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Managing Agile Transformations

A Multi-case Study of Common Challenges and
the Use of Change Management

Master's thesis in Computer Science

Supervisor: Torgeir Dingsøy

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Abstract

In today's market, organizations are preparing for a more competitive and global market. The increased competition has resulted in organizations seeing a need to deliver faster and therefore change the strategy for how they work. As a result, many large organizations and non-developing departments are starting to see the benefits of changing and therefore aim to adopt agile in the enterprise. Changing from traditional methods to an agile approach has in earlier research been presented as challenging. The challenges are usually related to factors that often cause resistance and changes in the existing organizational culture. Earlier literature has highlighted that such transformation challenges often are highly suitable to be reduced by methods from *Change management*. This study aims to collect challenges from real *agile transformation* cases and discuss how Change management can be used and involved in the process of solving the challenges. The results in this master thesis are based on 14 interviews collected in a *Multi-case Study*, with two cases. The interviews were analyzed by a qualitative approach, which led to a categorization of challenges and a discussion on; how Change management can be involved in the reduction and solution of agile transformation challenges. Based on the results, this thesis concludes that the use of methods from Change management can benefit in structuring, communicating and reducing common agile transformation challenges related to resistance and changes in the existing organizational structure.

Sammendrag

I dagens marked forbereder organisasjoner seg på et mer konkurransedyktig og globalt marked. Den økte konkurransen har resultert i at organisasjoner ser et økende behov for å levere raskere og derfor endrer strategien for hvordan de jobber. Som et resultat begynner mange store organisasjoner og ikke-utviklende avdelinger å se fordelene med å endre seg, og har som mål å adoptere smidig i virksomheten. Tidligere forskning har vist at endringen fra tradisjonelle metoder til en smidig tilnærming kan være svært utfordrende, da *smidige transformasjoner* ofte relateres til motstand og endringer i den eksisterende organisasjonskulturen. Litteratur har tidligere poengtert at flere av utfordringene som oppstår i en slik transformasjon ofte er svært egnet til å løses eller reduseres ved hjelp av metoder fra *endringsledelse*. Denne studien tar for seg en analyse av utfordringer fra reelle smidige transformasjoner, samt en diskusjon om hvordan endringsledelse brukes og involveres i prosessen med å løse disse utfordringene. Resultatene i denne masteroppgaven er basert på 14 intervjuer. Resultatene er innhentet via et *Multi-case Studie*, som omhandler to individuelle smidige transformasjoner. Intervjuene ble analysert etter en kvalitativ metode, som førte til en kategorisering av utfordringer og en diskusjon om hvordan endringsledelse er involvert i løsningen av smidige transformasjonsutfordringer. Basert på resultatene, konkluderer denne studien med at endringsledelse vil hjelpe med strukturering, kommunikasjon og reduksjon av vanlige smidige transformasjonsutfordringer relaterte til motstand og endringer i den eksisterende organisasjonskulturen.

Preface

This paper was written as my final master thesis for the *Department of Computer Science* at *Norwegian University of Science and Technology* (NTNU). My specialization at NTNU has been *Software Development*, and I have therefore had many different courses regarding software development and methodologies which have been highly relevant for writing this paper. My interest in management and especially Change management started after I took a course named *TSOL425 - Technology Management in Teams*. Here I got introduced to the basic concepts in Change management and learned how teams are managed in a good manner. I also found a lot of inspiration and engagement for writing this particular thesis from listening to different podcasts (e.g. Smidigpodden, Fimbul and Digitaliseringspadden) and discussing the topic with people in my network.

Lastly, I found inspiration on how to write, structure and organize this master thesis by reading the books "*Craft of Research*"¹ and "*How to Write and Publish a Scientific Paper*"².

¹Booth, W. C., Colomb, G. G., & Williams, J. M. (2008). *The Craft of Research* (3rd ed.). The University of Chicago Press.

²Day, R. A., & Gastel, B. (2016). *How to Write and Publish a Scientific Paper* (8th ed.). Greenwood.

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I would like to express my special thanks of gratitude to my supervisor, Professor *Torgeir Dingsøy*, from the Department of Computer Science at NTNU. Throughout both the specialization project and the master project Torgeir has guided me, helped me with questions and discussed challenges and solutions. Torgeir has been helpful with every step in the process and provided me with articles, books and information regarding both the topic of this thesis and the method used in this study. I will highly recommend Torgeir as a supervisor for all upcoming students at the Department of Computer Science.

I would also like to express a special appreciation to all informants participating in this project and my two contact persons that have helped me with finding participants and other information for this project. Further, I would like to thank my uncle (Senior developer), Smidigpodden (a podcast) and my future colleagues at Netlight for being available for discussing interesting aspects, topics and possible cases for this thesis.

In the end, I would like to thank my family and friends for their support and their help with proofreading this thesis.

Jesper Brynildsen
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1 Introduction

In this section, our goal is to explain the motivation and background for this research and Case study. The section explains the research question, scope, and contribution, as well as who the target audience for this thesis is. At the end of this section, a short explanation of the thesis structure is explained.

1.1 Background and Motivation

Based on the previous literature review and Specialization project; *Improving Agile Transformations with Change Management: A Literature Review* (Brynildsen, 2020), the literature revealed that transforming to and adopting agile methodologies in an organization is a challenging task, that often results in several challenges e.g. (Dikert, Paasivaara, & Lassenius, 2016) and (Brynildsen, 2020, pp. 24–28). Those challenges were often related to the fact that larger organizations and non-developing departments are implementing and adopting methodologies that traditionally were created for small software development teams (Dikert et al., 2016; Barroca, Dingsøy, & Mikalsen, 2019; Moe & Mikalsen, 2020).

To understand the reasons and motivation for organizations to transform and adapt agile methodologies, it is important to understand what the organizations are hoping to achieve. Traditionally have organizations been structured hierarchically and statically (Brosseau, Ebrahim, Handscomb, & Thaker, 2019), where roles, positions and processes often have a strong ground and decisions are made from the top-down. Such organizations usually plan their projects in detail from start to finish, which often results in a less flexible approach, where change is less accepted and project requirements are closed (Petersen & Wohlin, 2010; Awad, 2005). Agile on the other hand is a way of working and a set of principles that are based on the *Agile Manifesto*. The manifesto explains that; the success of agile lies within the mindset, collaboration, and customer involvement and not in the development practices and methods used to develop the software (*The Agile Manifesto*, 2001). Earlier studies have described self-organization as a major benefit, as self-organized teams often increase creativity, innovation and productivity in the organizations (Reginaldo & Santos, 2020). Based on the reported benefits of agile, another major reason to perform such organizational change has shown to be the pursuit of business success and deliver an increased value to the customers (Laanti, 2017; Reginaldo & Santos, 2020). The success has therefore shown that an agile transformation often is the strategy many organizations

choose to prepare for the increasing competition and a more demanding marketplace (Delgoushaie & Bolijn, 2019; Laanti, 2017).

According to literature, around 70% of all initiatives to change fails (Nohria & Beer, 2000; Errida, Lotfi, & Semma, 2018). One explanation is that organizations often rush the change, which leaves the management with little control over the change and all initiatives from within the organization (Nohria & Beer, 2000). Even though most large organizations have some experiences with radical changes, they often introduce the change in a controlled environment, with the involvement of project plans, best practices, controlling management and complex presentations (van Solingen, 2020). Such processes do not work well in hand with the agile principles and might therefore result in resistance and a mindset not willing to change. Another factor causing change initiatives to fail is the human factor (Trost, 2020), which is explained by the lack of correct mindset, trust in the change and an increasing resistance for adopting the new (Errida et al., 2018). As investigated and showed in the results from the literature review and pre-study, both changes in management and the human factor were found in literature as major challenges in agile transformations (Brynildsen, 2020). The literature review also showed that challenges regarding the agile transformation were closely related to challenges causing change initiatives to fail. This highlights the fact that including Change management in the process of an agile transformation might benefit and help the organization in performing a successful change initiative and the adaption of agile methodologies.

The preparation study and literature review for this master thesis revealed that existing organizational culture, role changes, mindset and training were other major challenges, that created resistance and potentially hinder or failure when transforming to agile (Brynildsen, 2020). The results from the literature review also highlighted the fact that methods and the involvement of Change management in the agile transformation process are suitable to reduce or solve many of the most common challenges (Brynildsen, 2020). However, most published literature only explains how the transformation is done and which challenges and success factors were involved e.g. (Dikert et al., 2016). Few studies, therefore, explain and discuss the involvement of Change management in the transformation process and how that is used to create a successful adoption of agile methodologies.

This brings us to the motivation for this master theses, which includes a further investigation on how Change management is used and involved in agile transformation cases in practice. The goal is to find challenges occurring in real cases and investigate how organi-

zations successfully manage those. This to later discuss in what part Change management has a role in the success. The research will contribute with empirical evidence from real agile transformation projects and the involvement of Change management in the process of successfully transforming to agile.

1.2 Research Question and Paradigm

The main goal of this research project and master thesis is to continue the investigation of the two topics agile transformations and Change management. In contrast to the previous literature study and Specialization project; *Improving Agile Transformations with Change Management: A Literature Review* (Brynildsen, 2020), this empirical study has the main focus on investigating real cases, where organizations are performing an agile transformation. The goal is to identify challenges occurring in the agile transformation process and investigate how Change management is used as a solution to the challenges. From this, the main research question and the following three sub-questions has been created:

RQ: *Which challenges do we find in organizations transforming to agile, and how is Change management used to reduce those?*

RQ1.1: *Which challenges occur in organizations transforming to agile methodologies?*

RQ1.2: *How is Change management used in organizations to reduce agile transformation challenges?*

1.2.1 Research Paradigm

The research paradigm for this thesis classifies as a *positivist paradigm* (Oates, 2006; Abdul Rehman & Alharthi, 2016; Shanks, 2002), as this research intend to describe and investigate the real phenomena of organizations performing an agile transformation without any interference (Oates, 2006; Abdul Rehman & Alharthi, 2016). The research will investigate the cases from a qualitative perspective, where informants will provide the data through their experiences and perspectives from the agile transformation and the involvement of Change management. Further and more detailed explanation of the *research method* and *data generation method* for this thesis is explained in Section 3.

1.3 Thesis Scope and Limitations

The scope of this master thesis is limited to a discussion around challenges, experiences and factors provided by organizations transforming to agile methods. Due to limited time, the master thesis will be limited to only investigating some departments and teams at different hierarchical levels in the selected organizations. This because a full investigation of large organizations is not in the scope of this thesis. This thesis is also scoped to only present and discuss the relevant and basic concepts from Change management, as a full explanation of every aspect of Change management is out of scope for this thesis. The results and discussion are therefore limited to the statements provided in the interviews. This means the scope and results will be centered and limited to the provided information and other relevant aspects might therefore not be included.

1.4 Thesis Contributions

The goal for this thesis and research project is to further investigate how Change management is used in organizations performing an agile transformation, and how Change management fits in the adoption of agile methodology. The study will be investigating how challenges and resistance are reduced or solved in transforming organizations and will therefore contribute with empirical evidence. The research will rely on qualitative data collected from existing and ongoing agile transformation projects. This evidence will result in a discussion on how Change management is used in real transformations to solve or reduce common challenges.

1.5 Target Audience

This thesis is written as the final master thesis for the master program *Computer Science* at the *Norwegian University of Science and Technology*. The main audience is, set to be other researchers and practitioners with a particular interest in the topic's, agile transformations and Change Management. We also assume that the readers have a general understanding of computer science and agile methods.

Readers with less experience with computer science and the agile methodology are encouraged to start reading the Theory section (Section: 2), as this explains the core principles and the general theory of the discussion presented later in this thesis.

1.6 Thesis Structure

Table 1 provides a brief overview of this thesis structure³, as well as a short description of each individual section.

Section	Description
1 Introduction	This section introduces the motivation, research question, scope and limitation of the research project. The introduction also explains what the research is contributing to, who the target audience is and a brief introduction to the structure of this thesis.
2 Theory	The Theory section includes and aims to explain the main principles and theories required for understanding the discussion. The section will only explain the key elements from the background literature and will therefore not include every aspect and theoretical concept.
3 Method	This section presents how the research was performed and the method used. This includes explaining and evaluating the selected research method, strategy, and data generation method for this thesis.
4 Results	In this section the results from the data generation (Section: 3) is presented and evaluated after the research question presented in Section 1.
5 Discussion	The discussion is centered around the research question explained in Section 1 and aims to discuss the empirical evidence collected and presented in Section 4.
6 Conclusion	This section brings a conclusion to the research question described in Section 1. The conclusion is based on the results and discussion from previous sections. The section also includes an explanation of the research contribution and future work after this thesis.

Table 1: Thesis structure

³This thesis is structured after the *IMRaD-model* (Gastel & Day, 2016; *IMRaD - How to structure your text*, n.d.), which in general includes an *Introduction*, *Method*, *Result* and *Discussion*. In addition to those, a *Theory*-section and a *Conclusion* was added to the structure.

2 Theory

In this section, the most relevant background literature and theory is presented and explained. Our goal is therefore to give a brief introduction to the basic concepts needed to understand the cases, results and discussion of this thesis. The section starts by introducing the agile methodology and mindset. Then following up with an explanation of Software development and the comparison between agile and traditional development. Towards the end is an explanation of large-scale agility, agile transformation and the methodology of Change management.

2.1 Agile Methodology and Mindset

Agility and the agile methodology are a set of working principles and a mindset, which are based on the agile manifesto (*The Agile Manifesto*, 2001). The methodology itself is based on 12 principles⁴ and four statements (See: Figure 1), where a goal is an approach centered around the people and not the processes and tools used to develop the software (Mordi & Schoop, 2020). This by creating a shift towards a people-oriented approach, where communication, self-organizing, customer feedback and a strong belief in the team are essential for succeeding (Mordi & Schoop, 2020; McIntosh, 2016; Miler & Gaida, 2019).

As explained above, being agile is more about just mastering the approaches, guidelines and methods provided. Mordi and Schoop explains that; to be successful with the agile methodology the key lies within having the correct mindset (Mordi & Schoop, 2020). The mindset is about learning and welcoming change, as well as delivering good results quickly (van Solingen, 2020). However, to establish such an agile mindset, the focus on individuals and the individualistic mindset needs to be changed in a direction of identification and commitment to the project and team (Senapathi & Srinivasan, 2013). The focus should not only be on the technical skills but also include social competencies, collaboration, self-organization, project ownership, and being able to adapt and incorporate new changes based on customer feedback (Miler & Gaida, 2019; McIntosh, 2016). To fully adopt the agile mindset, the strict traditional thinking and planning need to change into a flexible approach, where the team has the ability to quickly react and respond to changes (Baham & Hirschheim, 2021; Conboy, 2009).

⁴The 12 principles behind the Agile Manifesto: <https://agilemanifesto.org/principles.html>

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

Figure 1: Core statements of (*The Agile Manifesto*, 2001), where statements to the left are valued higher in agile than those to the right. *Original created for the specialization project (Brynildsen, 2020).*

Besides being a mindset, agile is a methodology that is defined as a set of common standards that a team chooses to follow (Alliance, 2020). Agile methodology implies to be a conventional process, where teams are following and agreeing upon principles and standards based on the agile mindset and the agile manifesto (Alliance, 2020). Those standards are often related to fundamental approaches like continuous iterations, adaptive planning, customer feedback and evolutionary development (Kumar & Bhatia, 2012). As explained by the agile manifesto, agile is fundamentally centered around the team and the individuals within. The benefits lie within acknowledging the individuals by establishing success based on individual skills and a collaborating team (*The Agile Manifesto*, 2001; G. Lee & Xia, 2010). To further achieve the principle of being "change positive", the methodology includes several common concepts, including iterative development, close collaborative communication, customer involvement and incremental design (Baham & Hirschheim, 2021). The most fundamental part of the methodology is the way of splitting the process into several increments, which benefits by letting the team reevaluate at making changes based on feedback from previous iterations (Baham & Hirschheim, 2021). The next factor is open communication and close collaboration within the teams. As described in the *Agile Manifesto* and in Figure 1, the agile methodology values individuals over "processes and tools" and therefore encourages the team to self-organize, communicate and collaborate in the approach towards the common goal (Baham & Hirschheim, 2021).

