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# Leadership in the Hybrid Era: Navigating Agile Software Development Teams

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by

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Master of Science Thesis TRITA-ITM-EX 2023:248
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# Ledarskap i en Hybrid Era: Att Navigera Agila Mjukvaruutvecklingsteam

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## Abstract

The virtual office has since the pandemic become a part of many workers' lives and something that many expect a modern organization to provide, especially software developers. The increasing adoption of hybrid work models and agile methodologies poses new challenges to leaders. These in conjunction, with the domain of software development create a complex dimension to leadership. This thesis investigates leadership practices in hybrid agile software development teams, focusing on the impact of the hybrid work model on agile methodologies and the challenges that arise in leadership in the context of these combined dimensions. Utilizing a qualitative research approach, data was collected through semi-structured interviews with teams working in hybrid work environments at an agile software development company. The findings suggest that situational, distributed, adaptive, transformational, servant, and complexity leadership theories can all be applied in the context of hybrid agile software development teams, with a preference for flexibility and individualized support. Communication, creating engagement and collaboration, and fostering knowledge sharing were identified as key challenges for leaders in these teams. Agile processes and software development practices were mostly seen as a good fit for the hybrid work model, with transparency and scrum artifacts becoming increasingly important for effective collaboration. However, collaboration and problem-solving in software development were identified to have been impacted negatively by some, where junior developers potentially suffer the most. The study contributes to the understanding of leadership practices in hybrid agile teams and the implications of the hybrid work model on agile methodologies. These findings can help inform the design of more effective tools, practices, and environments that support the unique challenges and opportunities associated with hybrid agile software development teams. Limitations of the study include limited sample size and a single-case study approach, which may affect the generalizability of the findings. Future research directions include exploring different hybrid models, comparing multiple cases, and investigating the role of team maturity, and technological tools in hybrid agile software development teams.

**Key-words**
Agile Software Development, Hybrid Work, Leadership, Communication, Collaboration

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## Sammanfattning

Det virtuella kontoret har sedan pandemin blivit en del av många arbetares liv och något som många förväntar sig att en modern organisation ska erbjuda, särskilt mjukvaruutvecklare. Den ökande användningen av hybrida arbetsmodeller och agila metoder ställer nya utmaningar för ledare. Dessa i kombination med mjukvaruutvecklingsaspekten skapar en komplex dimension för ledarskap. Denna studie undersöker ledarskapspraktiker i hybrida agila mjukvaruutvecklingsteam, med fokus på inverkan av den hybrida arbetsmodellen på agila metoder och de utmaningar som uppstår i ledarskapet i kontexten av dessa kombinerade dimensioner. Genom att använda en kvalitativ forskningsmetod samlades data in genom semistrukturerade intervjuer med chefer och icke-chefer som arbetade hybrida arbetsmiljöer på ett agilt mjukvaruutvecklingsföretag. Resultaten tyder på att situationell, distribuerad, adaptiv, transformativ, tjänande och komplex ledarskapsteori alla kan tillämpas i kontexten av hybrida agila mjukvaruutvecklingsteam, med en preferens för flexibilitet, empati och individualiserat stöd. Kommunikation, att skapa engagemang och samarbete samt att främja kunskapsdelning identifierades som nyckelutmaningar för ledare i dessa team. Agila processer och mjukvaruutvecklingspraktiker sågs mestadels som en bra passform för den hybrida arbetsmodellen, med transparens och scrum-artefakter som blir allt viktigare för effektivt samarbete. Dock identifierades samarbete och problemlösning inom mjukvaruutveckling som negativt påverkat av vissa, där juniora utvecklare potentiellt drabbas mest. Studien bidrar till förståelsen av utövningar av ledarskap i hybrida agila team och konsekvenserna av den hybrida arbetsmodellen på agila metoder. Dessa resultat kan hjälpa till utformningen av mer effektiva verktyg, metoder och miljöer som stöder de unika utmaningar och möjligheter som förknippas med hybrid agila mjukvaruutvecklingsteam. Begränsningar av studien inkluderar en begränsad mängd deltagare i studien, och användningen av en singel-fallstudie, vilket kan påverka generaliserbarheten av resultaten. Förslag för framtida forskning inkluderar att utforska olika hybridmodeller, jämföra flera fall och undersöka rollen av teammognad och tekniska verktyg i hybrid agila mjukvaruutvecklingsteam.



## Nyckelord

Agil Mjukvaruutveckling, Hybridarbete, Ledarskap, Kommunikation, Samarbete

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# Chapter 1

# Introduction

The following chapter will introduce the context and motivations of the study with previous research funneling into a problem statement, purpose, and research questions. Delimitations are also stated.

## 1.1 Background

The virtual office has since the pandemic become a part of many workers' lives and something that many expect a modern organization to provide [2] [40]. At the same time, there is a shortage of trained labor in some professions such as software development [6]. Software companies have since tried to address the challenges and opportunities that this brings, for example, Spotify with their "Work from anywhere" initiative[1], and working with software development enables you to work wherever you can use a laptop. Previous studies have highlighted challenges and opportunities with hybrid work, where for example challenges regarding communication and opportunities with traveling time was identified [2]. A hybrid work model consists of being flexible where employees work, be it from different physical office locations or online from home [21].

At the same time, an agile way of working is becoming more popular, and more organizations are transitioning into agile ways of working, especially when working with software development. Wanting fast development processes, especially in internet software and mobile applications has made agile software development attractive for many [1]. The agile method of working is a reaction towards traditional project methodologies and can be summarized as a set of approaches for project management that prioritize flexibility, collaboration, and continuous improvement [8]. Leadership in the context of agile software development

[1] https://www.lifeatspotify.com/being-here/work-from-anywhere

has been previously studied. Studies have examined various leadership approaches and one found that agile leadership is a characteristic of a team rather than a specific role, and its success is contingent upon agile team members' sense of identification with the team, willingness to take ownership, and ability to navigate cultural differences [17]. Good leadership has been shown to be especially important in software development teams when you want to create team encouragement and communication since different parts of software must be integrated [25]. Agile leadership can be difficult to embrace and define since it poses new perspectives from traditional leadership such as going from a hierarchical view of your organization towards shared leadership [28]. Furthermore, leadership in the context of hybrid work has been studied thoroughly since the pandemic, one example being in the healthcare industry where leaders were interviewed, and themes such as increased work efficiency were identified [5]. Managing employees and a team that works from home and from the office poses new challenges such as adapting and creating effective communication and fostering positive team spirit and positive relationships within the team [43].

## 1.2 Problem statement

Since the pandemic, the topic of hybrid work has been studied extensively [2]. Furthermore, agile work in the context of software development has been studied before and after the pandemic [1]. Leadership studies have been conducted with a focus on hybrid work, and with a focus on agile software development teams [17] [5]. However, both of these angles have rarely been used as a lens at the same time in previous research. Previous research looking into this specific constellation has proposed further studies in the area and focused on the times and conditions of the COVID-19 pandemic while there are still initiatives ongoing today, in a post-COVID era [31]. Additionally, when teams have been studied, the non-management perspective has often been neglected in favor of the management perspective. For the purposes of this study, the term 'management' will be used to refer to individuals in leadership roles, such as team leaders or project managers, who are responsible for overseeing the project, making strategic decisions, and guiding team members. 'Non-management', on the other hand, will refer to other team members who, while not holding supervisory roles, are critical contributors to the project's execution and success, such as software developers or engineers.

The perspectives of the hybrid work model as well as agile software development both pose their respective challenges in relation to leadership. Combining these dimensions, this research will try to identify the

complex perspectives on leadership that arise.

## 1.3 Purpose

The purpose of this study is to enhance the understanding of leadership practices in the context of hybrid agile software development teams. Furthermore, this also entails discerning the influences of the hybrid work model on agile methodologies and software development processes. Ultimately, this research seeks to contribute to the existing body of knowledge in the fields of leadership and computer science.

## 1.4 Research Questions

Following the purpose, this study will examine the following research question:

- How is leadership practiced in an agile software development team that works according to a hybrid work model?
- What challenges do the combined dimensions of hybrid work, agile methodologies, and the software development domain pose regarding leadership?
- How are agile software development methodologies affected by the hybrid work model?

