in different projects, which are considered extremely valuable.

The time limit also resulted in limitations in the literature review. The focus of the review was to analyze the agile project manager role. However, to analyze theory more thoroughly regarding the other agile roles would increase the understanding of overlaps and gaps in

responsibility areas, and therefore provide a better understanding of the need for the agile project manager role.

Another limitation of the study is the limited prior theoretical knowledge of the studied phenomenon. A limited set of scholarly and research journal articles were identified as useful for the purpose of the thesis. Not all the studied articles were thoroughly applicable to the characteristics of the case company since some articles focused on small agile implementations for software development.

6.6 Future Research

It was found in the literature review that theory often compares responsibility areas of the project manager role with the scrum master or product owner and suggests that these are the roles that a former project manager could adopt. Based on the findings from this study, it seems that the project manager role might share a lot of responsibilities with the release train engineer role, and it is therefore suggested that research should analyze the project manager role compared with the release train engineer role applied in large-scale agile projects.

It could not be concluded how often a project manager is utilized in agile organizations today, or if organizations with different characteristics in different industries have a different need for the role, and future research could address this gap. One hypothesis is that the concentration of agile project managers is decreased in SAFe implementations, due to shared responsibility areas with other agile management roles. Another hypothesis is that larger organizations have a greater need for the role due to greater coordination needs, and that software development projects have a smaller need for the role since software is more flexible than hardware products.

Furthermore, future research should continue to fill the theoretical gap identified in this study, by continuing to investigate which factors that affect the need for the role. The factors identified in this study could be addressed by future research, to confirm or deny the factors found, to concretize the factors such as agile maturity, organizational structure, and project size, or to identify new factors. One factor that might affect the need for the agile project manager could be the choice of agile framework method used, since mainly large-scale agile methods address portfolio-level project management practices. Future research could also try to rank the factors that affect the need for the role, to identify which factors that most prominently affect the need.

Some sources in the literature proposed that the agile project manager is likely to be structurally different from the traditional project manager. However, other sources as well as the empirical study of the thesis found that the main responsibilities and competencies of the project manager are similar in a traditional as well as an agile setting. The findings of responsibilities and competencies of the agile project manager could be addressed by future research to be confirmed or denied, and for building knowledge of whether the agile project manager role is different from the traditional project manager. Last, a discrepancy was identified in articles meaning that face-to-face meetings are crucial for efficient knowledge sharing, and articles requesting a solution of how to reduce the number of meetings in large-scale agile implementations. As communication and collaboration are amongst the most frequently mentioned CSFs, future research could investigate how to practically ensure efficient communication in large-scale agile projects.

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Appendices

Appendix A. Interview guide

Intervjuguide

1. Finns det ett behov av en agil projektledare hos YS?
Skala: 1: inget behov. 2: litet behov. 3: måttligt behov. 4: stort behov. 5: mycket stort behov.
2. Varför svarade du som du gjorde på fråga 1?
3. Vilka är de 3 viktigaste ansvarsområdena för en agil projektledare?
4. Vilka är de 3 viktigaste kompetenserna för en agil projektledare?
5. Vilka är de 3 viktigaste framgångsfaktorerna för ett agilt projekt?
6. Vilka är de 3 största problemen för ett agilt projekt?
7. Hur kommer följande aspekter fungera i ett agilt projekt utan en projektledare?

	1 Väldigt dåligt	2 Dåligt	3 Måttligt	4 Bra	5 Väldigt bra
Planering (bygga på projektplanen med aktiviteter, leveranser, milestones etc)?					
Change control (förvalta och kommunicera ändringar)?					
Scope management (definiera mål för projekt/team, följa utveckling utifrån mål)?					
Time management (utveckla schema baserat på plan)?					
Quality management (analysera kvalite av projekt)?					
Resource management (leda och motivera team dagligen, planera, uppdatera och rapportera resursbehov)?					
Communication management (planera och försäkra kommunikation och informationsdelning)?					
Rapportering (följa status på faser, leveranser, aktiviteter. Rapportera utveckling mot projektplan)?					
Information and documentation management (underhålla och försäkra					

tillgänglighet av information och dokumentation)?					
Stakeholder engagement (planera och försäkra stakeholder kommunikation)?					
Risk management (identifiera, förvalta och kommunicera risker och problem)?					

8. Varför svarade du som du gjorde i fråga 7?

Om tid:

9. Vilka är de viktigaste skillnaderna mellan ett agilt och traditionellt projekt?

Om tid:

10. Tror du att projektledarrollen kommer få en högre, samma eller lägre arbetsbelastning i det agila YS, varför?

11. Är det något du vill lägga till som jag har missat, undrar över, eller övriga tankar?

Appendix B. Agile Role Descriptions at Scania

Level	Area	Role	Description
Team	Flow	Scrum Master/ Team Lead	<ul style="list-style-type: none"> Part of team leadership. Responsible for facilitating team sprint activities and processes. Coach/encourage the team to follow agile practices (e.g., self-organizing, teamwork and knowledge sharing). Help the team to plan schedules based on the capacity. Remove obstacles and manage risks and dependencies. Aligning competence needs with line management and can mandate capacity allocation.
Team	Product	Product Owner	<ul style="list-style-type: none"> Part of team leadership. Responsible for maximizing the value of a product/part of a product. Owning, prioritizing, and updating the (area) product backlog. Creating and updating product roadmap with product management. Align work with stakeholders. Ensure the backlog is transparent and clear to all stakeholders. Create clarity in vision and mission of the team.
Value creation team	Flow	Release Train Engineer	<ul style="list-style-type: none"> Part of VCT leadership. Responsible for facilitating multi-team sprint activities and processes (i.e., at a VCT level). Coach/encourage the VCT to follow agile practices (e.g., self-organizing, teamwork and knowledge sharing). Coordinate and align with other flows. Facilitate coordination with product owners, through e.g., product owner sync meetings. Help the teams to plan schedules based on the capacity of VCT. Remove obstacles, manage risks and dependencies. Aligning competence needs with line management and can mandate capacity allocation. Support teams to ensure economic decision making.
Value creation team	Product	Product Manager	<ul style="list-style-type: none"> Part of VCT leadership. Responsible for maximizing the value of a product. Owning, prioritizing, and updating the overall product backlog and the product roadmap (VCT backlog and roadmap) together with product management. Align work with stakeholders. Ensure the backlog is transparent and clear to all stakeholders. Create clarity in vision and mission of the VCT.
Value creation team	Architect	System architect	<ul style="list-style-type: none"> Part of VCT leadership. Responsible for developing and communicating a shared technical and architectural direction and vision of the product/solution on a multi-team level. Determine the primary components and subsystems.