2.2 Traditional Development

The plan-driven methods are considered to be the traditional software development methods. The methods are often described as a heavyweight approach that consists of heavy planning and a step-by-step approach (Awad, 2005). Those methods tend to plan the roadmap of the development process in great detail over a long period supported by processes and heavy documentation (Awad, 2005). Literature is explaining that the goal for the traditional approaches was to often create an efficient and predictable approach based on extensive planning and a system that is fully specified throughout the development process (Awad, 2005; Nerur et al., 2005). The traditional approaches are often also characterized as a formal, process-oriented methodology that focuses on planning, comprehensive documentation and heavy testing (Khan, Qureshi, & Khan, 2011; Nerur et al., 2005; Dybå & Dingsøy, 2008). A collection of characteristics and a comparison with the agile software development approaches is presented in Table 3.

One popular and traditional method for software development is the *Waterfall* method. This method is a plan-driven process, which is characterized by planning and scheduling before starting the actual development (Sommerville, 2011; Shastri, Hoda, & Amor, 2021). The process itself is usually conducted of five fundamental activities shown in Figure 2, that is based on a sequential approach where a new activity starts after one is fully finished (Despa, 2014; Aitken & Ilango, 2013; Stoica, Mircea, & Ghilic-Micu, 2013). Those activities are also part of the main criticism against the *Waterfall* method, which explains that the method itself is less flexible when handling changes in the project (Shastri et al., 2021). Besides being a heavyweight approach, literature has also described the benefits of this model. The benefits lie within the advantages of documentation, coordination and that the approach itself is easy to understand, by making the *Waterfall* approach easy for new people joining the team (Stoica et al., 2013). In fact, understanding the benefits of this approach is important for later understanding why some resist the adoption, fall back to "the old way" and continues with traditional approaches.

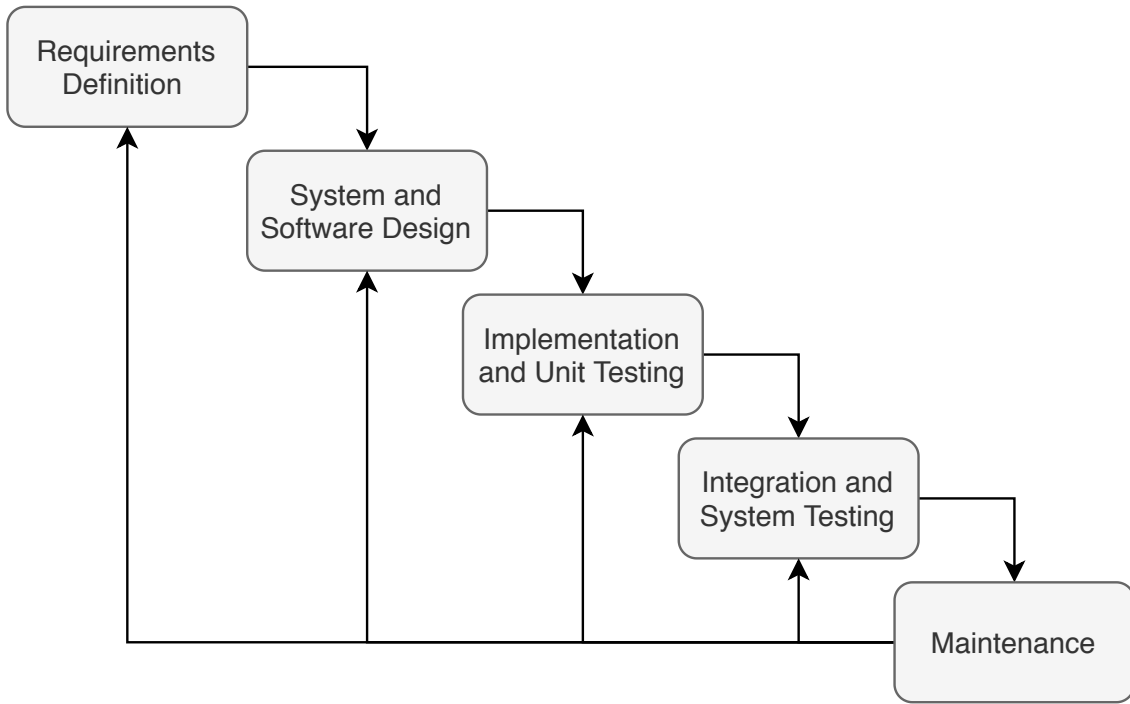


Figure 2: The five activities representing the Waterfall method (Sommerville, 2011), *figure originally created for the autumn and Specialization project (Brynildsen, 2020)*.

2.3 Agile Software Development

As previously described, the traditional and plan-driven approaches have often been associated with being heavy and cumbersome, especially in situations where the project requirements are changing (Livermore, 2007). As a solution to the weaknesses of the traditional approaches, agile as a non-linear, iterative and change positive approach were created (Livermore, 2007; Hoda, Noble, & Marshall, 2013; Dingsøy, Dybå, & Moe, 2010). Agile software development is more lightweight than traditional software development and focuses on the principles (See Table: 2) from the agile manifesto (Sommerville, 2011). This to achieve continuous delivery in an iterative approach, where the focus is on improving customer relations and quickly react to different changes (Hoda et al., 2013; Stray, Memon, & Paruch, 2020). One of the main reasons agile has been so successful is the fact that agile is improving the traditional methods with an iterative approach where specified functionalities are prioritized each iteration (Hoda et al., 2013). Agile software development is often described as a democratic approach where the teams have no strict hierarchy and all decisions are made collectively by an interdisciplinary team (Hoda et al., 2013). This implies an involving process where teams and individuals often take more ownership

and responsibility of the development processes. Other reasons that organizations choose to leave the traditional methods and adopt agile is in fact that studies have indicated that agile software development uses less time to marked and often delivers software with higher quality (Li, Moe, & Dybå, 2010). A complete comparison and a summary of the key differences seen between the traditional- and agile software development approaches are presented in Table 3.

Principle	Description
Customer involvement	Is about always involving the customer in the development process, decisions, prioritization and the evaluation of each iteration. The customer should also provide feedback after each iteration and on the incremented product.
Incremental delivery	Based on the prioritization and the customer's specifications the product is developed incrementally and delivered partly after each increment. This provides the customer to give feedback and evaluating the process before the development continues.
People not the process	Each team should not be limited by processes, but rather create and develop their own flexible way of working that highlights individuals and the skills of the team.
Accepting change	A system should be designed to accommodate change, as the system requirements often changes.
Maintain simplicity	Keep the development processes as simple as possible and eliminate or reduce the complexity if possible.

Table 2: The core principles of agile software development, rewritten and based of (Sommerville, 2011), *Original created for the autumn and Specialization project (Brynildsen, 2020)*

	Traditional development	Agile development
Fundamental assumptions	Systems are fully specifiable, predictable and build with extensive planning	High-quality software is built by iterations and continuous change based on customer feedback.
Control	Process centered	People centered
Project management	Command and control	Leadership and collaboration
Knowledge	Explicit	Tacit/implicit
Role Assignment	Individuals – favors specialization	Self-organizing teams – encourages role interchangeability
Communication	Formal	Informal
Customer involvement	Important	Critical and continuous
Project cycle	Guided by tasks or activities	Guided by product features
Development model	Life-cycle model	Evolutionary-delivery
Preferred organizational structure	High formalization (Mechanistic)	Flexible (Organic)
Project planning	Up front	Continuous
Documentation	Substantial	Minimal
Quality control	Heavy planning, strict control and heavy testing	Continuous control of requirements, design and testing

Table 3: Key differences between traditional and agile software development, Originally from (Dybå & Dingsøy, 2008; Nerur et al., 2005; Conboy et al., 2011)

Limitations of Agile Software Development

Besides all the beneficial aspects of agile software development, there also exists criticisms to the methodology and the approaches (Dingsøy, Fægri, & Itkonen, 2014). One of those is that the agile methods miss out on architectural decisions and when the methodology scale, agile projects become significantly harder to estimate the project effort, coordinate larger teams and direct face-to-face communication (Dingsøy et al., 2014; Balaji & Muru-

gaiyan, 2012; Awad, 2005). Another reported limitation is that besides being simple, agile software developing methods is often difficult to implement, as they can be hard to manage and usually need extensive training and coaching (Hayes & Richardson, 2008). Scaling and using agile in larger teams is also reported as a major limitation to the methodology (Awad, 2005), as coordination, face-to-face communication and handling agile teams becomes significantly more complex when the team's increases in size (Awad, 2005). Limitations regarding the increased number of different agile methods are also addressed as a problem, as choosing the correct method for a particular project might be challenging (Hayes & Richardson, 2008).

2.3.1 Agile Methods

In agile software development, several lightweight methods like; *Scrum*, *Extreme Programming (XP)*, *Crystal Clear*, *Dynamic Systems Development Method (DSDM)*, *Feature-Driven Development (FDD)*, *Lean software development* and more is often used. However, an explanation of every method and lightweight approach is out of the scope of this project and master thesis. For further readings⁵, see the article "*Empirical studies of agile software development: A systematic review*" by Dybå and Dingsøy, which provides a brief explanation of every method. However, below is a brief introduction to the methods *Scrum* and *Kanban*, which are relevant for the results (Section: 4) and discussion (Section: 5) of this thesis.

Scrum

Scrum is one of many popular agile software development methods, and an iterative approach for developing software (Pries-Heje & Pries-Heje, 2011). Being an iterative approach, Scrum is divided into iterations, cycles or "*Sprints*", which last over a period of two to four weeks (See Figure: 3) (Kumar & Bhatia, 2012; Pries-Heje & Pries-Heje, 2011; Sommerville, 2011). In each sprint, the goal is to create and develop one iteration or part of the software, based on a set of prioritized requirements and user stories. The "*Product backlogs*" owned by the Product Owner, as described in Section 2.3.2 includes a lists of business requirements and functionality, which later are prioritized and included in Sprints

⁵**Further readings:** A short explanation, with references are available in "*Table 1: Description of main agile development methods, with key references*" (Dybå & Dingsøy, 2008, pp. 835)

(Pries-Heje & Pries-Heje, 2011; Vlaanderen, Jansen, Brinkkemper, & Jaspers, 2011; Lei et al., 2017). Before and after each sprint several team activities take place. The first activity is often the *"Sprint planning"*-session, which has the purpose of accepting and splitting the requested functionality into smaller pieces, as well as estimating the effort required to complete the task (Vlaanderen et al., 2011; Pries-Heje & Pries-Heje, 2011). Another activity is the every day and short *"Stand-up meeting"* (often around 15 minutes), which is performed every day throughout the sprint. The meeting is also led by the Scrum Master (Explained in Section: 2.3.2), and has the purpose of letting team members inform each other on the progress, their current work status and if any help is needed to continue the work (Boehm & Turner, 2005; Lei et al., 2017). Throughout the sprint, the team develops and creates a delivery to the customer. This delivery is based on the tasks and the functionality that was prioritized, accepted and included in the *"Sprint backlog"*, for that particular sprint (Lei et al., 2017). After the sprint, the team perform a *"Sprint Review"* and *"Retrospective"*, which includes discussing what each individuals did and the process of evaluating the sprint for future improvements and learning (Vlaanderen et al., 2011; Pries-Heje & Pries-Heje, 2011; Lei et al., 2017).

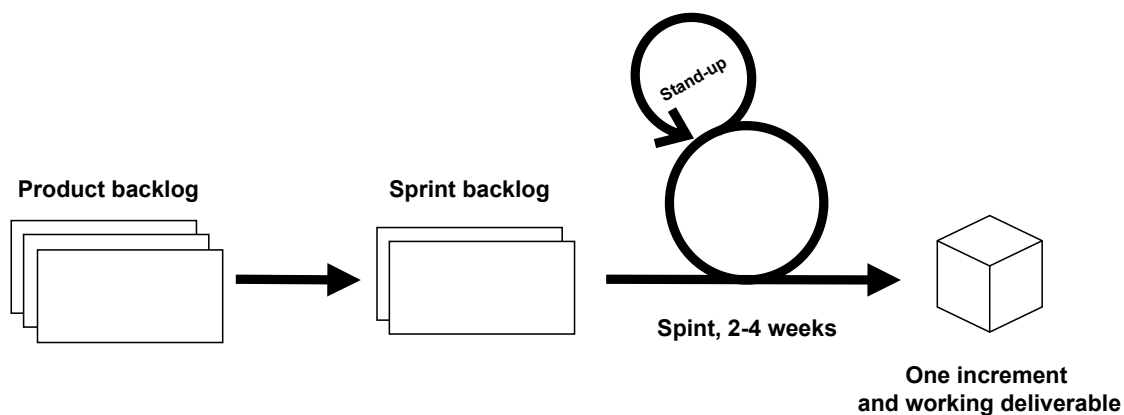


Figure 3: The Scrum process, *recreated and inspired of (Lei et al., 2017), (Boehm & Turner, 2005) and (Hayes & Richardson, 2008)*

Kanban

Kanban was originally a Japanese term used for scheduling manufacturing processes, and the method is often associated with Lean thinking⁶ (Ikonen, Pirinen, Fagerholm, Kettunen, & Abrahamsson, 2011; Ahmad, Markkula, & Oivo, 2013). In software development, the Kanban method is a visualization of the project's workflow and the current work in

progress (Ahmad et al., 2013). The method has a goal to minimize the work-in-progress by limiting the number of tasks to some predefined and specified items (Ahmad et al., 2013; Lei et al., 2017). To visualize the current project workflow the Kanban method provides a specific tool called "Kanban board" (See Figure: 4). The goal of this board is to provide a visualization of the current status for the work-in-progress by visualizing assigned tasks and provide an overview of tasks at each stage (Ahmad et al., 2013). The Kanban board exists of several steps with a predefined maximum of available task slots. A task gets pulled from the backlog and when completed at one stage, the task moves down to the next stage (Lei et al., 2017). In short, the method is all about visualizing the progress and creating the right thing at the right time by only implementing components needed and components that can be tested and deployed (Lei et al., 2017).

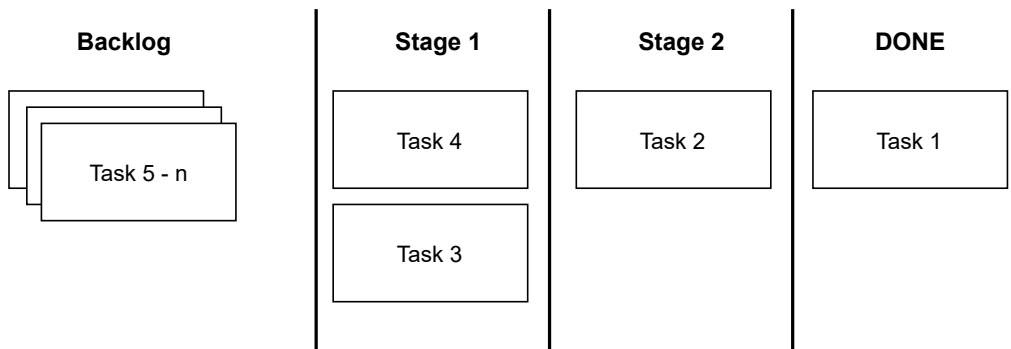


Figure 4: The Kanban process, inspired from "Fig. 3. Kanban Process overview" by (Lei et al., 2017)

2.3.2 Agile Roles

The agile methods and approaches often include new roles, that existing projects and teams usually do not have. The paper will further present some of the main and most important roles in the context of agile and agile transformations. It is also essential to keep in mind that different organizations can use roles differently and also have various names on traditional agile roles.

⁶"Lean thinking is a framework or philosophy, which can be applied to any process for removing unwanted elements, actions and ensuring that a chain of value is maintained." (Hicks, 2007)

Further readings: (Hicks, 2007)

Agile Coach:

The *Agile Coach*, is a coaching role that is often introduced to increase the speed and help organizations grow their agile transformation (Stray, Tkalic, & Moe, 2020; Stray, Memon, & Paruch, 2020; O'Connor & Duchonova, 2014). This by helping teams and individuals learn and understand agile in an effective way (O'Connor & Duchonova, 2014). The results from the study *The Agile Coach Role: Coaching for Agile Performance Impact* by Stray et al. indicate that Agile Coaches have an important role in establishing the motivation for reaching the project goals (Stray, Tkalic, & Moe, 2020). The coaches do this by helping the team find and agree upon common rules, technical guidance and increasing knowledge by establishing the awareness of the agile mindset, processes, methods and each individual's role in the team (Stray, Tkalic, & Moe, 2020).