## 1.5 Delimitations

A few factors delimit the scope of this research. The study focuses on agile software development teams operating within a hybrid work model, and the findings may not directly apply to other types of work models or non-agile software development teams. The research primarily explores the perspectives of teams within the software development domain. The study is geographically limited to Sweden, with the accompanying cultural, organizational, and regulatory aspects.

## 1.6 Disposition

This thesis is organized into the following chapters:

**Chapter 1: Introduction**

- Presents the background and motivation for the study.
- Defines the research questions, objectives, and delimitations.

**Chapter 2: Literature Review**

- Reviews relevant literature on leadership theories, agile software development, agile methodologies, and hybrid work models.

**Chapter 3: Theoretical Framework**

- Establishes a theoretical framework for the study.

**Chapter 4: Methodology**

- Describes the research design and data collection methods.
- Explains the data analysis process.
- Discusses research quality and rigor.
- Discusses considerations regarding ethics and sustainability.

**Chapter 5: Results**

- Presents the findings from the interviews and thematic analysis.

**Chapter 6: Discussion**

- Compares and contrasts the findings with the reviewed literature.
- Addresses the research questions in the context of the literature review and theoretical framework.

**Chapter 7: Conclusion**

- Summarizes the main findings, answers to the research questions, and their implications for leadership, hybrid work, and agile software development teams.
- Discusses the theoretical contributions, limitations, and future research.

# Chapter 2

# Literature Review

The following chapter will provide a review of previous literature and studies in the subject area. This will be utilized to propose a theoretical framework that will be used as a lens throughout the study.

## 2.1 Hybrid work

The hybrid work model refers to a combination of remote work and in-person office attendance [26]. The degree to which these are preferred and combined gives way to three distinct types of the hybrid work model: remote first, office occasional, and fully remote. The remote first model is where employees primarily remote work and only occasionally come to the office. The office occasional model is where physical presence in the office is required occasionally. The fully remote model is where employees work completely remotely [26].

The pandemic has resulted in an increasing amount of companies adopting hybrid work arrangements for their employees, and hybrid work has since the pandemic been studied in depth. One such study with a focus on the relationship between employer and employee highlighted three key lessons that were learned during the pandemic [30]. These key lessons were: the importance of authentic, continuous, and two-way communication, the unique challenges presented by having virtual employees, and the importance of considering the interests of all stakeholders, not just the investors.

The growing popularity of hybrid work has also been analyzed previously and suggests that hybrid work is likely to remain a popular option for many even after the pandemic. One study for example found that over 60% of users in a sentiment analysis expressed positive sentiments

towards working from home and hybrid work [49].

Research has explored the impact of working from home and the hybrid office on stress and presenteeism of office workers during the pandemic [38]. Results from this study showed that the possibility of working from home was associated with a reduction in stress responses, both psychological and physical, as well as total sleep time. However, those who worked 5 days a week were associated with a reduction in productivity at work. They suggested that a hybrid workplace might be the best compromise for these issues. Furthermore, another study presented findings in Latin America relating to work stress and work satisfaction [34]. The findings illustrated increased perceived stress levels and decreased work satisfaction, but increased productivity and engagement. Another study conducted in the USA found that the perceived work-life balance improved during the pandemic, but reports showed that boundaries between work and home got blurred [50]. Further, they identified factors for improved productivity and satisfaction, which was flexibility, conditions for their home office, and support from the organization [50]. Other factors, both at home and at the office in this environment have been studied further, such as one study finding family-work conflict affecting productivity and engagement negatively, while self-leadership and autonomy were related positively to productivity and engagement [12]. Another study found that stress management should be subject to further study and that it should be focused on more by managers [36].

Additionally, further studies have seen a boost in both the use and development of technology and digital platforms for companies, accompanied by challenges such as adapting to new ways of learning for employees [44] [33].

It has been argued that working from home or hybrid work will become the new normal and that teams and organizations will be quantified and shaped in ways that are unknown, but there were also those with the opposing view, that working from home is just a fad that will fade [27]. However, following this, one study argues that whatever the future may hold, learnings from the pandemic will continue to shape organizations and teams [27].

Not everyone has access to a job that can be conducted remotely, and one study found that 41% of jobs in Canada can be done remotely, but this varies heavily across industries and cultural factors [13]. The perceptions on relational communication at work have also been studied, finding that

public sector employees with no previous experience of working remotely had greatly varying perceptions of how challenging it was. The study highlighted the importance of developing a culture that fosters effective communication, and technology to support this in these environments [24].

Software practitioners have previously been used as a lens to study hybrid work. One such study found that many working with software have re-evaluated their work preferences [48] [39]. Additionally, it was found that a hybrid work model combining being in the office and working remotely can improve both collaboration and productivity [48]. The study highlighted the importance of revisiting this work model and calibration to ensure long-term success, especially in the areas of communication, change management, and organizational culture.

In the context of hybrid work, leadership faces new challenges in managing teams that work both remotely and in person. Effective communication and fostering positive team spirit and relationships within the team are essential for success in hybrid work environments [43]. Leaders in hybrid work settings must balance the needs of remote and in-person team members, ensuring that all employees are engaged, informed, and supported.

## 2.2 Agile Software Development

The agile working methodology for projects was first adopted for software development use and can be summarized with the help of the agile manifesto as a set of approaches for project management that prioritize flexibility, collaboration, and continuous improvement [8]. Software development is at its core very collaborative and includes problem-solving at every step in the process [10]. These agile methodologies involve breaking down a project into smaller, more manageable components and delivering working increments of the project in iterative cycles. Agile methodologies emphasize customer satisfaction, teamwork, and adaptability to changing requirements throughout the project life cycle. processes and tools: Agile development emphasizes the importance of flexibility, collaboration, and responsiveness to change in software development. It encourages teams to focus on delivering working software that meets the needs of the customer, rather than getting bogged down in rigid processes and plans. The Agile manifesto can be summed up with four core values, being:

- Individuals and interactions over processes and tools: Agile devel-

opment emphasizes the importance of collaboration between team members and communication with customers over rigid processes and tools.

- Focus on delivering working software over comprehensive documentation: Agile development prioritizes delivering working software over creating exhaustive documentation, although documentation is still important.

- Customer collaboration over contract negotiation: Agile development values regular collaboration with customers to ensure that the product meets their needs, rather than relying on a fixed contract.

- Responding to change over following a plan: Agile development acknowledges that change is inevitable and encourages teams to be flexible and adapt to changes in requirements, rather than rigidly adhering to a plan.

Agile methodologies are accompanied by frameworks to guide work, and one such framework is scrum. Scrum is an agile framework for managing and completing complex projects [37]. It emphasizes collaboration, flexibility, and continuous improvement. The Scrum framework consists of a set of roles, rules, and activities that provide structure and guidance to the Agile team as described in Agile project management with Scrum by Schwaber [37]. These roles usually consist of the product owner, scrum master, and Development Team. The product owner is in charge of maximizing the value of the product and managing the backlog of the product. The backlog is a prioritized list of features and fixes that make up the product. One type of leadership position within the agile team is the scrum master, who provides guidance to the team regarding the scrum principles and ensures they are followed and is in charge of scrum activities. The development team is ultimately responsible for delivering an incremented product at the end of each sprint. A sprint consists of a specified time period where some planned work should be conducted. The Scrum activities usually include sprint planning, daily scrum, sprint review, and sprint retrospective. During sprint planning, the team plans the work to be done during the upcoming sprint. Daily Scrum is a short meeting conducted daily where the team members discuss their progress and plan for the day. Sprint Review is an activity where the team shows the work they conducted during the sprint and receives feedback from stakeholders. Sprint Retrospective is an activity where the team reflects on the previous sprint. The Scrum artifacts include the Product Backlog, Sprint Backlog, and Increment. All these artifacts recognize and are based on the principles of transparency and adaptation.

A comparison between agile software development versus traditional software development has previously been made, identifying different parameters [3]. These include:

- It is harder to modify the product during development in traditional methods
- Traditional methods are more predictive than adaptive.
- Traditional methods are more process-oriented rather than customer oriented.
- The project sizes tend to be larger for traditional methods, and the planning style tends to be long-term.
- Learning is continuous during development rather than secondary in traditional methods.
- Traditional methods tend to have more focus on documentation.
- The organization types which adopt traditional methodologies tend to be of higher revenue, have a larger number of employees, and a greater amount of teams that are bigger in themselves.