Product Owner:

The *Product Owner*, has the main purpose of representing the customer and being the owner of the product backlog, which includes all prioritized tasks for the product in development (Brown, 2013; Kniberg, 2007; Pries-Heje & Pries-Heje, 2011). This means that the Product Owner has the main responsibility for "what" is done in the project (Sverrisdottir, Ingason, & Jonasson, 2014). The Product Owner also has the main authority to prioritize and decide user stories (Brown, 2013). According to Scrum do also Product Owners have the responsibilities for the project's finance, as well as handling the requirements in the product backlog (Sverrisdottir et al., 2014).

Scrum Master/Team Lead:

The *Scrum Master* is the person who has the main purpose to make sure the Scrum process and method are kept on track and that all ceremonies are followed by the rules of the Scrum approach (Brown, 2013; Sverrisdottir et al., 2014). The Scrum Master also serves as a team leader, that supervises the communication within the team, removes hinders and helps the team remove or solve disagreements and warnings in the team (Sverrisdottir et al., 2014; Kniberg, 2007; Shastri et al., 2021). Different from the Product Owner, the Scrum Master is responsible for "how" things are done (Sverrisdottir et al., 2014).

Project Manager:

The *Project Manager* role is not defined as a typical agile role but is often extensively practiced (Shastri et al., 2021). Traditionally, the Project Manager role is a critical role that is well-defined in the team's hierarchy (Shastri et al., 2021; Shastri, Hoda, & Amor, 2017). In traditional software development, the Project Manager is responsible for leading the team in the right direction, as well as planning, managing discussions, budgeting and take decisions on behalf of the team (Shastri et al., 2017). Traditionally the Project Manager is also responsible for negotiating contracts and details with the customer (Cockburn & Highsmith, 2001). In an agile project, the literature shows that the Project Manager still has much of the same responsibilities, with only some modifications to fit a more agile approach. The results from the Grounded Theory study "*The role of the project manager in agile software development projects*", explains that the main responsibilities of a Project Manager in an agile setting are to facilitate and mentor the team, as well as budgeting, reporting and track the progress of the project (Shastri et al., 2021).

2.4 Traditional Versus Agile Organizations

In contrast to an agile organization, which is built on a network of self-organized teams are the traditional organization often related to a static hierarchy, structured after separated units of departments and employees, usually described as silos (Brosseau et al., 2019; Santos-Pereira, Durão, Fonseca, Ferreira, & Moreira, 2020). The traditional organization has often a strong hierarchy where every decision is made from the top-down and work is measured, evaluated and rewarded by individual bonuses (Aghina, Smet, & Weerda, 2016). A traditional organization is also often controlled by strong leadership and pre-defined processes (Vinekar, Slinkman, & Nerur, 2006). Leaders often plan and structure everything after linear and plan-driven methods (See Section 2.2), which often result in a controlled, slow and rigid organization where goals are created by the upper management (Santos-Pereira et al., 2020). In contrast, is an agile organization usually recognized as a learning organization, where decisions are made by self-organized teams (Brosseau et al., 2019). The article "*Insights towards an agile enterprise*" describes that one definition of an agile organization is that such organizations are fast-moving and based on factors such as robustness and the capability to adopt new changes from the market quickly (Golob et al., 2020). To further understand the changing market and the change in customer's

need, an agile organization is built on the principles of frequent change, collaboration and reevaluation (H. B. Lee, Kim, & Park, 1999; Golob et al., 2020; Vinekar et al., 2006). An agile organization is often referred to as a dynamic and living organism that turns quickly and responds to changes while creating good value to stakeholders (Santos-Pereira et al., 2020).

2.5 Large-Scale Agile

Because of the major benefits in the organization and the radical changes that occur, an agile transformation is often introduced at scale from a wide and top-down perspective (van Solingen, 2020). As a response to the documented benefits of agile in smaller teams, larger organizations are adopting the methodology in larger contexts (Carroll & Conboy, 2020). This with the help of large budgets and a watching management (van Solingen, 2020). Such adoptions have shown to increase in complexity with the size of the organization, as agile methods often introduces major changes in the organizational culture and structure (Dikert et al., 2016; Dybå & Dingsøy, 2008; Stray, Memon, & Paruch, 2020).

As described by Dingsøy and Moe, large-scale agile is about using the agile methodology in the entire organization, as well as in multiple- or large teams (Dingsøy & Moe, 2014). This is done by transferring agile principles to a scaled-up setting, where the entire organization has adopted the methodology (Fuchs & Hess, 2018). However, the literature has no clear definition of what "large" is. The article *Scaling agile in large organizations: Practices, challenges, and success factors* by Kalenda et al., defines large-scale as a dependency of the number of teams (Kalenda, Hyna, & Rossi, 2018). They explain that 2-9 teams, are described as "large-scale" (Kalenda et al., 2018), while Dikert et al., defines large-scale as more than six teams, that includes at least 50 team-members (Dikert et al., 2016; Edison, Wang, & Conboy, 2021).

As described in the article *"Applying Normalization Process Theory to Explain Large-Scale Agile Transformations"*, by Carroll and Conboy, large organizations are now trying to adapt and transform organizations into agile methodologies (Carroll & Conboy, 2020). Those transformations often include complex agile large-scale frameworks like; Scaled Agile Framework (SAFe)⁷, Large Scale Scrum (LeSS)⁷, or the Spotify-model⁷ (Carroll & Conboy, 2020; Edison et al., 2021; Kalenda et al., 2018). However, each framework is complex and a in-depth explanation of each is therefore out of scope for this master thesis

(See further readings⁷).

2.6 Change Management

Change management, as explained in the article "*Change management through leadership: the mediating role of organizational culture*" is a systematic approach for handling changes in people and resources based on several factors (Al-Ali, Singh, Al-Nahyan, & Sohal, 2017). The concept is about guiding and preparing the organization for a successful change (Tang, 2019). Literature has found that change is something people can fear, resist or welcome in the organization (Galli, 2019; Trost, 2020), as such changes often introduce new structure or dismissal of employees and department. Handling Change management and organizational change is usually related to individuals and may therefore vary. An example of this is described by Perkins, as the different understanding of Change management by professionals and managers (Perkins, 2018). Perkins explains that professionals often see change as the implementation of new tools, while managers often relate Change management to the improvement of a change within the time-box, budget and scope (Perkins, 2018). Others explain that Change management is about archiving some desired goals, state or benefits, by transforming from the current organizational state to a future state (Joseph Galli, 2018; Association of Change Management Professionals, 2021; Altamony, Al-Salti, Gharaibeh, & Elyas, 2016; Errida et al., 2018). The article "*Change Management Models: A Comparative Analysis and Concerns*" by Galli, explains that to begin a change initiative an organization often needs to handle and consider several change phases (Joseph Galli, 2018):

1. **Identification of the change:** Establishing the type, reason and scope of change, as well as finding and presenting the current and future state in the organization.
2. **The details:** Finding what the process, people and behavior changes are, what the cost of the change will be and investigating the risks that might occur.
3. **The change approach:** Includes analysis of stakeholders, resistance of change and changes in roles.

⁷**Further readings:** A brief introduction to the characteristics of the framework (including references) are available in: T. Dingsoeyr, D. Falessi and K. Power, "Agile Development at Scale: The Next Frontier," in *IEEE Software*, vol. 36, no. 2, pp. 33-34, March-April 2019, doi: 10.1109/MS.2018.2884884.

-
4. **Implementation:** Creating plans for handling actions, communication, training and resistance. Also includes the transition of the management.
 5. **Monitoring:** Reviewing management, reporting and monitor behavior.

(Joseph Galli, 2018)

2.6.1 Organizational and Planned Change

As earlier described, organizational change is about moving an organization from one state to another and is a common situation in most organizations e.g. (Errida et al., 2018; Tang, 2019; Le Grand & Deneckere, 2019; Allaoui & Benmoussa, 2020). Such changes often include everything from introducing new technology and reorganization in departments to restructuring in management (K. Lee, Sharif, Scandura, & Kim, 2017). Those changes often benefit the organization by moving towards higher efficiency and effectiveness (Mitrović & Ralević, 2010; Errida et al., 2018). Studies like "*Procedural justice as a moderator of the relationship between organizational change intensity and commitment to organizational change*" by Lee et al., explains that earlier research has proven that besides being a benefit to the organization, the organizational change often increases the stress on employees (K. Lee et al., 2017), which may result in resistance and other challenges to the initiative e.g. (Tavakoli, 2010). Research has described that a critical factor to the success of the initiative lies in changing attitude, as an organizational change can not be considered successful unless people change their actions (Lenberg, Wallgren Tengberg, & Feldt, 2017). As described by *Trost* in the book "*Human Resources Strategies: Balancing Stability and Agility in Times of Digitization*"; Change management is about the change of human's mindset and should not only focus on planning for the economical and technical changes (Trost, 2020), but also the change in human's attitude and behavior.

To successfully change organizations three major phases are normally included: *preparation*, *implementation* and *follow-through* (Stobierski, 2020). One way of preparing for the change is by performing *planned change*, which Change management describes as the purpose of planning and analyzing the current situation and the possible risks while changing (Jacobsen, 1998). The planning phase should also include communication and how to communicate the change to employees (Trost, 2020). This because changes often cause confusion, uncertainty, questions and challenges that might be reduced if a structured plan is communicated effectively (Trost, 2020). Other important factors are to create a

roadmap for measuring the change success and make sure the planned change fits the business goals in the organization (Stobierski, 2020).

As described by Stobierski, organizational change have two main types (Stobierski, 2020). The first is the *Active changes*, which are often minor incremental changes in the organization (Stobierski, 2020). The second type and the focus of this master thesis is the *Transformational changes*, which Stobierski explains as large-scale changes that effects the whole organization including people, structure, strategies and business goals (Stobierski, 2020).

2.6.2 Methods in Change Management

Because most change initiatives and organizational changes are different and depend on several factors, a standardized method is not suitable for every situation. The management must choose the correct change method based on the individual situation when conducting the changes (Joseph Galli, 2018). In this project an explanation of every method is therefore out of scope. However, at the end of this section, the methods are relevant for the results (See Section: 4) and discussion (See Section: 5), and are therefore briefly explained.

The first method is the *Kotter's Eight Steps* of change, which is a very well known theoretical model, based on eight steps explaining the implementation of a change initiative and how to include the people and employees (Joseph Galli, 2018). The second method is the *ADKAR* model which is a practical model, that focuses on changing individuals and teams in the process of achieving an organizational change (Joseph Galli, 2018).

Kotter's Eight Steps

Kotter's eight-step model of change (See list below) is created by John P. Kotter and was created after an investigation of several organizations performing changes (Kotter, 1995; Brynildsen, 2020; Tang, 2019). The model itself is based on the most common errors that managers make while introducing change initiatives in an organization (Mishra, 2013). Kotter explains that the core challenges while changing is not related to "*strategy, culture, system or structure*", but rather changing peoples behavior (Wipfler & Vorbach, 2015). Kotter describes that organizational changes often fail due to senior manager's mistakes in establishing a sense of urgency, but also in establishing effective leadership, removing

obstacles and creating a systematic plan for the change (Galli, 2019). The method is all about the initiative for large-scale, organizational restructuring, adjustments, cultural- and strategic changes, and does not focus on small and individual changes (Troost, 2020). Kotter explains that the model is based on a top-down approach where the change is driven, planned, and structured by the senior management (Troost, 2020). All eight steps are presented below, followed by a brief introduction and Table 4, presenting advantages and disadvantages with the model.

1. Establish a sense of urgency
2. Create a core coalition
3. Create a vision and a strategy for change
4. Communicate the vision
5. Remove obstacles, barriers and resistance
6. Create short-term wins
7. Build on the change
8. Anchor the new change in the organizational culture

The first step is about making the managers understand why the need for change and use the "why"-factor to establish their support (Mishra, 2013). The second step is about creating a coalition that more effectively can present and build the urgency (Joseph Galli, 2018; Mishra, 2013). Creating a vision and a strategy is about planning for a roadmap to present the change initiative to employees, as employees have to understand why they should adopt the new changes (Joseph Galli, 2018). This explains the fourth step, which is about communicating the vision and strategy to employees and creating motivation for changing (Mishra, 2013; Joseph Galli, 2018). As communication alone does not establish the change, step five encourage managers to remove obstacles and barriers so employees can try out new ideas (Kotter, 1995). As described by Kotter; *"real transformations take time, and without short-term wins, employees will not follow the change in a long time"* (Kotter, 1995). This, therefore, explains the importance of step six, which is to present short-term wins to keep the change from fading away and keep the motivation going. The two last steps are about firstly create more change to prevent teams from falling back,

as the last step is about establishing the newly adapted change as the new norm in the organization (Joseph Galli, 2018).

Advantages	Disadvantages
<ul style="list-style-type: none"> - Provide step for involving employees in the change. - Guides a top-down approach and good for a traditional (hierarchical) organization. 	<ul style="list-style-type: none"> - No involvement of employees from the beginning. - Disadvantages when steps are performed incorrectly or skipped.

Table 4: Advantages and Disadvantages with the *Kotter's eight-steps* of change, collected from (Joseph Galli, 2018)

The ADKAR-model

The *ADKAR-model* which was created by Prosci (1998), is a change-model characterized by focusing on the individual change (Galli, 2019; Tang, 2019; Rohmah & Subriadi, 2020). The model is a people-oriented model that centers and focuses on changing individuals (Galli, 2019; Hansen, 2019). By changing individuals, the model tries to collectively change the organization by affecting each individual through a five-step process explained below, together with advantages and disadvantages in the model (Table 5).

Awareness:

The *Awareness* is when the organization informs individuals about the need for change (Joseph Galli, 2018). This is to make sure individuals are informed and that the planned change is understood by everyone in the organization (Galli, 2019). The Awareness step should also explain to individuals what they get out from changing, as well as establishing the basic understanding of the change and the risks involved while changing (Hiatt, 2006).

Desire:

This step is about being supportive and engaging for the change (Hiatt, 2006). *Desire* includes the motivation and the willingness by individuals to perform new changes and each individual should know the reason for why the organization is

changing (Joseph Galli, 2018; Galli, 2019; Rohmah & Subriadi, 2020).

Knowledge:

The *Knowledge* stage is about presenting the relevant knowledge needed to participate in the change (Joseph Galli, 2018). This, therefore, includes information and training on change behaviors, processes, new tools or new roles (Hiatt, 2006).

Ability:

Ability is the step or phase that turns knowledge into action and the actual execution of the change initiative (Hiatt, 2006). This step is performed when a team or group of individuals shows the knowledge and willingness to implement a change correctly (Hiatt, 2006; Joseph Galli, 2018).

Reinforcement:

The last step is about maintaining and sustaining the change within the organization (Joseph Galli, 2018). This can often include two types which is the *external reinforcement* and the *internal reinforcement* (Hiatt, 2006). The external is about celebrating and provide rewards for transforming, while the internal is each individual's satisfaction and benefits from implementing the change (Hiatt, 2006).

Advantages	Disadvantages
<ul style="list-style-type: none">- Focuses on involving the employees and changing project teams - Individual acceptance of change	<ul style="list-style-type: none">- Better suited for project teams rather than large organizations.

Table 5: Advantages and Disadvantages with the *ADKAR-model*, collected from (Joseph Galli, 2018)

2.7 Agile Transformation

As explained in the previous sections agile has a lot of advantages in both the team- and organizational culture, customer relationship, and adopting changes in the organization. Improvements in productivity and less time to market, as well as improved team com-

munication and an increased ability to handle change, are some of the effects and main goals organizations are reporting as reasons to start the adoption of agile methodology (Rodríguez, Markkula, Oivo, & Turula, 2012). Traditionally agile is associated with principles and methods used within small software development teams, but now have also other departments and the organizations in their entirety seen the benefits of adopting the agile principles (Barroca et al., 2019; Dikert et al., 2016). This adoption and implementation is what Barroca et al. are defining and labeling as the *"agile transformation"* (Barroca et al., 2019), and implies implementing agile methodology in non-developing areas (Mikalsen, Stray, Moe, & Backer, 2020). Another definition is that; an agile transformation is a process of changing from a traditional software development process to a less formal, iterative and people-centered agile approach (Gandomani, Zulzalil, & Nafchi, 2014). To establish a better understanding of what an agile transformation is, Figure 5 includes and illustrates some key changes and a simplified understanding of what an agile transformation is and what organizations are trying to transform towards.

An agile transformation is a major change that often introduces new technical approaches and huge changes in the existing organizational culture (Gandomani et al., 2014). The transformation is a time-consuming process that affects the whole organization and often involves changes in roles, responsibilities and practices (Stray, Memon, & Paruch, 2020). Cultural change has often shown to result in many challenges, including change of people's structure and behavior (Gandomani et al., 2014). Performing such transformation is therefore more about handling the constant change and regularly perform small changes to the organization and the structure within (Delgosaie & Bolijn, 2019). Such changes should be about reorganizing the organization to fit the agile principles and remove the traditional silos⁸ (Delgosaie & Bolijn, 2019). The research paper *"Becoming Agile in the Digital Transformation: The Process of a Large Scale Agile Transformation"* by Fuchs and Hess, explains that agile transformations often are conducted in either a *"one-time big bang"* or as a *"stepwise approach"* (Fuchs & Hess, 2018). Either way, literature has shown that such transformations are complicated and usually take several years to complete (Stray, Memon, & Paruch, 2020).

⁸**Organizational silo:** Often used in traditional hierarchical organizations and refers to: *"the separation of different departments and the employees who work there"*. <https://www.lightercapital.com/blog/what-are-organizational-silos/>

Because most transformations have different motivations and reasons to change, a repeatable and rhythmic recipe is usually not suitable when performing the transformation (van Solingen, 2020). However, Solingen presents eight phases and steps that have shown to be helpful in other successful agile transformation cases:

1. Initial assessment that maps out the current status, obstacles and where to start the agile adaption in the organization.
2. Formulate the why factor and the urgency of the transformation.
3. Create a blueprint for communicating the direction of the transformation.
4. Find and work out a change strategy.
5. Create a roadmap for the order of implementation.
6. Iterative implementation of the roadmap.
7. Measure and reevaluate the roadmap.
8. Integrate and anchor the changes in the organization and team culture.

(van Solingen, 2020)

Common for the eight phases by Solingen, is the focus on planning, implementing and anchoring the transformation. The principles are relatable to phases (preparation, implementation and follow-through) explained in Section 2.6, for achieving a successful organizational change. The five first phases indicate that focusing on communication, structuring and roadmapping is essential for succeeding, as they all explain strategies or factors often related to a preparation stage. Further, the phases relate to agile principles such as iterative implementation and reevaluation, which commonly implies that a successful agile transformation should be implemented after agile principles and constantly reevaluated for measuring the effect. The last principle is about keeping the agile methods and anchor the new approaches in the organizational culture.

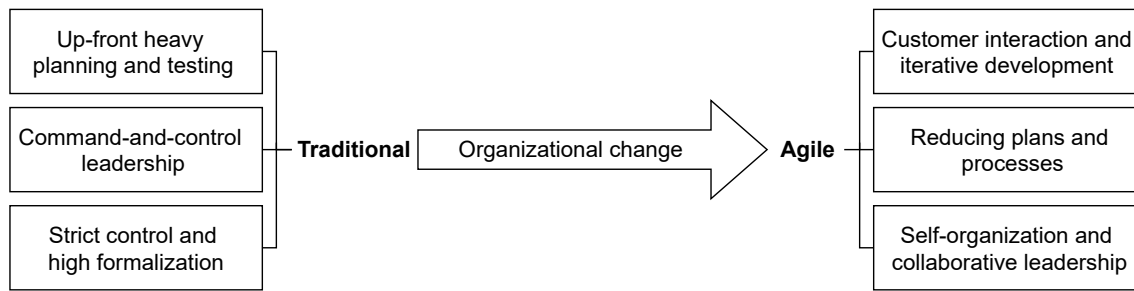


Figure 5: The agile transformation process, illustrating the change from traditional to agile.

2.7.1 Coaches Role in an Agile Transformation

As earlier described in Section 2.3.2, Agile Coaches is a often used role in agile transformations. The role is mainly used for communication and coaching activities e.g. (Stray, Tkalic, & Moe, 2020) and is described by literature as a critical role in the adopting of agile (Parizi, Gandomani, & Nafchi, 2014). As described in this paper, moving from a traditional approach towards agile principles is often related to challenges and is by literature explained as a time-consuming process involving several hinders (e.g. resistance, lack of knowledge, incorrect leadership, etc.) (Sureshchandra & Shrinivasavadhani, 2008). The article *"Moving from Waterfall to Agile"* found that coaches tasks were often related to "unlearning" the traditional mindset and introducing the agile approaches (Sureshchandra & Shrinivasavadhani, 2008). The coaches, therefore, often needed to have a positive and patient mindset while introducing the changes (Sureshchandra & Shrinivasavadhani, 2008). Dikert et al. also highlight that coaches have an essential role when performing an agile transformation, as coaching activities showed to benefit and increasing the success of an agile transformation (Dikert et al., 2016). The article explained that coaching was essential for presenting and guiding the teams, as well as creating a focus on the agile mindset and approaches rather than the available tools (Dikert et al., 2016).

In an agile transformation are often Agile Coaches responsible for helping the organization implement the agile methodology (Stray, Memon, & Paruch, 2020). The coaching is usually performed using initial training, as well as facilitating teams to make sure the teams follow the new agile principles (Stray, Memon, & Paruch, 2020). Agile Coaches should express and communicate the real expectations to the teams, as some studies have explained that teams transforming to agile could develop unrealistic goals as the approaches often are new and less known in the organization (Gandomani & Nafchi, 2016). The coaches should

help the teams be familiar with the new agile approaches, by overwatching practical work, answer questions, explaining new roles and methods, and make sure the agile adoption stays on track with goals and visions (Parizi et al., 2014).

3 Method

To answer the research question presented in Section 1.2, a research method was applied. This section will therefore describe the selected research method in detail. The section starts with a brief introduction to the selected research strategy and method, followed by an explanation of how participants were collected and why the cases were chosen to examine in greater detail. Secondly, the explanation of the data generation method and how the data were analyzed is presented and explained. At the end, an evaluation of the research method is presented together with limitations found in the chosen method for this paper.

3.1 Research Strategy and Method

The research strategy and method (Appendix: A) chosen for this research project is based on the framework "*Model of the research process*" explained in the book "*Researching Information Systems and Computing*" by Briony J. Oates (Oates, 2006, Ch. 3, pp. 33). This framework is centered around multiple steps, where a research strategy, data generation- and analysis method was chosen. Each step from the framework is therefore explained in the following sections below (3.1.1, 3.3 and 3.4).

3.1.1 Case Study

For this research project, a *Case study* was chosen as the research strategy. The reason was to create empirical evidence based on the research questions presented in Section 1.2, and further investigate the topics researched in the specialization project and literature review (Brynildsen, 2020). The intention of the strategy Case study is to create a rich and detailed explanation of the focused areas that are being investigated in the case (Oates, 2006). This is done by investigating the relations and how those are connected and affecting the case (Oates, 2006). A Case study has therefore the opportunity to provide a deeper understanding of the relationship and phenomena used in the particular case or situation (Runeson & Höst, 2008). A Case study is very suitable for studying and researching topics from the software engineering field, as the method focuses on contemporary phenomena in the natural setting (Runeson & Höst, 2008). In the book "*Case Study Research and Application*" by Robert K. Yin, a Case study is presented as highly relevant to investigate

research questions seeking to investigate some "*contemporary circumstance*" or "*social phenomenon*" (Yin, 2018).

As described by Runeson and Höst in the article "*Guidelines for conducting and reporting case study research in software engineering*" (Runeson & Höst, 2008), a Case study is usually based on five major phases:

1. Case study design and planning
2. Preparation for data collection
3. Collecting evidence
4. Analysis of collected data
5. Reporting

(Runeson & Höst, 2008)

Those five steps were used as the base on how this Case study was designed and conducted. Figure 6 highlights the selected processes, as well as the different phases that were performed and included in this study. The first box, named the *researching phase* illustrates the *design and planning* step explained by Runeson and Höst (Runeson & Höst, 2008). This phase includes the research on relevant theory, defining research questions (Section: 1.2), choosing research strategy and defining the purpose of what to achieve (Runeson & Höst, 2008). Step two and three are illustrated by the second box *collecting data and interviewing* and is presented in section 3.1, 3.2 and 3.3. Those sections explain the selected strategy and the methods used to collect the empirical data for this study. The last two steps are illustrated by a combination of the last three boxes and mainly represented by section 3.4, 4 and 5.

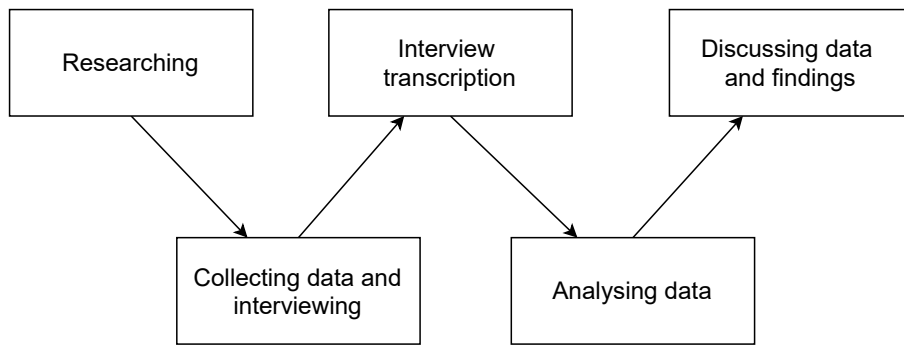


Figure 6: Method phases and investigative procedure.

As earlier explained, *Robert K. Yin* explains that a Case study is highly suitable for investigating social phenomena (Yin, 2018), which an agile transformation has showed to be, as such transformations often affect people’s behavior, decisions and mindset. A Case study are also suggested to have one of the three main types: *exploratory*, *descriptive* and *explanatory* (Oates, 2006). In this study, the focus will be on an *exploratory* Case study, as an exploratory study often is used when literature has limited resources in the field and a real-life investigation is suitable to collect more data (Oates, 2006).

The project is based on several cases, which implies a *Multi-case* strategy (Bryman & Bell, 2011). This approach is selected to provide a broader range and different aspects to the analysis, which can be used to discuss similarities and differentiation’s in the cases. The cases were selected based on a *literal replication* (Ridder, 2017; Shanks, 2002), which means different cases and organizations were selected to find similarities for later discussions. Literal replication was also chosen to investigate if different situations and organizations had similarities in how challenges were solved and how Change management was used. A literal replication also provides a stronger *“external validity”* (Shanks, 2002), as further explained in the method evaluation section (3.5). The focus of this study has been to investigate the instance and the cases from a short-term perspective and in the natural setting. This to give the best inside and answers for the data analysis.

3.2 Cases

This sub-section has the goal to present a brief introduction to each case, as well as explaining how the cases, informants and participants were contacted and selected. Each case is described with anonymization in mind and will therefore not include any names or information that can be used to directly connect the case to an organization. The

cases were also scoped to interviewing participants from different levels of the hierarchy to create an understanding of the agile transformation in the organization and not just the involvement and adaption of agile in a particular team. This is done because an agile transformation is not often only affecting a particular team, but rather the organization in total. To also be able to investigate the research questions from Section: 1.2, an investigation and getting information and knowledge from all heretical levels was critical to discussing the results later in this thesis.

3.2.1 Selecting Participants and Cases

All participants and informants in this study were gathered by contacting each case individually. The cases were provided with a set of desired roles, that were particularly interesting when investigating each case. Every informant and interviewee were therefore based on those suggested roles. All informants are employees with different roles and experiences in the organizations. The informants also had a different level of agile knowledge and various experience with agile before the transformation (See Appendix C for distribution diagram). This provided the possibility to investigate the research questions (Section 1.2) at different hierarchical levels and find challenges based on the organizational structure. The interviewees were also contacted separately and informed of both topics and reasons for the project, as well as an information- and privacy agreement. Each informant was interviewed once, and an overview of all interviews is presented in Table 6. An explanation of some of the most common agile roles is also described in Section 2.3.2.

3.2.2 Case One

Case One a large financial organization, that has several thousand full-time employees in the Nordics. Case One is also used as the main case for this thesis and has the purpose of investigating the organization's agile transformation and the involvement of Change management. The informants from case one are represented and based on suggested roles at different hierarchical levels, as the goal has been to investigate how the Change management has affected the transformation and the challenges occurring (See Section: 1.2). The roles were selected to fill both coaching and leading roles at a team level, middle management level and at the top section of the organization. Roles such as Project Managers, Product Owners, Section Leaders and Agile Coaches were therefore included. The infor-

mants were also not limited to one particular team, as the usage of Change management where often introduces and used at other hierarchical levels in the organization. Some of the informants are also located at different departments and have different levels of technical background. This results in a wider perspective of challenges in the organization and the various solutions that are involved. An overview of all participants from Case One is presented in Table 6.

Case One is a traditional and hierarchical organization that over years has performed several stages in its agile transformation. The transformation started as an initiative based on global and local competition and was first introduced in some developer teams for specific projects. The success of those teams led to a further initiative, including a reduction of traditional handovers, replacing waterfall with new agile methods (e.g. Scrum and Kanban) and introducing new agile roles (e.g. Product Owner and Scrum Master). The transformation has also led to a reorganization and several new agile initiatives involving Agile coaches and cross-functional teams.

3.2.3 Case Two

Case two is represented by a medium to large organization, working in the Nordics media and entertainment industry. Case two was in this project used as a contrast case, to find similarities and contrasting elements based on the two cases. The informants were also recruited the same way as in case one and included a suggestion of roles. As in case one, this case also investigated several teams. This to get a better sense of the different perceptions within the organization and how the agile transformation is affecting the organization in total. The case also included two informants with non-technical roles from none technical teams (See Table: 6) to investigate how the transformation has affected a team with less experience in technical development and at teams with no product development.

Before the transformation Case Two was a typical media organization focusing on delivering entertainment to the customers. As the market changed towards IT and larger global organizations started to create competition. The organization changed from a more traditional organization to an agile enterprise, by introducing agile in cross-functional teams. Case Two has transformed for a long time and has among other things, achieved to implement agile in most departments, reduced hierarchy and established open communication in the enterprise.

3.3 Data Generation Methods

The data generation method is about finding the empirical data from the selected strategy (Oates, 2006). In a *Case study* the data generation methods can vary, however interviews, observations and questionnaires are often used (Oates, 2006). As described in the article "*The qualitative interview in IS research: Examining the craft*" by Myers and Newman, the interview generation method is an essential method when collecting empirical evidence in a qualitative research study (Myers & Newman, 2007). For this project, interviews were selected as the main generation method, as the process mainly produces *qualitative* data, which also is the decided and preferred analysis for this thesis. Qualitative data was preferred in this study as it creates an in-depth understanding of the cases and their context (Kaplan & Maxwell, 2005), as well as an understanding of emotions, characteristics and situations needed to discuss the research questions described in Section 1.2. This study was also first designed with a triangulation as data generation method, however as explained in the Evaluation section (3.5), this was replaced with a single generation method due to limited access in the cases.

3.3.1 Interviews

An interview is a planned conversation, where the researcher has an agenda and purpose for the conversation (Oates, 2006). The goal is to answer a particular question or investigate a specific theme or topic in the selected case. In this project, the interviews have been performed digitally and in a "one-to-one" setting. Each interviewee was also contacted separately and informed of why they are contacted, what the project is about and what participation in the project will include. Since the interviews were digitally recorded an application for handling personal data, video- and voice-recordings were sent to and accepted (Case number: 867665) by the *Norwegian center for research data (NSD)*⁹. The interviewees were also informed and presented with information- and an agreement letter. This agreement letter had to be signed or digitally agreed to before the interview could start.