## 2.3 Leadership in Agile Software Development Teams

An agile way of working has been adopted by many in recent years and has had a focus on having highly skilled programmers while keeping teams cross-functional and self-organized [14] [25]. There is a need for a project manager in these kinds of teams, but their core responsibilities are different from the traditional role [14]. In traditional development methods, some researchers argue that the management style tends to be more inclined to command and control, while agile suggests leadership and collaboration [4]. It has been stated that implementing agile methodologies is simply a result of effective leadership and provides leadership quality improvement [32]. Still, looking at the agile manifesto, we know that agile teams are at their core self-managing, and it has been shown to have a large positive effect on motivation and productivity [19]. Leadership in agile software development teams has been a subject of research due to the unique challenges and opportunities it presents. The agile methodology emphasizes collaboration, flexibility, and continuous improvement, which can pose challenges to traditional hierarchical leadership styles

[28]. Agile leadership has been identified as a characteristic of a team, rather than a specific role, and its success is contingent upon agile team members' sense of identification with the team, willingness to take ownership, and ability to navigate cultural differences [17].

Regarding what qualities should be present in an agile team leader, one study highlighted the importance of being agile as a leader, by having competence in change management and having an understanding of market conditions and uncertainties [9].

Leadership in these contexts has previously been studied, including challenges in practice. Effective leadership is hard to define, and while most agree that it needs to be studied further, some studies use leadership theories to explain the role of agile leaders, while others use different perspectives [29]. When agile methodologies started being used in larger scale teams instead of smaller ones, there were challenges identified for leaders such as keeping the team autonomous, creating a strong commitment, and fostering an organizational culture that was cooperative in nature [25]. More specifically, one study identified practices to adopt as a leader, including team encouragement and face-to-face meetings [25].

One study describes how the theoretical concept in regards to leadership in agile teams suggests that the Scrum Master allows the team to lead itself, but empirical findings on the role are mixed [41]. They further described that for team members to take on the leadership role, trust and freedom are required. The role of the scrum master, as a leader within agile software development teams, is to provide guidance and support to the team in following the scrum principles and practices [37]. The scrum master also serves as a facilitator for communication, collaboration, and conflict resolution within the team. Agile leadership involves not only ensuring that the team follows the agile methodologies and frameworks but also fostering a culture of trust, transparency, and continuous learning.

One study aimed to address the lack of research on the relationship between leadership styles and the self-management often shown in agile software development teams. They found that all leadership patterns have a similar impact on self-management in agile teams, but that authoritarian leadership might be able to compensate for low autonomy levels with high alignment levels [18]. On the other hand, one study examined how different types of leadership affect team performance and had different results [15]. They highlighted the positive impact of transactional,

transformational, and empowering leadership on team performance and the importance of leadership development and allowing for flexibility in teams [15]. Another study also highlighted the impact of transformational leadership in agile software development teams, specifically the impact it has on innovation and creativity and it being especially impactful when focusing on reinventing business models and processes [20].

## 2.4 Leadership Theories

This section will cover some leadership theories that will be used as a theoretical lens when analyzing the results of the study. There are many leadership theories, but here the relevance to agile software development teams was considered, with its emphasis on team collaboration, empowerment, and adaptive leadership approaches. These leadership theories are relevant to agile software development because they align with the values and principles of agile methodologies, such as collaboration, flexibility, self-organization, and continuous improvement. They emphasize the importance of empowering and supporting teams, fostering a culture of learning and innovation, and adapting leadership approaches to the dynamic and fast-paced nature of software development projects.

### 2.4.1 Transformational Leadership

The Transformational Leadership Theory proposed by Bass suggests that leaders who inspire and motivate their followers to achieve their full potential can have an enormous impact on organizational performance [7]. This theory suggests that so-called transformational leaders are able to create a compelling vision and inspire their followers to work towards this vision, while at the same time fostering individualized support and feedback systems. According to the theory, there are four key components of transformational leadership:

Firstly, idealized influence. This means that transformational leaders are role models for their employees and followers by acting with high ethical standards, integrity and showing commitment to the goals of the organization.

Inspirational motivation is the key component that allows transformational leaders to inspire their followers by utilizing effective communication as a means to engage followers in a shared vision, with purpose, optimism, and enthusiasm.

Transformational leaders provide intellectual stimulation to their followers by enabling, promoting, and encouraging them to think creatively and challenge the current state of affairs using tools within learning and personal development.

Lastly, transformational leaders provide individualized consideration, by showing a true interest in the health and growth of their followers by providing support systems, continual constructive feedback, and recognition for their follower's efforts and development

### 2.4.2 Servant Leadership Theory

Servant leadership emphasizes the role of the leader in serving the needs of team members. In agile software development, servant leaders prioritize the well-being and growth of their team members to let them perform at their best. It also fosters a healthy and supportive environment, provides support, empowers people, and removes obstacles to their success [16].

Servant leadership is a holistic approach to leadership that engages followers in multiple dimensions to enable them to reach their full potential [11]. The primary aim of servant leadership is to cultivate a loyal following based on the ethical and selfless attitudes of leaders. By prioritizing the well-being and development of followers, they become more committed and productive in their duties. Servant leaders perceive themselves as caretakers of their organizations, striving to increase their resources, including financial assets. They do not overlook the expectations of high performance but rather prioritize the personal growth of their followers. Unlike performance-driven leadership strategies that may disregard the welfare of employees in favor of profits and growth, servant leadership is more concerned with sustained performance in the long run. This aligns well with the agile principles of collaboration, self-organization, and continuous improvement.

### 2.4.3 Distributed Leadership Theory

Distributed leadership emphasizes shared responsibility and decision-making within a team, and has been defined as a perspective on leadership that recognizes the importance of leadership practice at all levels of an organization and emphasizes collaboration and shared responsibility [42]. Distributed leadership involves delegating leadership tasks and responsibilities to multiple individuals across formal and informal organizational boundaries. Some dimensions of distributed leadership are

the distribution of cognitive work, leadership activity, and of power and authority. Distributed leadership is argued to offer advantages such as enabling flexibility and responsiveness, promoting shared responsibility and ownership, and facilitating professional learning and development [42].

### 2.4.4 Situational Leadership Theory

Leadership has been studied extensively in the past, and there are many approaches in conjunction with the agile leadership model, which as covered can look different in different types of teams. The Situational Leadership Theory proposed by Hersey and Blanchard suggests that effective leadership is determined by the situation and the needs of the team members [23]. According to this theory, there is no approach that always works in every situation in regard to leadership, and leaders must adapt their leadership style based on the needs of their team members and the specific situation they are facing.

The Situational Leadership Theory identifies four different leadership styles: directing, coaching, supporting, and delegating. The appropriate style depends on the readiness level of the team members, which is determined by their ability and willingness to complete a task. Leaders must be able to accurately assess the readiness level of their team members and adjust their leadership style accordingly.

The directing style is appropriate for team members who are new to a task and require specific guidance and instruction. The coaching style is appropriate for team members who have some experience with a task but still require support and feedback. The supporting style is appropriate for team members who are capable of completing a task but require some encouragement and recognition. The delegating style is appropriate for team members who are highly capable and motivated to complete a task independently.

### 2.4.5 Complexity Leadership Theory

The Complexity Leadership Theory proposed by Uhl, Marion, and McKelvey suggests that leadership is in nature dynamic and emergent, and exists within an adaptive system that is complex [45]. According to the theory, these complex adaptive systems are the organizations and are characterized by having non-linear, unpredictable behavior which is emergent.

The Complexity Leadership Theory further suggests that there are three dimensions that are related to one another that together builds effective leadership within complex systems:

Administrative leadership is a dimension that focuses on often thought of traditional aspects of management such as planning, organizing, and controlling. Practicing administrative leadership involves setting goals, allocating resources, and being ultimately responsible so that tasks are completed as efficiently as possible.

Adaptive leadership is the dimension of being able to anticipate and react to changes and uncertainty. Being an adaptive leader entails being proficient at learning and adapting to these changes. Furthermore, this leads to being able to affect the system by fostering the emergence of new patterns and behavior.

The final dimension of relational leadership entails building and supporting relationships among individuals and groups that are part of the complex system. Being a relational leader suggests that you can help foster an environment of shared purpose and identity, along with trust and collaboration among individuals.

### 2.4.6 Adaptive Leadership Theory

The Adaptive Leadership Theory proposed by Heifetz suggests that being a leader means being in the middle of constant adaption when the world and circumstances around the organization are shifting [22]. The theory highlights the importance of being able to identify opportunities and challenges to be able to enable their team and organization to act upon these to prosper. Furthermore, the two dimensions of stability are highlighted as being constant and the ability to let the dimensions co-exist is key for the adaptive leader. This can be aided by allowing experimentation and embedding adaptive processes in the organizational culture.

The theory calls attention to three key practices to foster fruitful leadership. Firstly, diagnosis of the current conditions, meaning understanding challenges and opportunities. Secondly, engaging individuals and teams in adaptive process changes to inspire motivation and dedication to the cause. Lastly, after the changes are put into action, it is crucial to support and reinforce the adaptive changes to embed it into the organizational

culture.

# Chapter 3

# Theoretical Framework

The theoretical framework for this study combines the concepts of hybrid work, agile software development, and leadership, and the research on these topics. This framework will be used as a lens to examine the complex perspectives on leadership that arise when combining these dimensions.

The hybrid work model, which includes remote work, in-person office attendance, and a combination of the two, serves as the foundation for understanding the context in which agile software development teams operate. The agile software development methodology, with its emphasis on collaboration, flexibility, and continuous improvement, informs the leadership practices within these teams. Finally, leadership theories and concepts will be used to analyze the ways in which leadership is enacted within agile software development teams in a hybrid work setting. The theoretical framework will combine the research on the transformational, servant, distributed, situational, complexity, and adaptive leadership theories to create a comprehensive approach to leading agile teams.

The theoretical framework will guide the exploration of the research questions, focusing on the practice, preference, and perception of leadership in agile software development teams working in a hybrid work model. Additionally, it will help to understand the interplay between agile methodologies and the hybrid work model and identify the challenges posed by the combined dimensions of hybrid work, agile methodologies, and the software development domain regarding leadership.

# Chapter 4

# Methodology

The following chapter will cover the methodology used to produce the results of the study. Research setting and design will be covered, as well as the literature review along with data collection and analysis. Lastly, considerations on data quality, ethics, and sustainability are covered.

## 4.1 Literature review

As a first step of the research process, a literature search and review was conducted to attain an understanding of the research field, find potential gaps in research, and assist in formulating a purpose and non-trivial research question that would contribute to research within management, organizations, and computer science. The search strategy included using the KTH library as well as Google Scholar. Combinations of the keywords "leadership", "agile", "software development" and "hybrid work" were utilized to find previous relevant research and theories. Only peer-reviewed articles, most from 2018 to 2023 were included in the search, to get recent, quality research both from before and after the COVID-19 pandemic. This inclusion/exclusion strategy made the selection process easier in terms of quality and recency, but relevance was still checked before selecting the sources. The first step for extracting information from the articles was to skim through them by reading the abstract, introduction, and conclusion while looking at headings and keywords that might be relevant. Further, I used a citation reference manager to keep a summary of key information from the sources. This aided in the process of later identifying common themes and patterns to find a gap in the literature and to create respective parts of the literature review. These strategies aided the goal to provide a summary and overview of the current state of knowledge in the field, by being able to identify the gap in leadership perspective on the three dimensions of software development,

agile methodologies, and hybrid work. One limitation is that there were too many search results even with restrictions to be able to read all of them, and the fields are too enormous to grasp everything in a literature review.

## 4.2 Research Setting

Firstly, a detailed description of the context in which the research took place will be presented. The case study took place at a multinational technology corporation in their Stockholm office. The specific population and sample that was studied were members of their software development teams. The teams worked on different products and the team members had different roles both regarding their engineering and leadership positions. All teams worked according to the Agile manifesto and implemented Agile principles and activities such as scrum. The teams were diverse in terms of age and work experience. The specific hybrid work model being used by the teams working at the Stockholm office was a split between working at the office two days a week and remotely three days a week. This setup of hybrid work matches the model as described by Lenka, with a mix of in-office and at-home work, aligning it with the office-occasional model [26]. Furthermore, the team consisted of members from several locations in Sweden which made meetings with the whole team virtual.

## 4.3 Research Design

As for research design, the overall strategy for conducting the research, including methods and techniques for data collection and analysis will be presented. To answer the research question, a qualitative method and abductive reasoning was utilized. The research design, consisting of data collection and data analysis followed the structure from Saunders [35]. A case study is an empirical method that explores a present occurrence using a real-life context, and according to Saunders, there are three types of case studies, exploratory, explanatory, and descriptive. This case study was chosen to be exploratory since the focus is on exploring a phenomenon and identifying variables for further research. Since the problem was to be approached from theory, using previous research on leadership, hybrid methodologies, and agile software development work, an abductive approach is used, where theory was derived from the collected data, and themes were identified to be discussed in the context of the previous theories to try and derive new theory to be tested through

further data collection, which allowed for utilizing an iterative approach between data collected and theories derived [35]. This means, that the literature review was continuously updated and reviewed throughout the research process.

A single case study approach was chosen due to limited resources with time and availability of participants, as well as being appropriate for an exploratory study which is unique due to the complex perspective of the research. Before starting data collection, planning in advance and considering the research aims objectives, and research questions as Saunders describes was done [35].

## 4.4 Data collection

### 4.4.1 Interviews

The research problem was deconstructed into qualitative interviews to collect in-depth data from participants. Interviews were held with those involved with agile software development work at the case company, and to get a grasp of the different perspectives, these had different engineering roles and levels of management.

Themes and key questions were adapted according to the research question. The interviews were kept semi-structured to enable looking at different organizational perspectives depending on the participant and being able to deep dive into certain topics when relevant with probing questions to add depth to discussions, since semi-structured interviews allow for more flexibility and follow-up questions, enabling participants to expand on their answers and share more insights [35]. The interview questions can be found in Appendix A. One-to-one face-to-face interviews were preferred, which were recorded, and later transcribed. The availability of participants was an important factor to consider, so the participants mainly consisted of participants from the case company Stockholm office, but some interviews were conducted online due to availability constraints. Establishing rapport with participants to create a comfortable and safe environment for the interviewees to share their experiences and perspectives was also important [35]. The interview participants consisted of thirteen people. Five managers, and the rest being employed software engineers.

Interviews were planned beforehand by preparing questions for the structured parts of the interview, and booking according to the participant's schedules was arranged. All participants gave consent to be recorded with video and audio and were informed that their interviews would be

anonymized to protect their identities. The participants were also notified of the purpose of the study and interviews. Most of the interviews took between 30 and 60 minutes, depending on how much depth each participant went into. Alongside the interviews, observations were noted on paper.

## 4.5 Data Analysis

After collecting the qualitative data, it was analyzed according to the abductive approach. Before analysis, data preparation was conducted by organizing and transcribing interviews according to what the participant said word by word but also trying to decode the meaning behind it in an objective way. This gives context to the interview, and context is valuable to analysis according to Saunders [35]. Saunders also highlights the importance of planning the analysis of the transcription well before starting to transcribe, so to keep research quality high this was important.

In terms of analyzing the data collected, this was done utilizing the Gioia methodology. Following the Gioia methodology, to get familiar with the data, the data was read thoroughly to be able to identify patterns and themes. This process involved making notes and highlighting important points [35]. A coding system was then developed. This allowed for labeling and tagging segments of data that related to a specific concept, category, or theme. The themes and codes are illustrated in Table 4.1. Since the research design was abductive, these were adjusted along the research process. Once the coding system was established, the codes were applied to the interview data, to codify relevant segments of it. To focus on the relevant information, data reduction was applied to get a more manageable size of data by focusing only on the most relevant codes. Data was then organized and displayed in a matrix to identify potential relationships and patterns in the data. The last step of the data analysis process was to interpret the data based on these relationships and patterns, by making associations with existing theory. This can be found in the results and discussion sections.