The interviews were structured as *Semi-structured interviews* (Oates, 2006; Bryman & Bell, 2011; Myers & Newman, 2007), which provided the freedom to change, restructure

⁹<https://www.nsd.no/>

and reformulate the questions and interview based on the answers provided. The *Semi-structured* approach was also chosen as this gives in-depth information and explanations of the topics. As a base structure, an interview guide (Appendix: B) was created and reevaluated for each role and case. The guides ensured that the interviews and the questions were as relevant to the informants as possible and had the main purpose to structure specific topics and themes. The guides provided structure to subjects and questions that were important to cover in each interview. The interview guide also ensured that all important topics were covered, as well as the semi-structured interviews provided the flexibility to change the theme and topic if needed. Each interview was conducted in Norwegian, as this was the mother language of most informants. This gave all informants the opportunity to speak more freely and the possibility to provide clear explanations. All interviews were structure after the principles suggested by Myers and Newman (Myers & Newman, 2007) (The list below is modified to this study):

1. Introducing the researcher, project and the privacy agreement.
2. Continued with some base introductory questions.
3. Starting the main part of the interview.
4. Summarize, thank and close the interview.

This approach was selected to first establish and explain the purpose of the interview. The opening questions were important for establishing some base information about the informant, which was essential for understanding the role and background before the main part started. Each interview was scheduled for 45 minutes to 1 hour and performed after the principles of letting the interviewees talk most of the time. This to get as much information as possible and prevent influence on the answers. All interviews resulted in a total of 157 transcribed pages, used in the analysis and discussion presented in Section 4 and 5.

All interviews were also conducted in five weeks, from around mid-February to mid-March, 2021 (Week 6-10, see Table: 6). Every interviewee was interviewed once, and all interviews were performed digitally due to the ongoing Covid-19 pandemic. All recorded interviews and personal information were also managed after the laws of privacy and suggestions from NSD⁹. Interviews were therefore stored at encrypted and password-protected drives, where keys and personal information were stored separately. The interviews were also fully

anonymized for both interviewees and organizations in the transcription process. This to prevent any reaction to either the organization or informants participating in this study.

Case One			Case Two		
#*	Date	Role	#*	Date	Role
P1	10.02.2021	Business agility coach	P9	19.02.2021	Product owner
P2	17.02.2021	Product owner	P10	22.02.2021	Agile coach
P3	17.02.2021	Section leader (IT department)	P11	26.02.2021	Product owner
P4	23.02.2021	Agile coach	P12	02.03.2021	Agile coach
P5	24.02.2021	Change manager	P13	04.03.2021	Team member (non-technical)
P6	24.02.2021	Agile coach	P14	05.03.2021	Team member (non-technical)
P7	02.03.2021	Middle manager			
P8	09.03.2021	Project manager			

Table 6: Overview of interviews and roles in Case One and Case Two

*Label for numbering participants

3.4 Qualitative Data Analysis

Based on the selected strategy and generation method, a *qualitative* data analysis was selected. This is based on the fact that Case studies tend to use qualitative data, as this provides an in-depth understanding of the investigated cases (Runeson & Höst, 2008). Qualitative data analysis also includes everything that is not numeric and is therefore very suitable to use in a *Case study* (Oates, 2006; Runeson & Höst, 2008). A *qualitative* data analysis was also selected as this provided the opportunity for a more detailed and in-depth investigation in the selected cases and the research topic. While the quantitative data analysis is based on statistics, the analysis of qualitative data is in contrast based on a sorting and categorization approach (Runeson & Höst, 2008). The approach was based on the suggestions provided from the book *"Researching Information Systems and Computing"* (Oates, 2006). Those steps included: data transcription, identification of key

terms and a categorizing of statements (Coding) (See BPMN model and Figure: 7). The statements were categorized into: no relevance, descriptive information and relevant to the research question (Oates, 2006). The statements relevant to the research questions were then coded based on a top-down approach, which included placing the statements in predefined categories and iterate on those. The categories presented in Section: 4 are based on the results and discussion given in the Specialization- and autumn project for this master thesis (Brynildsen, 2020, ch. 4 & ch. 5, pp. 20-35).

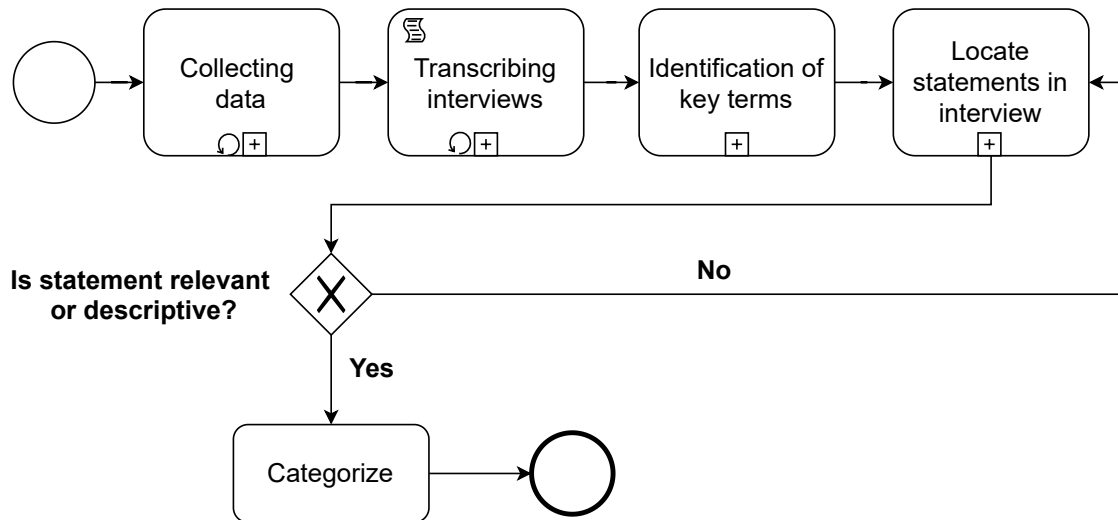


Figure 7: BPMN modeling showing the data analysis phase

3.5 Method Evaluation and Limitations

Based on the evaluation guides from the book *Researching Information Systems and Computing* (Oates, 2006, pp. 150, 198, 277), a suitable strategy and data generation method was chosen for this particular study, however as explained and suggested by Oates, the *Observations* method should ideally be included in a triangulation for a Case study, as this is beneficial when creating an in-depth understanding of the cases (Oates, 2006). This by performing interviews after observing situations and therefore better understand the context of the cases before collecting empirical evidence. The original plan was for this study to use such triangulation with either *Observations* or *Documentation*, however, due to limitations and limited document access in the main case, the triangulation was changed to a single data-generation method as explained in Section 3.3.

Another suitable method for this particular project and the associated cases could be the

Ethnographic method. Ethnography is a longitudinal method that involves investigating the people and the culture over a long period (Oates, 2006). Due to limited time in this research project, an Ethnography method was not suitable. However, this method would be interesting to see in a future research project with the same topics and on a large case similarly to Case-one (Section: 3.2.2).

Study Validation

The Case study of this thesis was also validated based on four quality criteria presented by *Robert K. Yin* from the book "*Case Study Research and Application*" (Yin, 2018) (See validation and criteria below):

Construct Validity:

The purpose of *Construct Validity* is about measuring and identifying correct operational concepts, based on the topics that are investigated (Yin, 2018). This by ensuring multiple sources of evidence is used, a chain of evidence exists and key informants have reviewed the draft (Yin, 2018; Shanks, 2002).

For this project and Case study, a Literature Review was conducted in the preparation and specialization project (Brynildsen, 2020), to support theory and findings, as well as investigating the topic before continuing with the investigation of the two cases. Research questions were also created to establish a clear understanding of what the investigation includes. The study was planned as a triangulation including *Interviews* and *Observations* or *Documents*, however as explained in Section 3.5, the access where limited which at the end resulted in *Interviews* as the only source of evidence. The chain of evidence is maintained by the interview guides and that all statements from the Results (Section: 4) are traceable back to the transcribed interviews.

Internal Validity:

As described by *Yin*, *Internal Validity* is only used for *explanatory* or *causal studies* and is therefore not needed or validated for this *exploratory* Case study (Yin, 2018).

External Validity:

The purpose of *External validity* is to show how results from a Case study can be generalized (Yin, 2018) and that the selected cases are "typical" cases for this type of study (Shanks, 2002).

As this study includes multiple cases *Yin* suggests that a replication logic is used (Yin, 2018). In this study, the cases were selected after a *literal replication* to provide and investigate similarities between two different cases. *Yin* also explains that this logic is also highly suitable for two or three cases (Yin, 2018), which also fit this project. The selected cases are also typical transformation cases and provide the opportunity to compare common cases and investigate the difference between them.

Reliability:

Reliability is about the operations, how the data is collected, the possibility of recreation of result and reducing errors in the study (Yin, 2018). To achieve this *Yin* suggests that the method and process should be documented, and a Case study Database should be created (Yin, 2018).

In this project the method and process of this Case study are well documented in Section 3, however, a Case study Database was not created which is one limitation to the Reliability of this study.

3.5.1 Method Limitations

As described in the article "*The qualitative interview in IS research: Examining the craft*" by Myers and Newman, a qualitative study with semi-structured interviews has several potential limitations or difficulties (Myers & Newman, 2007). One is the "*lack of time*", which Myers and Newman explain as; due to limited time for collecting empirical evidence and the limited time each informant and interviewee can spend, the data might be limited and incomplete (Myers & Newman, 2007), and other aspects might not be included. The limited time available has also shown to limit the number of cases this study was able to investigate. Ideally, a Multi-case Study should investigate multiple unique cases. However, due to limited time, this study only investigated two cases. Because of this, the study might not give a correct representation of every organization transforming to agile but can rather provide an explanation based on the selected cases.

Due to the Covid-19 situation, all interviews in this study had to be performed digitally, which has limited the opportunity of the researcher to get to know each informant and create a trustworthy relationship before the interviews. A result of this might be other limitations, which Myers and Newman explains as the "*artificiality of the interview*" and "*lack of trust*" (Myers & Newman, 2007). The first limitation is about asking informant

to answer questions under pressure, which might harm and limit the answers provided. Informants might therefore present answers they think the researcher want by twisting or changing the truth. The second is about the trust of explaining something to a stranger. This might limit the informant's trust in the researcher and therefore hold back important information like challenges from the transformation, personal experiences, or information regarding the case organization. Because different informants had different Internet connection strengths at the home office, the recordings had some limitations regarding noise and missing words.

As explained by Oates in the book *"Researching Information Systems and Computing"*; a good qualitative study is usually based on or dependent on the skills of the researcher (Oates, 2006). We can therefore see that this also can be a limitation, as the study is performed by an inexperienced researcher, with little experience from Case studies and qualitative analysis beforehand.

4 Results

In this section, the results from the Case study, described in Section 3 will be presented. All results are based on statements from informants and the two cases referred to as *Case One* and *Case Two* (Section 3.2.2 and 3.2.3). The results are structured after the research questions presented in Section 1.2 and starts by presenting a collection of challenges found in agile transformations (RQ1.1). Secondly, the results on how Change management is applied in an agile transformation are presented (RQ1.2). Towards the end are also results regarding agile transformation success factors briefly presented.

Table 7 and 8, illustrates the distribution of informants, roles and challenges reported in each case. Throughout this section and similar to Table 6 are participants from Case One represented by P1-P8 and Case Two P9-P14. Statements from both cases are also presented together, as this highlights similarities and differences between the cases.

Category	Challenge	Informants	Roles*
Resistance to change	General resistance	P8, P5, P6, P7	PM, CM, AC, MM
	Lack of agile knowledge	P1, P7	BAC, MM
	Dysfunctional training	P2, P8, P7, P4	PO, PM, MM, AC
	Change in routines	P1, P8, P3, P6	BAC, PM, SL, AC
	Roles and management	P1, P3, P7, P2, P8, P5, P4	BAC, SL, MM, PO, PM, CM, AC
Change in Organizational culture and structure		P8, P3, P6	PM, SL, AC

Table 7: Distribution of informants, roles and reported challenges from Case One (3.2.2)

**(BAC: Business agility coach, PO: Product owner, SL: Section leader, AC: Agile coach, CM: Change manager, MM: Middle manager, PM: Project manager)*

Category	Challenge	Informants	Roles*
	General resistance	P10, P12	AC
	Lack of agile knowledge	P9, P10, P12, P13, P11	PO, AC, TM
Resistance to change	Dysfunctional training	P9, P13, P11	PO, TM
	Change in routines	P9, P12, P14	PO, AC, TM
	Roles and management	P9, P12, P10	PO, AC
Change in Organizational culture and structure		P9, P13, P14	PO, TM

Table 8: Distribution of informants, roles and reported challenges from Case Two (3.2.3)

**(PO: Product owner, AC: Agile coach, TM: Team member)*

4.1 Agile Transformation Challenges

Analyzing the transcribed interviews revealed several challenges related to an agile transformation, all with different levels of relevance to Change management. To categorize the challenges, the results from the literature review and Specialization project (Brynildsen, 2020, ch. 4, pp. 20-29) was used to select categories that have shown in the literature to be highly relevant in a discussion with Change management. The categories were organized under *resistance to change* and *change in organizational culture and structure*. These categories have been revealed as important and suitable in a discussion and involvement of Change management.

4.1.1 Resistance to Change

The analysis revealed that one major challenge in an agile transformation was the *resistance to change* and the fear of changing to something new and unpredictable. The challenge was reported to be related and represented at several stages in the transformation, both at the start of the transformation but also later in the process. The interviews revealed that the resistance to change were often affected by factors such as *lack of agile knowledge*, *dysfunctional training*, *change in routines* and *changes in roles and manage-*

ment, all presented separately below. The interviews showed that resistance often was related to the fact that people had a limited understanding of the agile mindset and how the agile methodology worked. Another reason highlighted by several informants (P10, P8, P12, P6) was the need of changing something that already worked well, as the old and traditional processes were strongly anchored in the organization's culture and structure.

"It was a lot about understanding. In other words, a lot of our stakeholders did not understand what agile was, which quickly resulted in resistance to the change. The whole transformation was for them [stakeholders] a maturation journey, as they [stakeholders] often have had a really good experience with the waterfall method in the past." (P8, Project manager, Case One).

"A big challenge for us is that some are drawn to old ways of working. The willingness to work is there, but the will to change is a much bigger struggle." (P7, Middle manager, Case One).

Lack of engagement in the change initiative also showed to be a major factor that often resulted in resistance. The lack of engagement was reported by informants in both cases and was often reported as a challenge seen in both managers and team members. As seen in the analysis several interviewees explained situations where the agile engagement was lacking and not prioritized by employees and managers in the organization. Informants from Case One (Section: 3.2.2) reported that the *lack of engagement* often were seen in top management positions as the managers often related the agile transformation to an IT initiative and not as a change initiative affecting the whole organization. Findings indicated that people with less engagement showed significantly less interest in the actual change and the interviews revealed that managing roles, non-technical departments and business roles often had a larger lack of engagement and willingness to learn.

"We have seen reactions where people think that agility is just nonsense. They are often not curious about learning something new and they often have the attitude that; I can do this, so why should I bother participating in this? They put themselves in an expert role and choose not to be curious about the change." (P7, Middle manager, Case One).

"In the market department, we met much more direct resistance than we did in the economics departments. Many thought; Why should I sit here in a meeting and reflect on how the previous campaign went [referring to a retrospective meeting]? I do not have time for this now! In a way, they [marketing employees] did not understand why they should change things they thought worked well." (P10, Agile coach, Case Two).

Lack of Agile Knowledge

Another major aspect of resisting the agile transformation was in fact *lack of agile knowledge*, principles and approaches. The investigated interviews highlighted that both managing roles and other team-related roles often had some type of lack of agile knowledge, which often resulted in other challenges or resistance in the transformation process. Interviews also explained that most of this lack was directly connected to departments or roles with less experience in agile, as well as a less effective training in agile.

"Yes, there are several challenges here [referring to agile methods]. The first is about understanding that some have very little understanding of agile, agile principles, how to work and what it actually means to be agile. The second part is that some just don't feel changing, as they don't see the need for it" (P1, Business agility coach, Case One).

"The challenge is that you are asked to do something that you really only understand intellectually [referring to practicing agile], but you cannot take it in, so it is clear it is difficult to defend a direction like that." (P9, Product owner, Case Two).

Traditionally agile have been associated with IT development and production teams that produce some type of product. However, as the transformations started to involve other departments in the organization the lack of knowledge increased as non-technical employees and departments were introduced to a new way of working. The challenge associated with introducing agile in the whole organization and especially in non-technical departments was reported as challenging in both cases. Both cases also informed that lack of agile knowledge still is challenging when recruiting for non-technical roles and departments.