Table 4.1: The result of the coding process, with themes and corresponding codes.

| **Theme** | **Code** |
|---|---|
| Team Leadership | Self-organizing |
| | Team responsibility |
| | Top-down |
| | One-on-one |
| | Hands-off |
| | Technical leadership |
| | Situational leadership |
| Leadership Qualities | Trust |
| | Communication |
| | Processes |
| | Insight |
| | Delegating |
| | Network |
| | Belonging |
| | Collaboration |
| | Change driver |
| | Adaptable |
| | Approachable |
| Hybrid Work | Body language |
| | Natural communication |
| | Tools |
| | Onboarding |
| | Engagement |
| | Belonging |
| | Communication within teams |
| | Communication between teams |
| | Social disconnection |
| | Work-life balance |
| | Knowledge sharing |
| Software Development | Small changes |
| | Problem solving |
| | Productivity |
| | Collaboration |
| | Dependencies |
| | Recruiting |
| | Tools |

## 4.6 Research quality and rigor

Saunders emphasizes the importance of data quality and rigor in qualitative research, suggesting strategies for achieving data validity, reliability, and generalizability [35]. Since the research quality aims to be of a high standard, it will make use of these concepts. According to Saunders, it is important to note that a single case study has limitations in terms of generalizability and external validity.

### 4.6.1 Internal Validity

Internal validity pertains to the extent to which a study's outcomes can be ascribed to the intervention or treatment being scrutinized, as opposed to other variables or influences [35]. Saunders describes internal validity in the context of qualitative research as the degree to which the results of a study precisely represent the viewpoints and encounters of the participants involved in the study.

To ensure internal validity in this research, strategies which are recommended by Saunders were implemented [35]. First, to establish trust with participants, the purpose of the study as well as how their answers would be used was explained, to encourage them to be open and honest about their experiences. Secondly, multiple types of participants were interviewed, to try to triangulate findings. A coding system was also utilized to categorize data for analysis. Saunders explains that this can assist in guaranteeing precise and consistent interpretation of the data.

### 4.6.2 External Validity

The second concept, external validity is explained by Saunders as the external validity is discussed as the degree to which the research conclusions can be extended to other populations or contexts outside the immediate sample under investigation [35]. Ensuring external validity is crucial to ensure that the research findings are applicable to other comparable cases or circumstances, allowing for broader generalization and application of the results.

Following Saunder's framework to address external validity, participants were carefully selected based on being relevant to the research question and the general problematization outside of the specific case [35]. Specifically, working in agile software development teams utilizing a hybrid model. Transferability was also considered, by providing a detailed view of the research setting as well as the data collection and analysis process.

This sheds light on how the context and results were produced, which can aid other researchers in putting other research in the context of these findings.

### 4.6.3 Reliability

Within the realm of qualitative research, Saunders explains reliability as the coherence of the process of collecting and analyzing data [35]. The subjective nature of qualitative data and the potential for multiple interpretations make reliability challenging to attain in this form of research. According to strategies proposed by Saunders, attempts to strengthen reliability were made.

Participants were involved in the process, by discussing the data collected with them. All participants got the opportunity to assess the interpretation of their interviews. Peer review was conducted during the research process, to detect any probable prejudices, biases, or inaccuracies. Keeping the research replicable, as recommended by Saunders to increase both trustworthiness and reliability was employed by keeping detailed documentation of the research process, mainly with this methodology chapter [35].

### 4.6.4 Generalizability

Saunders defines generalizability as being linked to external validity, where extension of the results to contexts and populations rather than the settings and populations are highlighted [35]. To improve the generalizability of a study, Saunders suggests utilizing a purposive sampling technique to ensure that the sample is representative of the target population, which was done by choosing participants with different perspectives to study the phenomenon in particular in the kinds of teams the participants chosen were a part of. Furthermore, the data collection and research context were adapted to the research questions proposed. Potential limitations were also considered.

Limitations to internal validity were the choice of only conducting interviews, which might make triangulation tougher. This was compensated by choosing a diverse participant population. External validity can also be limited by the small sample size of 12 participants, which might have been a limiting factor in drawing conclusions. According to Saunders, while generalizability holds significance in research, it may not always be mandatory or fitting, particularly in qualitative research where the

emphasis is often on comprehending intricate phenomena rather than extending the findings to a broader population [35].

## 4.7 Ethics and Sustainability

Ethics was carefully considered throughout the whole research design, and in conjunction with data collection, Vetenskapsrådet's four principal requirements of ethical research were considered which are highly applicable to interviews [47]. These requirements were upheld firstly by being transparent about why the study was conducted, what their participation entailed, how their privacy would be protected, and how their answers would be used. The anonymity of the participant was also promised and ensured. Secondly, after data collection, when using the data, confidentiality was respected and the data was only used in such a way that was communicated to the participant. Since this will entail a case study, the companies' role in the study was evaluated and discussed not to let them create bias or sway the research ethics.

Moreover, the impact of my results and potential recommendations were carefully considered and evaluated from a sustainability perspective. My potential recommendations and results were considered in relation to the United Nations sustainability goal 8: "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" and goal 9: "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" [46]. Gaining insight into the field of software development, leadership, and organizations to further research and develop highly functioning teams can potentially help foster innovation and promote economic growth, and may thereby contribute to these sustainability goals in a positive manner.

# Chapter 5

# Results

In the following chapter, findings from the interviews and the thematic analysis will be presented. The interview questions were adapted from the research questions with the aim to answer the research questions.

## 5.1 Findings from Interviews

The interviews consisted of 13 participants from the case company. The participants and their position is illustrated in table 5.1. Four of the participants were management, and the rest were software engineers. Participants A through I are software engineers, while management participants are denoted with the letters W through Z.

Table 5.1: Interview participants and their roles

| Participant | Role |
|---|---|
| A | Software Engineer |
| B | Software Engineer |
| C | Software Engineer |
| D | Software Engineer |
| E | Software Engineer |
| F | Software Engineer |
| G | Software Engineer |
| H | Software Engineer |
| I | Software Engineer |
| W | Management |
| X | Management |
| Y | Management |
| Z | Management |

During a thematic analysis, four different themes were identified with

respective codes. These themes relate to the research questions posed by the thesis. The empirical findings will be disposed under each of these themes;

- Team Leadership and Leadership Qualities, which relate to the research question "How is leadership practiced in an agile software development team that works according to a hybrid work model?"
- Team Leadership and Leadership Qualities, which relate to the research question "What challenges do the combined dimensions of hybrid work, agile methodologies, and the software development domain pose regarding leadership?"
- Advantages and Disadvantages of the Hybrid Work Model, which relate to the research question "How are agile software development methodologies affected by the hybrid work model?"
- Adaptions and Changes in Agile Software Development Methodologies, which relate to the research question "How are agile software development methodologies affected by the hybrid work model?"

### 5.1.1 Team Leadership and Leadership Qualities

The theme of team leadership emerged as an important aspect of the agile software development process during the interviews conducted. Participants had varied perspectives on team leadership, with some emphasizing the importance of a flat hierarchy and team ownership of decisions, while others highlighted the role of line managers in providing leadership and guidance. Leadership in the agile software teams working in a hybrid manner was generally perceived positively. However, there were differences in perspectives between managers and non-managers.

Leadership was perceived differently among the participants, with some, such as Participant B putting more emphasis on technical leadership, while others, such as Participant I illustrated the leadership more with the line-manager and people-management perspective. Participant C underscored the significance of technical leaders being knowledgeable about the technologies used by the team, stating,

> "A good technical leader should have a deep understanding of the technologies and methodologies used by the team, and be able to provide guidance and assistance when needed." - Participant C

Participant F discussed agile leadership as something that the group shares, and that for example, a scrum master has to show one type of leadership. Participant W (Manager) highlighted that the leadership style is empowering and adaptive, with leaders trusting their teams to take responsibility and make decisions.

Regarding the agile work, participant W stated,

> "Being agile means the team owning responsibility. The agile culture and working hybrid culture works well together." - Participant W

Participant X (manager), discussed the importance of situational leadership in their work.

> "By being adaptable and enacting Situational leadership, you can coach everyone in different ways according to their needs." - Participant E

The role of situational leadership was further discussed by Participant E, saying that they see situational leadership enacted in their team and that,

> "You need different leadership styles depending on the person. For example, senior developers do not need as much supervision as junior developers do." - Participant E

Participant X (Manager) mentioned that the leadership is focused on providing team members the resources to solve problems together rather than relying on a single leader, and highlighted the use of a hands-off, coaching, leadership style. On the other hand, Participant D, a non-manager, wanted leaders to be more involved in problem-solving, as getting leaders to understand the specific work the team is conducting has become more difficult in the hybrid work model. Participant G felt that leaders need to be more proactive in encouraging knowledge sharing, as spontaneous collaboration has decreased.