"Agile is often run by those who know agile from before and you forget that sales, market and finance do not know this [agile] from before. So, one of the biggest challenges was the mental mindset of those [referring to employees in sales, market and finance] who did not know what this was before. Many people thought that it [the agile transformation] would probably not affect them, so why should they bother to have anything to do with it at all?" (P10, Agile coach, Case Two).

Additionally, several interviews highlighted that the lack of knowledge was related to little or less understanding of how agile principles, methods and mindset worked. The confusion between what agile was and how to work, organize and think after agile principles were reported as challenging factors. Some informants presented examples where agile principles were introduced in the team structure, however, the lack of correct knowledge indicated that the principles were used ineffectively or wrong, which resulted in some team members

developing a chaotic understanding of the agile methodology. The term "chaotic", was reported based on the impression that agile was a new and unstructured way to work. Informants reported that agile often also introduced uncertainty in teams and the confusion of what agile was resulted in challenges and resistance to the transformation.

"Some people think that agile only is about sitting with the customer in an unstructured way and delivering something specific. In other words, some people think they work agile just because they sit with the customer and develop together." (P7, Middle manager, Case One).

"When I started working in [Company name], it was difficult to understand the dynamics of the team. It was difficult to understand who did what, what was okay and what you had to get approval for. It was a bit indistinct, a bit like before you get into agile, it seems very chaotic and unstructured." (P13, Team member, Case Two).

Other informants (P12, P11) also reported similar examples explaining situations where lack of agile knowledge interfered with the team structure, productivity and why the organizations choose to start the journey of an agile transformation.

Dysfunctional Training

As part of the *lack of agile knowledge*, informants explained that little engaging training and little understatement of the actual transformation process was a challenging factor for establishing and creating the actual support for the change initiative. *"It was about poor communication skills. Those who held the course were very engaged in agile, but they didn't manage to convey it to us"*, (P11, Product owner, Case Two). Informants reported that the challenge often was related to a dysfunctional theoretical presentation, that provided less information on how to perform and include the agile methodology and practices in a non-technical environment. This because the training was not based on the situation and the current structure of the organization, which led to challenges. The interviews also indicated that the commitment to agile was challenging, however, the analysis revealed that contribution to the actuality training was a less challenging factor as most informants reported contribution and engagement in the actual training sessions.

"I think the biggest challenge with the training [referring to an agile seminar/course] we have had is that we have not had training that has seen [Company name] in context. We have sort of had courses that have been a bit; "that's the agile methodology", without being put in context by what we do and how we are structured." (P9, Product owner, Case Two).

"It is difficult when theory meets practice. Because theoretically you can go through agile in

one presentation, but then it also goes a little over the head of everyone who listens.” (P2, Product owner, Case One).

One interesting finding regarding *dysfunctional training*, was that the challenge was mainly reported by informants in new and changed roles (e.g. Product owners), but also Middle- and Project managers reported this as a challenge. The analysis showed that the challenge of *dysfunctional training* was less reported by coaching roles with much agile experience (e.g. Agile coaches). However, the analysis showed that informants who reported *dysfunctional training* as a challenge also reported either having much or little practical agile experience before the change initiative.

Change in Routines

Another factor explained as a challenge to the adoption of the agile methodology and the agile practices were the feeling of *changes in routines* and changes in how the work was performed. Several interviewees explained examples where resistance was caused by challenges related to the fact that the transformation was a new way of working, which resulted in fear and resistance against changing from well-known structured routines.

”The biggest and most obvious challenge was that it was such a big change for some. Some even felt compelled to work in a way they were not comfortable with. We had many who quit during that period [referring to the starting phase of the transformation], without me being able to say for sure that it [people quitting] was related to agile.” (P9, Product owner, Case Two).

The analysis indicated that resistance related to changes in work routines and project structures often were related to resistance implementing the new agile methods. Older employees were often reported as more traditional thinking, as they were used to outline the whole project and being told future directions. Changes in the traditional structures and routines was reported as a major challenge to the agile approaches, as the agile approaches has a larger focus on a more self-organizing team structure and iterative product development. *”Not everyone likes the responsibility that comes with being agile. Some people just enjoy being told what to do.”* (P3, Section leader, Case One). Some informants explained that changing the mindset of people who were used to be told what to do often resulted in negative mindsets and fear related to the new agile approaches.

”People experience it [the transformation] as very scary, especially when a lot is new, and you suddenly have to do everything in a completely different way than what you have done

for 40 years.” (P1, Business agility coach, Case One).

”It is difficult to change the habits of people because many are used to waterfall and have it in their heads. Sitting and saying no, let’s find the needs, let’s sit together and discuss what makes sense. Of course, that is a challenge.” (P8, Project manager, Case One).

Roles and Management

Little support and resistance in the management were also highlighted as major challenges when adopting agile in the investigated organizations. Those challenges were also explained as significantly harder at the beginning of the transformation process. The analysis revealed that resistance was a major challenge to all hierarchical levels of the organizations, however, commonly management were normally explained as a challenging group as they often had a traditional mindset and less experience with agile. The resistance was often affected by the fact that middle managers were afraid of losing position and power, while the upper managers often had a harder time understanding the need and the actual change.

”I think many middle managers are hesitant to make changes and strongly oppose them [referring to agile changes], as they [middle managers] are afraid of losing power, influence and their own relevance.” (P1, Business agility coach, Case One).

The middle managers were explained in the findings as managers with a huge impact on other employees as they often are the closest manager to the actual team. The analysis revealed that the lack of middle manager’s support and understanding of the agile mindset was a major challenge that often resulted in less engagement in the team and little support to adopt the agile methodology. One reason presented and explained was the fact that middle managers often had a traditional toolbox for managing, which often resulted in less knowledge on how to manage the newly implemented agile approaches and therefore a resistance to adopt.

”So top management is difficult for obvious reasons, but middle management are often neglected. I feel the middle managers are like make it or break it. Because if you do not have them [middle managers] on board, then you have truly lost. They [middle managers] have so much power and influence over people, so getting them to acknowledge the change is absolutely the key.” (P1, Business agility coach, Case One).

One of the challenges occurring in the cases was that the managers often had no clue or very little experience with agile, what it was about and why it was needed. Upper

managers often showed to be more interested in numbers, bottom line and the overall economical income, which was reported as challenging when introducing and gaining support for the transformation. The analysis also revealed that to successfully achieve the agile transformation, gaining support and focusing on the top managers was critical in the first steps of the transformation. This to achieve the essential support for changing parts of the organization.

"If not everyone in the upper management takes it 100% and leads by example, it will be extremely challenging to introduce the changes." (P9, Product owner, Case Two).

Many organizations are still hierarchical, which often also implies a career-focused organization, that intensifies work by individual bonuses. People do often work hard to rise in the ranks and to reach a specific level or title in the organization. At the same time, this often creates a great deal of uncertainty and a major challenge when the company starts an agile transformation or introduces a change initiative. Such transformation often results in that old roles disappear and new roles such as Scrum Master and Product Owner takes over. The analysis revealed that those roles often have been associated as less attractive, as many managers and leaders are afraid of losing position, opportunities and power in the organization. The interviews showed that the challenge and resistance were more connected to the confusion of the new roles rather than the new names. Leaders were used to be in charge and have control, and as the new roles were introduced the confusion of who had the responsibility in the team was prominent (P1).

"Going from being a leader where the role is to decide what to do, to a role where your most important job is to facilitate the team and help them solve their tasks in the best possible way, was a huge challenge." (P9, Product owner, Case Two).

"These Product owners were previously team leaders and often had a lot of responsibilities. During this transformation, they were visited [in the teams] by the Agile coaches, which had the same influence and power as themselves. It wasn't as easy for them [previous team leaders] to let go of anything, especially if they [previous team leaders] didn't feel the interest in adopting agile. This quickly becomes a challenge when an Agile coach comes to change your processes and to make your team more agile." (P12, Agile coach, Case Two).

One of the biggest challenges reported by informants (P9, P5, P10, P8, P4) was the change from traditional leadership to a more collaborative agile approach. Leaders were used to having full control of the current projects and the project status, which often resulted in a need for control and status reports. The control reduction and the traditional mindset

were reported as challenging, as well as a major factor for leader's resistance to the agile transformation.

"One of the biggest challenges has been to change the levels of management. Because leaders are used to deciding, they are used to making decisions and they are used to set priorities. While in the agile culture, the teams themselves must be involved in setting the vision and their goals, which don't fit well with traditional leadership." (P4, Agile coach, Case One).

"You have to bring the management with you for this transformation to fully work. It's been really challenging, as I sometimes experience that there has been a large need for control and a very traditional way of thinking." (P10, Agile coach, Case Two).

As a result of the challenges related to traditional leadership and the need for control mechanisms, several informants reported that leaders often asked for status reports and that leaders had a challenge providing full ownership to the self-organized teams. One example reported from Case Two (Section: 3.2.3) was that due to the Covid-19 pandemic, leaders started adding remote status meetings to monitor the project status. The monitoring indicated a strong need for adding a control mechanism as leaders were afraid the productivity should decrease as the team moved to home offices. Informants in both teams also reported that traditional leaders had a challenge trusting the agile teams, as the leaders were used to delegating tasks and commanding the processes. Micromanagement and the need for unnecessary control were also highlighted to show that leaders often became the real hinder and bottleneck for the agile team.

"There are far too many leaders who are far too operational. Many are unable to completely let go of control mechanisms and give complete confidence to the team. I believe that when a leader starts to prioritize the backlog, then the leader becomes too operational and has a more focus on control mechanisms. They [controlling leaders] often also become the bottlenecks in the project as they [leaders] often have too little understanding of agile. [As leaders] We must not emphasize our agenda, but rather think holistically about the customer and let go more. We definitely have a way to go there." (P8, Project manager, Case One).

4.1.2 Change in Organizational Culture and Structure

Besides *resistance to change*, both cases reported changes in the culture and structure as an important challenge when starting the agile transformation. Both cases explained that changing the culture was a challenging task that needed strong leadership, a correct mindset and a willingness to change, as the important factor were to show engagement and

interest in succeeding with the agile transformation. Informants explained that some of the challenges were related to an old established culture where upper management asked for reports that did not match how the new agile teams worked.

"You have to have people and leaders who demonstrate the culture that is needed [referring to the agile mindset and culture]. You cannot tell the team that; now we will work agile and at the same time ask for status reports on how we are doing. Because then you just destroy the agile culture." (P3, Section leader, Case One).

The new agile culture was described by some informants as a chaotic approach, where the new structure and changed culture often resulted in problems with the old silo-based structure. The silos often had different maturity in the agile culture and mindset, which resulted in collaboration challenges between silos. The challenge was related to the size of the organization and the communication as different departments had a slightly different internal culture and were at different stages in the adoption process of the agile culture.

"Agility can for many be a bit chaotic, as you constantly change direction. The organization often has small units that work as independently of others as possible and the challenge is therefore often about how we coordinate those [the units] to ensure that everyone goes in the same direction?" (P9, Product owner, Case Two).

"The challenge is that we, as an organization are so big. The fact that we are so many that we get problems related to silos and very different cultures within the separate silos." (P3, Section leader, Case One).

Team members from Case Two reported that understanding the new agile culture in a team environment was a challenging task, as the new culture revealed uncertainty in how to operate, who is in charge when and who is doing what. One example presented and explained by a Team member (P13) was the challenge related to communicating and collaborating with less agile teams, as this often resulted in little understatement of how each other worked.

"When new employees started in our team, it was clear that some struggled to capture our culture, as the degree of agility varies so much in the organization and from team to team." (P13, Team member, Case Two).

4.2 The Use of Change Management

The analysis indicated that the cases used Change management in both similar and different ways. However, Case One (3.2.2) had a larger representation of informants explaining their process of using Change management, as well as being the only case with separate Change managers in the organization. Both cases also reported Change management as part of the coaching activities performed by Agile coaches and Change managers (Case One). The findings revealed that the cases used Change management to communicate the change initiative and explain what agile was about. The goal showed to be preparing stakeholders and the entire organization for a change as well as establishing the agile mindset of being more changeable. Statements such as *"We have to change or we lose!"* (P12, Agile coach, Case Two), highlights some of the urgency around changing. The reasons was explained by both cases as a result of the increasing competition from other and larger organizations. The goal of implementing agile was to keep a strong position in the market and continuing delivering solutions with increased value to customers.

"For us [referring to the organization], Change management has been used a lot for communication and explaining why agile is the answer to the increasing competition." (P5, Change manager, Case One).

The analysis indicated that Change management was mainly used by coaches for handling resistance, sharing knowledge and re-communicate the propose and the agile mindset. Case One also reported that Change management was used in structuring, creating and communicating the vision, roadmap and strategy for how to tackle both the increasing competition, as well as communication the agile transformation itself.

"Change management for me is about communication. It's about conveying and creating something the stakeholders understand and establishing value behind why we do what we do and why we go through this journey?" (P8, Project Manager, Case One).

Agile coaches from both Cases (P12, P1) explained that; changing the organization is all about understanding change, as the goal of the journey is to change people's behavior. The interviews indicated that employees often understand that a change is necessary, however, the analysis highlighted that the critical factor to success is to involve employees in the journey. From Case One the Change manager (P5) explained that the first important factor was to establish awareness. The awareness had the purpose of communicating that the change initiative also involves the whole organization and not only the IT departments.

Creating awareness was also important for reducing challenges related to the change and management support. In contrast, informants from Case Two did not report awareness as a direct factor, however, informants explained that providing management with the right mindset was critical for reducing challenges. Both cases reported that using Change management in establishing the correct mindset and ownership in the top management was an important factor when later reducing challenges.

"Change management is for us [as an organization] about creating the ownership for this change, especially at the top management level. The goal is to communicate that the adoption of agile is not just an IT initiative, but something that concerns us all [referring to the whole organization]. We do this by explaining the value and communicate the message around why it's [the change (agile transformation)] good for us and our customers." (P5, Change manager, Case One).

Change Approaches and Methods

The analysis revealed that both cases used separate Change management models and approaches to handle change initiatives and challenges in the organization. Case One reported to use the *ADKAR* model, with the main focus on *Awareness* and *Desire*. *"We don't use the model [ADKAR] exactly as it is, but we have tested and developed the model to our context and situation." (P5, Change manager, Case One).* In contrast informants from Case Two explained *Kotter's eight steps* as their main change method. Both cases also explained that the methods were used for changing behavior, individuals and teams. Case One also reported using Change management at a higher and more global level in the organization, as a way to establish and prepare all levels for the change as well as explaining the need for the agile transformation.

"I use Kotter's eight steps when we change a team composition, as the method allows us [the coaches] to discuss quite specifically when a team is in one phase, and then we can look at what we can do to help them move on to the next phase." (P12, Agile coach, Case Two).

"What we focus on is what we call ADKAR, which is a description of how you get people involved in a change and how the sum of all these individuals makes up the big change in the organization. We use this model for everything. How we influence and work with important stakeholders and decision-makers, as well as management and teams" (P5, Change manager, Case One).

Findings and the analyzed interviews indicated that both cases actively had used Change management when communicating and establishing the *Sense of urgency* or *Awareness* in

the organization. Communication was used to describe the purpose and the future vision, as the importance was to involve and motivate from the beginning. Both cases explained that communicating the urgency was critical and that competition from others was one of the main arguments mentioned. Case One also described that a primary goal for the transformation was to communicate a more effective way to work, as the changes would increase delivery, customer satisfaction, task productivity and cost-effectiveness in the organization. Informants also explained that the first transformation phase primarily was used to reduce resistance by communicating agile and the general change inactive. The goal was to test and learn in the organizational context and use Awareness to establish an understanding of how agile principles will affect decisions and the whole organization.

"In the beginning, much work went to inform around the organization. This is to present what agile was, what methods were available, but at the same time, we spent a lot of time talking about agile culture and how this differs from the existing culture." (P4, Agile coach, Case One).

"In the beginning, we used it [ADKAR] at all levels and for all types of communication. The goal was to present and create Awareness about the change and the future journey." (P5, Change manager, Case One).

Besides informing and preparing the organization for the agile transformation, informants from Case One also explained how Change management was used to establishing motivation, willingness and a desire to implement the changes. To reduce challenges, Change management was primarily applied to people ready and willing to change as this resulted in less resistance and an engagement in learning and spreading the knowledge. Agile coaches also explained that to reduce challenges and lack of agile knowledge providing the correct training was critical in reducing challenges and establishing the correct mindset.

"The toolbox they [referring to employees] already have is not in line with agile expectations. So, for us [Agile coaches] it's important to provide them with the courses and knowledge they need to manage these new structures [referring to agile]." (P1, Business agility coach, Case One).

4.3 Success Factors

The analysis of the cases presented in Section 3.2.2 and 3.2.3, showed that the organizations have succeeded in their transformation at several places. Table 9 (Case One) and

10 (Case Two) therefore presents some of the most important success factors related to the agile transformation and the success for their implementation and adoption of agile methodology.

Table 9 and 10 do also only include statements related to the context of the transformation. This means that success factors related to teams, development and specific methods or agile practices are left out as those were weighted as a success based on other factors than the transformation.

#*	Role	Success factor
P1	Business agility coach	<i>"I think the most important thing that has worked for us is to be pragmatic, not religious, meet people where they are and show that we understand them."</i>
P2	Product owner	<i>"The ability to have a good understanding of you own role and what expectations others have of you."</i>
P8	Project manager	<i>"Introduce technical leaders into top management."</i>
P5	Change manager	<i>"The fact that we have worked both bottom-up and top-down has been absolutely crucial for the success."</i>
P5	Change manager	<i>"Created good role models by recruiting new people who have established the agile mindset from before."</i>
P6	Agile coach	<i>"We deliver products in a whole new way, as we involve developers from the beginning and establish communication between business and tech departments."</i>
P7	Middle manager	<i>"That we have developed methods, an attitude and a belief that we want to transform."</i>
P7	Middle manager	<i>"That we have accomplished small frequent launches in an agile way and that we have to think MVP instead of Big bang releases."</i>

Table 9: Success factors from corresponding informants, Case One (3.2.2)

*Number of participant from Table 6

#*	Role	Success factor
P9	Product owner	<i>"Repeat the intention, and why the agile transformation"</i>
P9	Product owner	<i>"A leadership that believes in the direction and the transformation."</i>
P10	Agile coach	<i>"We have managed to implement agile throughout the organization and the understanding that this transformation will take time."</i>
P10	Agile coach	<i>"An important factor has been that we have a CEO who is very enthusiastic on the topic and in a way lives out the agile culture very well. This makes it easy for others to follow."</i>
P12	Agile coach	<i>"Establishing a two-part leadership and a flat structure in the organization."</i>
P13	Team member	<i>"I am more engaged, more enthusiastic and take much more ownership of the tasks I work on."</i>
P14	Team member	<i>"The transformation has provided me with a greater degree of mastery and efficiency. Before, I may have had a day that lasted from 7 am to 9 pm, now I have a completely normal day and I also manage to accomplish much more during the time I am at work."</i>
P14	Team member	<i>"We started the transformation from the top and established the mindset there."</i>

Table 10: Success factors from corresponding informants, Case Two (3.2.3)

*Number of participant from Table 6

5 Discussion

In this section, the results from Section 4 will be discussed. The discussion will be centered around the main research question: *Which challenges do we find in organizations transforming to agile, and how is Change management used to reduce those?* The main goal is to discuss and investigate how Change management is involved in a successful agile transformation to solve or reduce common transformation challenges. The discussion starts by discussing the agile transformation challenges found in the two cases, relevant literature and theory. The discussion is structured after the same main themes as presented in Section 4 and aims to discuss the first part of the main research question (RQ1.1, Section 1.2). The second part of the discussion is centered around how Change management was used to reduce the challenges and aims to explain how the cases are using Change management (RQ1.2, Section 1.2). Towards the end, a brief presentation of some of the limitations found in the study is also presented.

5.1 Agile Transformation Challenges

From our investigation and analysis in Section 4 several challenges were found suitable to be solved or reduced by the involvement of Change management. The results highlighted that challenges related to the main categories *resistance to change* and *change in organizational culture and structure* were two categories often seen in agile transformations. The results also showed that challenges often are similar to other cases, as most challenges found in this study also is described in other studies and by other researchers e.g. (Edison et al., 2021; Dikert et al., 2016; Kalenda et al., 2018; Gandomani & Nafchi, 2016). One clear difference to other studies is that the challenges are categorized under two main themes, *resistance to change* and *change in organizational culture and structure*, while most other studies list them individually. The analysis revealed that the challenges regarding *lack of agile knowledge*, *dysfunctional training*, *change in routines* and *roles and management* often resulted in some type of resistance or less willingness to change. Based on this we, therefore, concluded that grouping the challenges created an easier understanding when later referencing the challenges in the discussion including Change management.

We also believe that our analysis shows that most challenges found in agile transformations are uniform, however, that each case has individual or slightly different reasons for challenges to occur. The results also showed that both cases often had similar challenges,

regardless of industry and organizational size.

5.1.1 Resistance to Change

As explained by Dikert et al. in the article *"Challenges and success factors for large-scale agile transformations: A systematic literature review"*, resistance is often created by several factors and by different challenges (Dikert et al., 2016). Dikert explains that resistance is often related to people not willing to change (Dikert et al., 2016). Our results highlighted that the resistance often was related to routines, training, knowledge, position and power affecting peoples willingness, engagement and motivation to adopt the new agile mindset.

Both cases showed to have challenges with lack of knowledge, as well as challenges related to management and little support. As described by Kalenda et al., in the article *"Scaling agile in large organizations: Practices, challenges, and success factors"*, the researchers reported that resistance often is seen at every hierarchical level and that large organizations usually have more problems with upper and middle management (Kalenda et al., 2018). Studies such as *"Employees' attitudes toward change with Lean Higher Education in Moroccan public universities"*, describes resistance to change as one of the most common challenges found by employees directly affected by a change initiative (Allaoui & Benmoussa, 2020). The study explains further that the resistance not only was challenging for employees directly affected but also middle managers who often had essential roles when introducing the initiative (Allaoui & Benmoussa, 2020). The results from our study were similar and revealed that challenges related to middle management often were explained in greater detail by Case One, as this organization includes several levels of hierarchy and is significantly larger than Case Two. However, Case Two also explained management challenges but more in the starting phase and by individuals.

We also found that traditional leadership and mechanisms such as control, reporting and commanding were challenges highly related to resistance to change. Informants from the interviews explained that managers often resisted the new change initiative because of change in control and the feeling of losing position, power and relevance. We believe that this resistance has a direct connection with the other two challenges *lack of agile knowledge* and *changes in routines*, as informants explained that managers often had no experience with agile from before and that they often had a mindset of commanding, delegation and

asking for reports and status. The traditional mindset was therefore one of the major factors causing resistance, as this was a direct conflict with how the theory explains the agile mindset and agile approaches.

The research and findings presented in this thesis indicate that hierarchical organizations might have a higher resistance and challenges related to role changes than organizations with a flat structure. The analysis showed that the resistance caused by insecurity and uncertainty often is related to managers losing control and position. The research showed that roles such as Scrum Master and Product Owners were roles often causing confusion in the traditional mindset, as those roles often created challenges regarding who had control and who where in charge. The research regarding organizational roles by Jovanović et al. describes that the transition from traditional roles such as Project Managers often creates changes in the organizational culture and structure (Jovanović, Mas, Mesquida, & Lalić, 2017). Also, Dikert et al. explain that changing roles in management positions is a challenge to agile transformations (Dikert et al., 2016). The results from our study also indicated that resistance related to role changes had a connection with resistance related to *change in routines*. The findings indicated that changing to something new and unknown (e.g. new role or new team structure) from something well structured and defined, created resistance to the change initiative and the agile approaches.

Edison et al. explain in the article "*Comparing Methods for Large-Scale Agile Software Development: A Systematic Literature Review*" that lack of engagement is a significant factor when developing resistance to the adoption of agile (Edison et al., 2021). Both cases also informed that lack of engagement in agile approaches and the mindset resulted in challenges and resistance to continue changing. The findings in this paper showed that less commitment often was seen in managing roles or in non-technical departments as those often believed that the agile methodology was intended for others and more technical departments like IT. We, therefore, believe that the resistance caused by less engagement is based on a lack of knowledge, as little understanding of the agile methodology showed to result in less support and willingness to change.

5.1.2 Change in Organizational Culture and Structure

As earlier explained in Section 2, an agile transformation is often introduced at scale. Departments that usually do not develop or create any products are introduced to a

methodology with is presented as a success in IT development. The new agile approaches and culture are promising increased customer satisfaction, higher releases and a team culture based on self-organization where team members take ownership over what they produce. Studies such as *"Comparing Methods for Large-Scale Agile Software Development: A Systematic Literature Review"* by Edison et al., explains that a wrong organizational culture and mindset makes the transformation towards a large-scale adoption more complex (Edison et al., 2021). Edison et al. also explain that having people with the correct mindset is essential for changing and establishing the agile culture (Edison et al., 2021). Our findings also showed that changing the culture of the organizations was challenging, as most people outside IT have little experience with agile and a mindset very different from agile. The existing culture was reported as a silo-based structure, where departments had little coordination between them. The findings showed that the cultural challenge was related to an old mindset and leadership, which does not understand the transformation fully. The lack of culture and leadership may therefore create a weaker role model for employees and challenges related to the initiative. Our result also presents this, as informants explained that some leaders continue with old structures and routines while other parts of the organization try to adopt the new culture.

The article *"Agile methods and organizational culture: reflections about cultural levels"*, explains how difficult existing organizational culture might be, as the culture is often created by the companies traditions and history (Tolfo, Wazlawick, Ferreira, & Forcellini, 2011). The results showed that an old structure in combination with agile is a challenge, as this often resulted in the feeling of chaos and unstructured teams. The outcome highlights that the wrong impression of agile may lead to the impression of a chaotic methodology, as team members struggle to understand the path and direction of the team and organization in total. The analysis also highlighted that the traditions in especially Case One were one of the factors creating challenges in the transformation process.

We also believe that our results show that cultural challenges and weak communication are related, as some informants reported challenges regarding the internal communication between departments, teams and old silos. Literature from organizational management addresses that having silos in an organization can benefit when organizing and managing a large-scale hierarchical organization (de Waal, Weaver, Day, & van der Heijden, 2019). However, our results indicated that a silo structure might result in weaker communication between agile and traditional departments as the cultural differences in silos might hinder

knowledge sharing and cross prioritization of tasks. Informants reported that the cultural challenges showed to be related to internal communication as different maturing of the agile culture resulted in problems with coordination. The challenge was connected to knowledge as informants described that communication with other less agile departments was challenging, as teams often were structured differently.

5.2 The Use of Change Management

Both cases analyzed in Section 4, reported using Change management in their process of transforming to agile methodology. However, as highlighted in the results Case One was the only case reporting to have separated Change Managers and a clear focus on the change strategy. The strategy included the *ADKAR* change model, as well as outlined roadmaps for communicating the vision and future strategy. In contrast, Case Two reported less direct focus on Change management, as the organization primarily used coaching for handling challenges and communication. However, some coaches from Case Two described that *Kotter's eight steps* were the change model used while coaching and communicating the organizational change. Besides this, we believe that a large organization (e.g. Case One) will highly benefit from having a clear change vision, strategy and plan as this showed by our results to create the structure needed to communicate effectively in the organization. The findings presented in our study showed that both organizations used different methods and approaches related to Change management and that the focus on methodology usage and structure was higher and more communicated across the organization in Case One.

As described by Dikert et al., support in management is one essential key to success with an agile transformation, as managing roles often have the power to remove changes (Dikert et al., 2016). Our result also highlighted similar power as explained in statements such: *"They [middle managers] have so much power and influence over people, so getting them to acknowledge the change is absolutely the key."*, (P1, Business Agility Coach, Case One). Based on the statement we believe that using Change management when communicating with managers is a key factor, as well as providing them with numbers and facts related to the benefits of agile. Oakland and Tanner present leadership as one key to a successful involvement of Change management, as the leader has to inspire and set the direction for the initiative (Oakland & Tanner, 2007). The literature explains that *Kotter's eight steps* always assumes a top-down initiative, where managers lead and support the initiative from the beginning (Hayes & Richardson, 2008). This assumption

highly interferes with our results, as the analysis indicated that management at every level in the hierarchy was one of the most common and largest reported challenges regarding resistance to change. Our results also explain that focusing on creating support in the management was essential for reducing challenges. The results indicate that other methods such as *ADKAR* might be more effective in an agile transformation as the method does not rely on a top-down approach, including full support in the management, but focuses on changing and establishing support through individuals.

The results found that both cases had a focus on communication and repeating the arguments for why the organization needs to adopt agile. Communication and collaboration were also highlighted in the literature, as essential factors when introducing Change management in software development (Kamal et al., 2020), as this created platforms for understanding the change and the new approach. The investigating and analysis showed that the focus on establishing Urgency and Awareness in the organizations most likely increased the success, communication and reduction of resistance. The results highlighted that providing coaching exclusively to individuals, teams and departments which want and are interested in the change helps the organizations in spreading the engagement to other more challenging parts of the organization. Our findings also indicate that individual coaching and training at changing roles is one of many essential factors where Change management most likely has helped the organization to reduce resistance and insecurity while transforming towards an agile organization.

The literature explains that since employees are highly affected by a change initiative, communication is crucial when establishing changes (Troost, 2020; Oakland & Tanner, 2007; Allaoui & Benmoussa, 2020). Literature regarding *Change management* describes that creating a change plan as well as involving employees in the process are both critical factors for succeeding with effective Change management in an agile setting (Le Grand & Deneckere, 2019). As we highlighted in the Theory Section 2.6, one important phase in a successful change initiative is the *preparation* phase, as this includes essential planning, communication and the involvement needed to establish early support and future engagement. Our results showed that to sustain a great involvement both employees and managers need to be involved from the beginning of the change process, as this increased the understatement for the transformation. One success factor (Section: 4.3) revealed that communication of the change initiative from both a top-down and bottom-up approach most likely resulted in increased support by upper managers and the feeling of ownership

and engagement by employees. Results indicated that this communication was essential for reducing challenges and establishing Awareness for individuals in the organization. Our results show that one way to combine a top-down and bottom-up approach is to focus on the opposite of where the support is. This by actively using employees or managers with essential knowledge as inspirational sources for others. The findings indicate that to establish top-down support, an agile leader or upper management that both communicate and work after agile principles is critical. The success factors also highlighted that having a CEO with an interest in agile was one essential factor when introducing the transformation from a top-down perspective and creating support in upper management. Further, the results showed that having a focus on both Awareness and Desire (ADKAR model) was important when reducing resistance, challenges and engage employees, departments and managers to adopt and spread the agile knowledge. Literature has also highlighted this, as the article *"A Change Management Model for Information Systems Implementation"* explains that a successful change must include more than just a vision and a strategy, as peoples satisfaction together with the desire for individual change increases the ability to have a successful change (Rohmah & Subriadi, 2020).

Another challenge and factor revealed in the transformation process was the lack of knowledge, engagement and functional training, which resulted in resistance and less willingness to collaborate and change. Literature regarding Change management explains that training is an important factor when establishing contribution to the change, as active training helps with communication and active involvement (Trost, 2020). Our research highlighted that both cases had a focus on coaching and training. Coaches were reported to have an essential role in introducing agile and communication between teams and departments, as they often had a focus on facilitating teams and suggesting solutions based on agile principles and methods. The results showed that one reason for the case's success is the high involvement of coaches and individual training, as this proved to reduce the active resistance from managing positions. However, our analysis also showed that dysfunctional, less active and too theoretical seminars and training sessions resulted in more resistance, as well as little engagement in the actual change. One solution presented in Case One is to actively use Knowledge (ADKAR model) for adding practical training and new tools for roles less familiar with the agile approaches. Another factor is to reduce external speakers in the introduction of the change, as this was reported as both too theoretical and less engaging by roles little familiar to agile.

From the book "*Leadership and Change Management*", Tang highlights that; to successfully build Awareness and Desire for the initiative; "*effective and targeted communication*", "*shard vision*" and "*leaders commitment*" is critical (Tang, 2019). Our findings and the reported success factors revealed that both cases have successfully established some type of Awareness and Desire in the organization. However, the reported success factors indicated that *leaders commitment* was more established in Case Two (See Table: 10, participants: P9, P10 and P14). We, therefore, believe this is one of the key reasons that Case Two has succeeded in many areas of the transformation, as well as managed to reduce levels of hierarchy and some change resistance. The findings also indicate that Case One as a much larger organization has started to establish effective communication between teams, departments and the whole organization in total, which showed as critical to future success when reducing challenges across the organization.