Regarding the qualities needed in leaders, Participant C emphasized the importance of being adaptive and open-minded to ensure effective leadership in a hybrid agile environment. They said,

> "I think a good leader needs to be open-minded and adaptive to the changes happening around them, as well as having a clear vision of what they want to achieve. Work has changed a lot in the past few years." - Participant C

Participant Y (Manager) noted that leaders should prioritize team cohesion, and Participant Z (Manager) stated that empathy and understanding are essential for leading agile software teams.

Further, the need for leadership to create team spirit, engagement, and being a good communicator was shared by most. The individual meetings were beneficial for both managers and non-managers. Participant Z (Manager) illustrated the need for leaders to create this engagement,

> "You need a toolbox to build a team that knows each other well and is able to work towards a common goal while having fun together at the same time. Especially when you do not see each other every day." - Participant Z

In terms of aspects of leadership that have worked well or less well, Participant B praised the leadership for being flexible but also pointed out that there is a need for better communication when it comes to bigger organizational changes. while Participant F credited the use of new digital tools and processes in improving transparency and collaboration within the team.

In conclusion, the participants' insights on leadership qualities in a hybrid work environment provided information on what makes a good leader in such settings. Trust, communication skills, understanding of the entire business, and flexibility emerged as critical qualities. Leaders who foster interpersonal relationships, create an open culture, and build trust were seen as better equipped to facilitate processes that enable effective planning and delegation. Effective communication skills were deemed crucial to connecting different parts of the organization without face-to-face interaction and keeping the team together. The understanding of the entire business and situational leadership skills were also highlighted as essential qualities for a leader in a hybrid work environment. Creating a sense of community and engagement, even at a distance, was seen as crucial. Effective onboarding processes were deemed necessary to ensure that new members understand their roles in the bigger picture. Changes that affect the team should not be made without consulting them, and documentation has become more critical in the changed work environment. Finally, team building was seen as becoming more important, and managers have adapted to make it a bigger part of the team. The transition to hybrid work was perceived as easier by having a senior team, and leadership with a "freedom under responsibility" mantra was appreciated.

### 5.1.2 Leadership Challenges

The theme of challenges for leaders in the context of agile methods and hybrid work was explored in the interviews. Participants shared their thoughts on the biggest challenges leaders face in agile software teams working in a hybrid manner, and suggested ways to meet these challenges.

Regarding communication and engagement, Participant W (Manager) mentioned that critical moments in product development and delivery require good communication, and suggested encouraging teams to use more informal channels while keeping meetings short and focused. Participant B echoed the importance of creating community, engagement, and belonging, recommending informal meetings and team-building activities. Participant G also emphasized the role of community and belonging, advocating for more in-person interactions and team-building activities, especially in geographically and culturally diverse teams. Participant E found it harder to create engagement in a hybrid setting, suggesting more team-building activities and clear communication of roles and responsibilities within the team.

Monitoring of team interactions and performance was another topic of discussion. Participant C highlighted the difficulty of leaders noticing team members' interactions in the workplace. They suggested being attentive to the team while at the office and conducting more frequent one-on-one meetings to keep track of individual progress. Participant D found it harder to understand each other and each other's work, recommending more in-office meetings and team-building activities. Participant H mentioned that leaders must build a culture of trust and open conversations, conducting more frequent one-on-one meetings in a hybrid environment.

Another identified challenge was inter-team collaboration and dependencies within projects. Participant X (Manager) pointed out that dependencies and collaboration between different teams are more challenging without organic meetings between teams in the office.

Participant F emphasized the importance of involving the right people in decision-making processes, in a changing environment with hybrid work, focusing on the vision and ensuring that employees understand why decisions are made.

> "Flexibility and adaptability are crucial in a rapidly changing environment." - Participant F

Onboarding and knowledge-sharing were further discussed. Participant A mentioned that onboarding is more difficult in a hybrid environment, as well as gathering information and understanding what employees are doing. They suggested having standardized tools and processes to follow up on individuals and working more closely with team members.

Participant Z (Manager) discussed the need for leaders to adapt their tools and processes for the new reality, as old methods may no longer be as effective. They emphasized the importance of situation-based and adaptive leadership and fostering interaction when meeting in the office.

In summary, the participants identified communication, engagement, monitoring team interactions, inter-team collaboration, decision-making, onboarding, role clarity, and evolving leadership practices as the biggest challenges for leaders in agile software teams working in a hybrid manner. They suggested various strategies to meet these challenges, such as fostering communication, conducting regular one-on-one meetings, organizing team-building activities, and adapting leadership styles.

### 5.1.3 Advantages and Disadvantages of the Hybrid Work Model

Participants shared their opinions on the advantages and disadvantages of the hybrid work model for agile software development teams and suggested ways to improve it.

Every participant appreciated and highlighted the flexibility and work-life balance offered by the hybrid work model, especially for those with families. Participant W (Manager) and Participant X (Manager) noted that the hybrid model made it easier to collaborate with teams that are located in other countries in an international business. They also highlighted the easier process of finding software engineers outside the usual geographical boundaries. Participants H, J, and M mentioned that working from home allows for more focused and undisturbed work on programming tasks, leading to improved productivity. Participants I (Manager), J, and M appreciated the time saved on commuting, which can be used for personal or work-related activities.

Participants D, F, G, H, J, and K highlighted the loss of spontaneous discussions and problem-solving that often happens in the office, which can hinder efficiency and collaboration. Participant H highlighted that it has worked better than expected due to good tools, but the introduction

of new tools during the transition period could have had better introductions to ease the transition. Participant G pointed out that collaboration between different teams might be more difficult in the hybrid model, as there are fewer organic meetings in the office landscape. Participant G stated that,

> "When you are less at the office, you naturally meet fewer of the other teams. This leads to less knowledge of what the other teams are up to. This is especially important to know when you collaborate with other teams on a product."

Participants J and M mentioned that onboarding new employees is more challenging in a hybrid environment. They also shared the sentiment of knowledge being less organic to share.

To improve the current working model, participants had a few suggestions. Participant X (Manager) suggested creating a culture that encourages in-person interaction to ensure both the freedom of remote work and the social connection at the office. Participants I (Manager) and M recommended focusing on frequent team building and engagement to counteract the negative effects of the hybrid work model on team dynamics. Participants A (Manager) and F noted that embracing new digital tools and processes can help teams collaborate more effectively in the hybrid environment. Participant Z (Manager) emphasized the importance of considering the human and communication aspects in the hybrid work model, ensuring that it does not lead to decreased cohesion and team spirit in the long run.

### 5.1.4 Adaptations and Changes in Agile Software Development Methodologies

Participants shared their opinions on how the agile software development methodology has been adapted or changed to fit the hybrid work model.

Some thought that there had been no major impacts on the agile software development methodologies. Participants C, I (Manager), J, and K felt that agile and hybrid work models are very compatible and have not required significant adjustments. Participants B and F stated that the craft of programming has not changed much due to the hybrid work model, with the primary impacts being on communication and problem-solving.

Participants D and G pointed out that spontaneous collaboration and

knowledge transfer have decreased in the hybrid model, which can make problem-solving more challenging. Participant W (Manager) emphasized the importance of being willing to share when one is blocked on a programming task, as spontaneous discussions are harder to initiate in a hybrid work environment.

Participant Z (Manager) thought that junior developers have had to adapt the most, stating,

> "Senior employees may have found hybrid work easier. I think they say they've gotten more done and haven't been as disturbed. Junior employees, on the other hand, may feel more vulnerable, work slower, and have more frustration." - Participant Z

Participants H and M noted that more online tools are used for scrum processes, replacing whiteboards and other traditional in-person collaboration methods. Participant F mentioned that processes and tools have been updated with the hybrid and agile transformations, which has increased transparency and made more data available, such as quality metrics, task completion rate, and deliveries.

Participant X (Manager) mentioned that the transition to agile might have been easier if done in an office setting, as it was harder to implement changes in education, routines, and team collaborations, and that change, in general, might be easier when you are in the office.

Overall, the participants agreed that agile software development methodology works quite well in a hybrid work model. However, they also highlight the importance of considering the challenges and adapting the methodology accordingly, such as communication within the team, across teams and the importance of organic knowledge sharing and problem-solving.