To summarize this discussion, we believe that one key element to succeeding is to involve Change management at the beginning of the change initiative. This by creating a clear vision on how to communicate the change and reduce possible challenges. Communication also seems to be another critical factor when establishing the Urgency and Awareness of the change. This because communication showed to be essential when creating the engagement needed to succeed with the initiative. From the eight phases (van Solingen, 2020) explaining a successful agile transformation (presented in Section 2.7), the findings indicated a clear connection between a successful transformation and the use of Change management. The steps indicate that the common and essential factors for succeeding in an agile transformation are planning, communication and establishing urgency. Our results present that having a clear structure on how to use Change management will probably benefit the organization when handling or reducing challenges and resistance. The results also explain that many challenges can be solved by clear and open communication, practical training and coaching based on individual needs.

5.3 Evaluation and Limitations

The results are as previously explained, based on several analyzed interviews and statements collected from two agile transformation cases. Since the results and analysis are collected from a limited number of interviews and only two cases, the results might be affected by what the informants emphasize. This therefore, implies that other cases might produce both similar and different results based on the situation and transformation.

The analysis also revealed several challenges related to agile transformations with little or no relevance to the research questions (Section 1.2) and the use of Change management. Those challenges were therefore not included in the results, as the challenges were less relevant to the discussion. Those challenges were categorized as a specific team and case-related challenges, physical distribution, Human resources, and technical development challenges.

Several similarities and similar examples were also found in the analysis of the results. Those similarities might therefore be an indication for strong evidence as several informants presented and explained the same situation, challenges, or success factor.

5.3.1 Limitations

One limitation in this study might be that both cases have been transforming for several years and therefore have established more of the agile mindset. Challenges often related to the starting phase might also be solved or forgotten. The interviews also only contained the Change manager from Case One, which has resulted in less data collected in the field of Change management. However, data regarding Change management was also collected through other roles to supplement the answers from the Change manager. The analysis also revealed that both cases had a focus on early steps in the change models, which has limited the results and discussion on how Change management is used later in the process of anchoring the new agile methodology.

The literature search performed in this thesis revealed that few studies are investigating and explaining the use of methods from Change management (ADKAR and Kotter's eight steps) in the context of software development. The search indicated that the ADKAR model was lacking from the literature, as we found no studies discussing or explaining the use of this model in the context of software development or information systems.

The lack of available literature has therefore limited our ability to discuss and investigate experiences and empirical data from other studies.

The study also has a limitation of not having participants in the top and upper management in both organizations. Interviewing such roles could increase the understanding of how the upper managers handle change initiatives, as well as providing a more in-depth understanding of challenges related to the upper management.

6 Conclusion

This study investigated how Change management is used in a successful agile transformation to solve or reduce common transformation challenges. The findings are based on two individual transformation cases and include a categorization of challenges found in those cases. Our results indicated that challenges often are uniform across transformations. The findings indicated that *lack of agile knowledge*, *dysfunctional training*, *changes in routines* and *role and management*, were challenges often creating resistance in both organizations. The challenges showed that losing position, power, control and influence were important factors resulting in less engagement and willingness to support the new initiative. The investigation also revealed that another challenge was related to change in organizational culture and structure. The cultural challenges indicated that an existing and well-established culture often resulted in more uncertainty between employees and challenges when communicating between departments and teams.

The second part of our investigation showed that both organizations used Change management in their transformation, but with different formalization. Our results indicate that involving Change management in an agile transformation will benefit the organization and the change initiative. We believe our findings show that a large organization has a higher benefit of using Change management, as both hierarchy and culture often sit stronger. We also found that early involvement and open communication from the beginning was critical factors as the results showed that a lack of knowledge often resulted in challenges. Our results showed that focusing on early steps in the change models was highly beneficial when establishing support and the essential motivation needed to reduce initial resistance. The findings indicated that having a clear plan and focus on establishing support in the management is likely to reduce common transformation challenges.

This study also concludes that both cases have achieved many success factors related to an agile transformation and the use of Change management. Both organizations have established higher support in the upper management and increased the reduction of existing resistance. The study also shows that the organizations have managed to communicate agile effectively and established an increased understanding of the actual transformation. However, our research also indicates that resistance still exists and that challenges, related to the old mindset, little knowledge and motivation still are challenging in some more traditional thinking departments.

6.1 Contributions

The main contribution from this master thesis is a further investigation of the involvement of Change management in agile transformation cases, which is a newer and less discussed topic in the *Software development* research community. The study contributes by analyzing and discussing two agile transformation cases, which provide empirical evidence on how change management is used and involved in agile transformations to reduce and solve common challenges.

This master thesis also contributes with a collection of common challenges and success factors from real agile transformation cases, as well as an inspirational source for practitioners who is interested in involving Change management in an agile transformation.

6.2 Future Work

Throughout this study, several other topics related to the involvement of Change management in agile transformations occurred. Future research related to agile budgeting, agile leadership (e.g. Let-go or Dual leadership), or how the role of Agile Coaches is affecting agile transformations is some highly interesting topics for future research and topics that seems left out in earlier research. The topics will help increase and create a more in-depth understanding of specific areas often related to an agile transformation. Let-go and Dual leadership might further help explaining how leaders and managers need to change to successfully adopt agile. The involvement of Agile Coaches is also interesting as this will increase the understanding of how coaching is used in the process of reducing challenges in an agile transformation and how coaching is affecting the transformation process itself. Another interesting topic for future research is the involvement of *Change leadership* in an agile transformation, as this would create an in-depth sense of the change needed to establish the correct leadership, vision and strategy for a successful agile transformation.

As also described in Section 3.5, a longitudinal *Ethnography*-study on similar topics and cases would be interesting, as such study would provide a deeper and more in-depth understanding of the transformation cases and the challenges commonly occurring. However, such study should also include a newly started transformation case as this would provide a more in-depth understanding of initial challenges and the first steps in both introducing the agile adoption and solving the first resistance with Change management.

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Appendix

A Model of the Research Process

Figure 8 shows the path and selected strategy, generation method, and data analysis for this thesis. The selected steps are highlighted by a red outline and explained further in Section 3. A *Literature review* was done as the preparation research for this master thesis and *Case study* and is therefore not explained in this report.

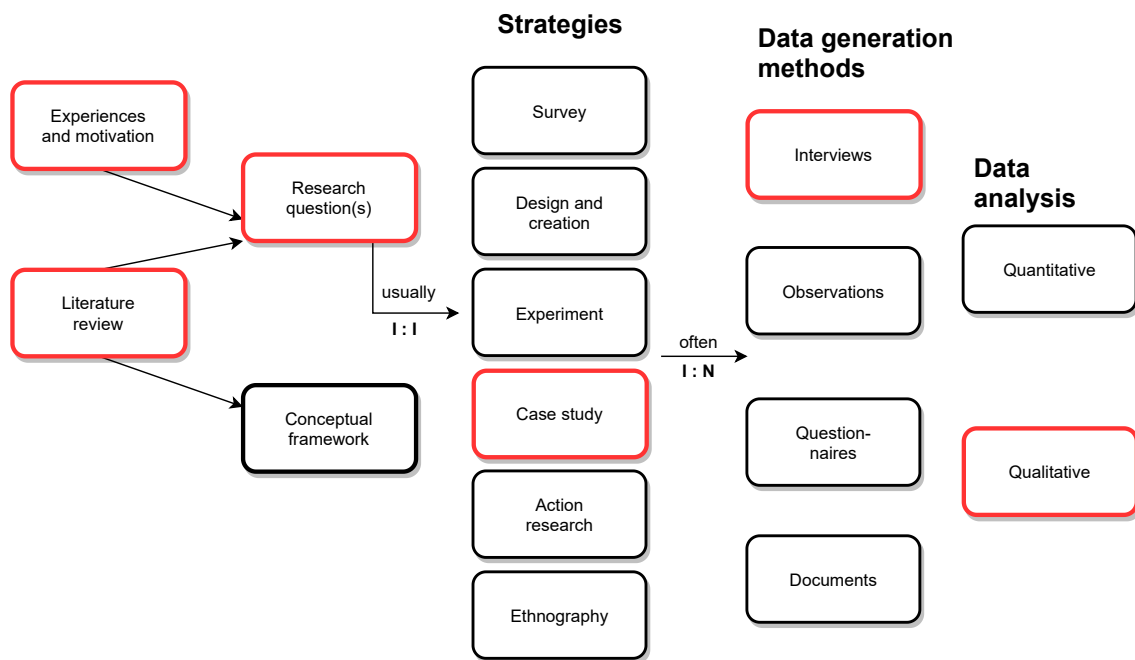


Figure 8: Model of the research process, original from (Oates, 2006, Ch. 3, pp. 33)

B Interview Guides

For this master thesis, four interview guides were created in Norwegian. All guides were structured similarly, however, each was created to target individual roles with different levels of agile knowledge. The guides are presented below (only questions) and were split into the following four guides targeting Agile coaches (B.2), Change managers (B.3), Other managing roles (Product owner, Project manager, Middle manager, etc) (B.4) and non-technical team members (B.5).

B.1 Introduction Questions (All guides)

1. What is your role?
2. How many years of experience do you have in this role?
3. Can you briefly explain what your work tasks are?
4. Can you briefly explain what the goal of the transformation is (what do you want to achieve with this)?

B.2 Main Questions: Interview Guide Agile Coaches

In addition, several questions were asked based on individual's answers to the following base questions.

INTRODUCTION OF AGILE METHODS

- **Can you explain the challenges you have seen regarding the introduction of agile methods?**
- **Can you explain what you saw as challenging when training teams/roles in agile methods?**

CHALLENGES IN THE TRANSFORMATION

- **What major challenges have you seen during the introduction of the agile transformation?**
- **In what way has the agile transformation affected your role and work task?**
- **Can you give some examples of how different roles have had to change during the agile transformation?**
- **Can you explain which changes have been introduced to the different projects/departments, and the challenges here?**
- **How is the agile transformation structured in your organization?**
 - o **Can you explain the challenges with this (if any)?**
- **Can you explain how important support from senior management has been?**
 - o **How are changes and challenges been present here?**

CHANGE MANAGEMENT AND SOLUTIONS

- **Can you explain how you have made use of change management together with the introductions of agile methods?**
- **How have you proceeded to introduce a change in your organization?**
- **Can you explain how challenges have been solved during the agile transformation?**
- **Can you give some examples where change management has been actively part of the way you solve challenges or the change initiative?**

B.3 Main Questions: Interview Guide Change Managers

In addition, several questions were asked based on individual's answers to the following base questions.

CHANGE MANAGEMENT AND AGILE

- **Can you explain how you have used and use Change management in the agile transformation?**
- **How is your change strategy to create a successful transformation towards agile?**
- **What are the biggest challenges you have seen with the use of Change management in your agile transformation?**

METHODS

- **Can you explain which methods you use from Change management?**
 - o **How do you use these methods?**
- **Can you explain how you use ADKAR in the introduction of agile methods?**
- **Can you explain what methods were used for the introduction of the changes?**
- **Can you explain how you are working to present the need for change (sense of urgency)?**
- **How do you work with the resistance to the introduction of agile methods?**
- **How do you work to ensure that the agile changes stay in the organization and become part of the culture?**

CHANGE

- **How have you proceeded to introduce a change in your organization?**
- **How have you proceeded to present a change at the team level?**
- **How do you work with management vs. teams to establish a successful transformation?**
- **What benefits do you think the combination of Change management in an agile transformation has?**
- **Can you explain what challenges have been solved during the agile transformation?**
 - o **Can you give some examples of such solutions?**
- **Can you give some examples where Change management has been actively part of the way you solve challenges or the change?**
- **Can you say something about how Change management has influenced your success in the transformation?**

B.4 Main Questions: Interview Guide Managing Roles

In addition, several questions were asked based on individual's answers to the following base questions.

YOUR EXPERIENCE AND AGILE METHODS

- **Can you explain a little about your experience with agile methods from before the transformation?**
- **Can you explain what you think about agile as a work method?**
- **Can you explain which agile methods you use and what the challenges with these are?**

ROLE AND THE PROJECT

- **Can you explain which challenges you have faced in your role?**
 - o How have those been solved?
- **Can you explain how your tasks may have changed during the agile transformation? (What has been new/challenging)**
 - o In which way has agile methods introduced changes in your role (Do you have any examples)?
- **Can you explain how changing from agile has affected the project you are working on?**
 - o What has been challenging about this?

THE TRANSFORMATION AND INTRODUCTION

- **What do you think has been most challenging about the introduction of agile methods?**
- **Can you tell a little about your point of view and motivation for the introduction of an agile transformation (before it started)?**
 - o Did you see any specific challenges with transforming into agile methodology and mindset?
- **Can you explain why the agile transformation is important to you?**
- **Can you explain how the training of agile methods has been carried out?**
- **How is the agile transformation structured in your project?**
 - o What roles have changed (challenges with this)?
 - o In what way do teams work differently from before?
 - o How has the motivation to work changed during the transformation and after the implementation of agile methods?
- **What methods have you used in your agile project?**
 - o What do you think about these methods?
 - o How are these methods different from how you are used to working?
 - o Have you used any frameworks (Scrum, SAFe, LeSS)?

CHANGE MANAGEMENT AND SOLUTIONS

- **How have challenges been solved during the agile transformation?**
- **How has Change management been used during the transformation?**

B.5 Main Questions: Interview Guide Team Members

In addition, several questions were asked based on individual's answers to the following base questions.

- **Can explain what it's like to work agile in your team?**
- **Can explain a bit about how you work agile in your organization?**
- **Can explain what you think about agile as a way of working?**
- **What do you find challenging about agile? (*Why has this been challenging*)**
- **Can you say something about how agile was presented to you in the team?**
- **How has working agile improved or worsened the way you work?**
- **How has the agile training been in the team you are working in?**
- **Do you think agile affect your team? If so, how and on what?**

C Informants Distribution of Agile Experience

This sector graph provides a brief illustration of how the 14 informants reported their knowledge and experience in agile before their organization started the agile transformation. The distribution is only based on each participant's definition of agile knowledge and only represents an illustration of much-, some- and no-experience with agile. The chart includes every participant from Table 6; however, some roles have naturally higher experience based on their current role and position (e.g. Agile coaches (high representation in blue)).

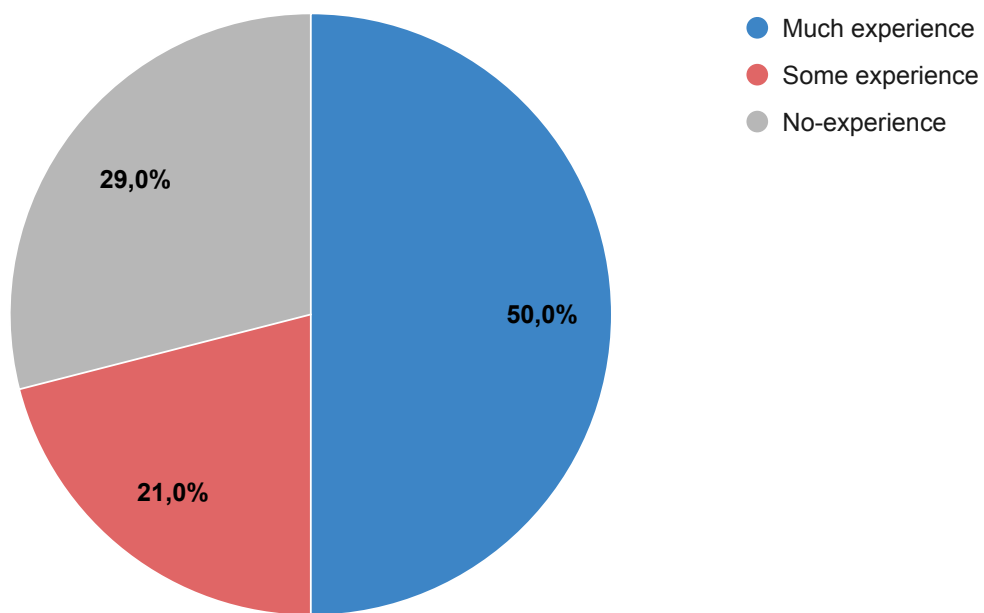


Figure 9: Distribution of agile experience