# Chapter 6

# Discussion

In the following chapter, findings from the interviews and the thematic analysis will be put in relation to the reviewed literature and theoretical framework while aiming to answer the research questions:

- How is leadership practiced in an agile software development team that works according to a hybrid work model?
- What challenges do the combined dimensions of hybrid work, agile methodologies, and the software development domain pose regarding leadership?
- How are agile software development methodologies affected by the hybrid work model?

## 6.1 Leadership Practices in Hybrid Agile Software Development Teams

Starting to examine the results, the thoughts and observations on leadership practices that were collected from the interviews will be analyzed. The Agile ways of working were acknowledged and well understood by the participants, with several using the same definitions from literature, such as self-organizing [14]. It became apparent that pointing out leadership within their team was not immediately obvious to the participants, this may be explained by the self-organizing nature of agile teams. Technical leadership from non-managers and leadership from formal managers were also contrasted, with some only considering one of these when discussing leadership. The concept of leadership within scrum, with the scrum master, was also considered by one participant, which has been described as a leadership position by agile research [37]. Management seems to favor leadership styles that enable them to inspire and support

their team when necessary. On the other hand, non-management seem to prefer leadership styles that foster autonomy and flexibility, such as situational and adaptable leadership. This preference might originate from the self-organizing nature of agile teams and the increased freedom that the hybrid work model allows.

### 6.1.1 Situational Leadership

Regarding leadership theories that can be used to analyze the leadership practices within the participant's teams, situational leadership was mentioned by several managers directly. Their understanding of the theory was in line with literature [23], with a manager pointing out the need for different leadership styles depending on the person, for example, newer developers versus experienced developers needing different leadership. Thereby, a junior developer needs directing or coaching, while senior developers benefit from supporting and delegating [23]. This was backed by non-managers, pointing out the positive associations they had with frequent individual meetings catered to creating open conversations. Another manager mentioned their use of a hands-off, coaching leadership style while describing their team as very senior, which clashes with the coaching style but might be appropriate due to the focus on consistent feedback. Contrasting the hands-off approach, one non-manager wanted managers to be more involved with the work the team was doing to get a holistic view.

### 6.1.2 Distributed Leadership

Distributing the leadership among the team, with a shared team responsibility with self-organization [14] was a shared sentiment among participants. The formal and informal leadership proposed by the distributed leadership theory [42] can be seen in participant answers by contrasting the line managers to the technical leadership and scrum masters. Distributed leadership has been argued to enable flexibility and learning, which was a quality appreciated by participants.

### 6.1.3 Adaptive Leadership

Adaptive leadership was also mentioned both directly and inferred from answers. Flexibility, was a skill that many associated with good leadership, especially when working hybrid, which aligns with previous studies highlighting adaption to new contexts [44], where adaptive leadership highlights being in constant adaption when the world around changes [22].

### 6.1.4 Transformational Leadership

Regarding transformational leadership, the vision and inspiration were not discussed by participants, but the aspects of individualized support and feedback systems [7] were enacted in the teams through frequent one-on-one meetings. The positive impact of this leadership in agile teams has previously been stated by research [20]. A transformational leader using tools within learning and personal development was discussed in the interviews. One manager mentioned that good leadership should have a suitable toolbox to build a team with a common goal. One participant mentioned that the organizational goals could be provided in a clearer manner, which transformational leadership could aid in [7]. This type of leadership could be better suited to technical leadership, to provide guidance and assistance when needed as highlighted by one participant.

### 6.1.5 Servant Leadership

Servant leadership theory, with priority on the well-being and support of team members [16] can be inferred from previous sentiments from participants of the hands-off approach to leadership, and focus on one-on-one meetings. The importance of this type of leadership in agile software teams was highlighted by one manager, mentioning empathy and understanding.

### 6.1.6 Complexity Leadership

Complexity leadership theory proposes the nature of leadership as dynamic and emergent [45]. The three dimensions of administrative, adaptive, and relational were discussed by participants by showing different perspectives on what they saw as leadership. Administrative can be tied to the qualities that some saw the scrum master having, while the adaptive and relational leadership qualities were more tied to the formal manager. Relational leadership from the complexity leadership theory, with building relationships within and among teams to foster collaboration [45] was discussed as a challenge to leadership and will be further discussed in the next section regarding challenges for leadership.

## 6.2 Challenges for Leadership in Hybrid Agile Software Development Teams

Continuing to examine the results, the thoughts and observations on challenges, and how these challenges can be met for leadership gathered

from interviews will be analyzed.

### 6.2.1 Communication and Engagement

Firstly, communication and engagement were put forth as challenges by both managers and non-managers. Effective communication has been argued as essential for hybrid teams [43], and previous research has shown the importance of continuous two-way communication within hybrid teams [30] and including team encouragement and face-to-face meetings to create engagement. This two-way communication can be seen in the one-on-one meetings between managers and non-managers in the interviewed teams. Preparing meetings, in general, was also discussed, with a preference for keeping the formal meetings to the remote days and keeping office day meetings more informal. They argued that this might help build a team that knows each other better. Self-leadership and autonomy have previously been related to engagement in hybrid teams [12], which was enacted in the team following the self-organizing and hands-off approach discussed earlier. Both management and non-management highlighted communication and engagement as significant challenges. However, their perspectives differ on the approach to these challenges. Management tends to lean towards structured communication and scheduled engagements. They perceive these as means to ensure everyone is on the same page and to foster team cohesion. Non-management, on the other hand, discussed more about flexibility in communication and engagement. They prefer a balance between structured and spontaneous interactions, as the latter can stimulate creativity and problem-solving. The nature of the hybrid work model might be able to provide this flexibility.

### 6.2.2 Collaboration within and between Teams

The collaboration within the team and between different teams was also discussed, and how to monitor interactions and the work of employees. Understanding each other's work, and what other teams are working on was seen as tougher when organic discussions did not arise as much in the office. This might tie into the discussion about knowledge sharing, especially when collaborating on projects. Previous research has highlighted the importance of considering all stakeholders [30], which can include other teams. This knowledge sharing and the discussed onboarding difficulties might be alleviated by, as some participants mentioned, the utilization of tools and processes. From a management perspective, structured processes and the use of specific tools can help facilitate these.

Managers may see the necessity to monitor interactions and work to ensure effective collaboration and knowledge sharing, which was seen in the interviews. On the other hand, non-management discussed more about an organic approach to collaboration. Previous research has shown a boost in the use of technological tools, but there are challenges when introducing these, including adapting and learning [44]. Participants highlighted these issues with adapting to the new tools and processes, both knowing what to introduce and how to introduce it.

## 6.3 Impact of the Hybrid Work Model on Agile Software Development Methodologies

For the final part of the analysis of the results, the thoughts and observations on the impact of the hybrid work model on agile software development methodologies from interviews will be analyzed.

### 6.3.1 Collaboration, Productivity, and Engagement

Studies show that many working with software have re-evaluated their work preferences to prefer hybrid work models [39] [48]. This, as participants stated, could make it easier to hire skilled software engineers when offering a hybrid work model. Studies have also shown improvement in collaboration, productivity, and engagement when teams transitioned to hybrid [48] [34]. This was backed by some participants, stating that their productivity had gone up while they were at home, able to be focused and undisturbed while programming. However, this was contrasted by a manager that speculated that senior developers might prefer this, while junior developers have a harder time adjusting and being productive at home. This could speculatively be due to a higher barrier to collaboration.

### 6.3.2 Problem-Solving and Team Interaction

At its core, software development includes collaborative problem solving [10]. Even though many participants thought that there had been no major changes to the agile methodologies or their software development practices at first glance, the problem-solving and collaborative aspects were discussed. The spontaneous discussions at the office, or between different teams working together on a product seem to be less prevalent when less present in the office.

### 6.3.3 Technological Tools and Agile Processes

The boost in technological tools in the workplace [44] seems to have helped the transition, with participants positively adjusted to the use of tools at remote scrum activities, but the introduction to new tools could have been handled better, with the views on the introduction of tools being supported by previous literature [44]. Scrum artifacts are partly based on transparency [37]. One participant discussed the added transparency that new tools for the agile software development processes in their team had gained due to the hybrid transformation in the form of having more data available such as metrics on quality.

## 6.4 Management versus Non-Management Perspective

Part of the purpose of this study was to explore the phenomena from both the perspective of management and non-management. This section discusses the most interesting comparisons in the findings for these different roles.

### 6.4.1 Management Perspective

Managers seem to view leadership in the hybrid Agile environment as a balance between technical knowledge and people management. They tend to appreciate the flexibility and work-life balance offered by the hybrid work model and see it as an opportunity to collaborate with teams across different countries, expand hiring geographically, and increase productivity. They also perceive it as a way to empower their teams to take responsibility and make decisions, through a hands-off, coaching leadership style.

However, managers also recognize challenges such as maintaining effective communication and engagement in the absence of spontaneous in-office discussions. They also find it harder to monitor team interactions and performance and to foster inter-team collaboration due to fewer organic meetings between teams in the office. They see the need for flexibility and adaptability in their leadership styles, especially in the rapidly changing environment of hybrid work. They further recognize that onboarding and knowledge-sharing have become more difficult in the hybrid environment, and there is a need to adapt their tools and processes to meet these new challenges.

### 6.4.2 Non-Management Perspective

Non-management employees also appreciate the flexibility and work-life balance offered by the hybrid work model. They find it particularly beneficial for focused work on programming tasks. However, they also feel the loss of spontaneous discussions and problem-solving that often happens in the office, which can hinder efficiency and collaboration.

They find it harder to understand each other's work and some feel that leaders should be more involved in problem-solving, especially since getting leaders to understand the specific work the team is conducting has become more difficult in the hybrid work model. They also believe that leaders need to be more proactive in encouraging knowledge sharing, as spontaneous collaboration has decreased.

From the non-management perspective, onboarding new employees is more challenging in a hybrid environment, and knowledge sharing has become less organic. They also share the sentiment that while the craft of programming hasn't changed significantly due to the hybrid work model, the primary impacts have been on communication and problem-solving.

# Chapter 7

# Conclusion

In the following chapter, the results and discussion will be summarized, with implications for leadership, hybrid work, and agile software development. Furthermore, it will discuss contributions to the field of research of industrial management and computer science while considering managerial implications. Finally, limitations and future work will be addressed.

## 7.1 Summarizing the Implications for Leadership, Hybrid Work, and Agile Software Development Teams

This thesis aimed to explore leadership practices in hybrid agile software development teams and the impact of the hybrid work model on agile methodologies, as well as the challenges that arise in the context of these combined dimensions. The results and subsequent discussion provide insights into various aspects of leadership, hybrid work, and agile software development teams. A comparison between management and non-management shows that both share commonalities and differences in their perspectives. Both groups appreciate the flexibility offered by the hybrid model but also acknowledge the challenges it presents, particularly in terms of communication, collaboration, and knowledge sharing. However, their views on leadership and problem-solving differ sometimes, with managers favoring a hands-off approach and some non-managers wanting more involvement from leaders. This indicates a need for a balanced approach that combines the strengths of both perspectives, taking into account the unique challenges of the hybrid work model. To bridge this gap, organizations might consider strategies such as fostering more communication, conducting regular one-on-one meetings, organizing team-building activities, and adapting leadership styles

to the needs of their teams. The use of digital tools and processes to facilitate collaboration, documentation, onboarding, and monitoring of team interactions and performance can also be beneficial. Further, creating a sense of community and engagement, even at a distance, is crucial. Furthermore, acknowledging that the perceptions of leadership may differ between management and non-management might help to gain a valuable perspective for leaders.

The answers to the research questions are as follows:

### 7.1.1 How is leadership practiced in an agile software development team that works according to a hybrid work model?

Regarding leadership practices in hybrid agile software development teams, the findings reveal that situational, distributed, adaptive, transformational, servant, and complexity leadership theories can all be applied in the context of hybrid, agile software development teams. Managers and non-managers expressed preferences for different leadership styles, with an emphasis on flexibility, empathy, and individualized support. The self-organizing nature of agile teams and the new, changing nature of the hybrid work model make adaptive and distributed leadership approaches key.

### 7.1.2 What challenges do the combined dimensions of hybrid work, agile methodologies, and the software development domain pose regarding leadership?

The findings also revealed challenges from different perspectives, where communication and creating engagement emerged as significant challenges for leaders, with a preference for and focus on individual support, a hands-off approach, and continuous one-on-one meetings. Collaboration within and between teams, monitoring interactions and work, and knowledge sharing were also identified as challenges that require proactive leadership. Utilizing tools and processes effectively can help overcome these challenges and might help promote engagement and productivity.

### 7.1.3 How are agile software development methodologies affected by the hybrid work model?

Looking at specifically the agile methodologies and software development practices, the hybrid work model has influenced work preferences and hiring practices, with many software professionals now preferring this model. The agile processes and software development practices were mostly seen as a good fit for the hybrid work model and were not assessed as having had a significant impact on this. However, larger-scale software development has a strong reliance on collaboration and problem-solving. While collaboration, productivity, and engagement have improved in some cases, the hybrid work model has also affected problem-solving and team interaction, leading to perceptions of lower productivity. Among more senior developers, however, this was thought to be less of a problem. Furthermore, transparency and scrum artifacts have become increasingly important in ensuring effective collaboration in hybrid agile software development teams.

## 7.2 Theoretical Contribution

This thesis contributes to existing knowledge in the research of leadership, hybrid work, and agile software development teams in several ways.

An understanding of leadership practices in hybrid agile teams, by examining various leadership theories and practices in the context of hybrid agile software development teams, this research offers an insight into how leadership and different leadership styles are perceived by team members, both managers, and non-managers. This expands the current literature on leadership within agile teams and specifically addresses the extra dimension of the hybrid work model. In these teams, it further identifies key challenges that leaders face in these teams, such as communication, engagement, collaboration, and fostering knowledge sharing. By having the perspective of both management and non-management, this can bridge the gap between these groups, and how leaders can use possible opportunities that arise in hybrid work environments. Furthermore, this research contributes to investigating this phenomenon after the initial transition to hybrid workplaces during the COVID-19 pandemic, which adds to previous research which was conducted during the transition.

The research offers insights into how the hybrid work model affects agile methodologies, work preferences, and software development practices. It highlights the importance of transparency and technological tools in

ensuring effective collaboration and productivity in hybrid agile software development teams. Moreover, it also highlights the importance of problem-solving, and how a lack of communication can hinder efficiency in software development. This contribution expands the literature on agile software development methodologies by specifically addressing the implications of the hybrid work model.

Specifically, for managers, the findings might contribute to a better understanding of how to effectively lead and manage agile software teams in a hybrid environment, and aid organizations that are looking to make a transition of their agile software methodologies to a hybrid model.

It is important to consider the limitations in section 7.3. and that the contributions are to be seen as indications of a phenomenon, due to the limited sample size and single-case study approach.

## 7.3 Limitations

The study is based on qualitative data obtained through interviews and the analysis is to some extent interpretive, so it is open to personal interpretation by the author. The sample of participants for the interviews is limited in size and diversity, and it is a single-case study which may affect the generalizability of the findings [35].

## 7.4 Future Work

Regarding future research, comparing multiple cases within one organization or a broader sample of organizations could provide additional insights. Studying similar agile software development teams that employ full-remote, hybrid, and non-remote respectively could help further establish what the hybrid dimension brings. This study focuses on one specific hybrid model, the office-occasional model. Other models could be interesting to explore. Adding a cultural dimension, and examining differences across different cultural contexts could help identify if cultural factors affect these types of teams. The topic of junior and senior developers could be further investigated, and how different compositions of teams are affected by the dimensions. Technological tools, their effectiveness, and their introduction could also be further researched in how they affect these teams, and especially how they tackle the new challenges with the hybrid work model. Finally, the phenomenon of the hybrid workplace is still relatively new and rapidly evolving. As such, it offers

opportunities for future research as organizations continue to adapt and refine their hybrid work models, and to study the long-term effects.

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# Appendix A

# Template: Interview Questions

- How is leadership practiced within the team, and how do you feel about the leadership style?
- What qualities do you think a leader needs to have to lead an agile software team that works in a hybrid manner?
- What aspects of leadership do you think have worked well or less well?
- What are the biggest challenges for a leader in an agile software team working in a hybrid manner? Do you have any thoughts on how these challenges can be met?
- How has the agile software development methodology been adapted or changed to fit the hybrid work model?
- What are the advantages and disadvantages of the hybrid work model for agile software development teams? How can it be improved?
- How has the hybrid work model impacted the way you collaborate with team members?