



CHALMERS
UNIVERSITY OF TECHNOLOGY

Bringing Agile home

A qualitative study on Agile methodologies in
the era of remote work

Bachelor's thesis in Technology Management and Economics

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Tillämpning av agil metodik i hemarbete

En kvalitativ studie om agila metoder i en era av distansarbete

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ABSTRACT

Agile methodologies combined with remote working is a relatively new phenomenon that arose with increasing popularity during the COVID-19 pandemic. This way of working has resulted in a new norm, creating a shift in the work environment. Therefore, this study aims to analyze how Agile methodologies are affected when working from home is becoming a more permanent part of the work culture. Methods chosen for this work were a literature review and semi-structured interviews in the form of qualitative research. The theoretical framework presents three main areas: the origins of Agile methodologies and applicable frameworks, relevant research on remote work and the effects of COVID-19, and recent studies of the combination of Agile methods and remote work. During the compilation of this study, key aspects related to the purpose were identified. These are communication, autonomy, and flexibility; however, team cohesion and cooperation, productivity, and well-being also turn out to be important indicators.

Keywords: Agile, Agile methodologies, work from home, remote work, Agile project management, communication, autonomy, flexibility

Note: This report is written in English

SAMMANDRAG

Agil metodik i kombination med distansarbete är ett relativt nytt fenomen som växte med ökad popularitet under covid-19 pandemin. Detta arbetssätt har resulterat i en ny norm som har skapat en förändring i arbetsmiljön. Av denna anledning syftar denna studie till att analysera hur agila metoder påverkas när hemarbete blivit en mer permanent del av arbetskulturen. Metoderna som har valts för detta arbete är en litteraturstudie och halvstrukturerade intervjuer i form av kvalitativ forskning. Det teoretiska ramverket presenterar tre huvudområden; ursprunget till agila metoder och dess ramverk, relevant forskning om distansarbete och effekterna av covid-19, samt nyligen genomförda studier om kombinationen av dessa. Under sammanställningen av arbetet identifierades nyckelaspekter relaterat till syftet. Dessa är kommunikation, autonomi och flexibilitet; dock visar sig även teamets sammanhållning och samarbete, produktivitet och välbefinnande vara viktiga indikatorer.

Nyckelord: Agilt, agil metodik, hemarbete, distansarbete, agil projekthantering, kommunikation, autonomi, flexibilitet

Notera: Rapporten är skriven på engelska

Preface

This bachelor's thesis was written during the spring of 2023 at the Department of Technology Management and Economics at Chalmers University of Technology, supervised by the Division of Innovation and R&D Management. The thesis was written by four Industrial Engineering and Management students and two Mechanical Engineering students.

Firstly, we would like to thank Lars Trygg for the guidance and help we received throughout this work. Further, we would like to thank Johannes Berglind Söderqvist, who introduced us to this subject and aroused our interest in the topic. We are very thankful for the opportunity to have both of you as our supervisors and that we got to share your knowledge and competence.

Secondly, we would like to thank all interviewees who took the time to participate and helped us learn how Agile and remote work works in real life. We are grateful for your knowledge and time, with your help, we gained a more profound understanding of the practical phenomenon.

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Acronyms

APM Agile Project Management.

CMC Computer Mediated Communication.

Glossary

Agile Agile with capital *A* insinuates a method of management with origins of the Agile Manifesto.

agile Agile with lowercase *a* insinuates a trait, the adjective to be flexible.

COVID-19 Also known as Coronavirus disease 2019, is a highly infectious respiratory illness caused by the SARS-CoV-2 virus.

digitalisation Is the adoption of digital technologies to transform traditional practices, leading to greater efficiency, productivity, and innovation.

digitising Refers to the process of converting analog information into a digital format that can be processed, stored, and transmitted electronically.

Product Owner Responsible for maximising the value of the product and the work of the development team.

Scrum Developer Responsible for designing, building, and testing the product increment during each Sprint.

Scrum Master Responsible for facilitating the Scrum process and ensuring that the team adheres to Scrum principles and practices.

Waterfall Waterfall management hierarchy refers to the structured order of roles and responsibilities within a waterfall project management team, where each member has specific duties and reports to the next level above them.

Contents

1	Introduction	1
1.1	Background	1
1.2	Purpose	2
1.3	Research questions	2
1.4	Delimitations	3
2	Method	4
2.1	Research strategy	4
2.2	Research design	4
2.3	Research method	5
2.3.1	Literature review	5
2.3.2	Interviews	7
2.4	Data analysis	9
2.5	Research quality	10
2.6	Ethical considerations	11
3	Framework of reference	13
3.1	Agility	13
3.1.1	The Agile Manifesto for software development	13
3.1.2	Feedback in Agile practices	16
3.1.3	Responsiveness in Agile practices	16
3.1.4	Agile methodologies	16
3.1.4.1	Scrum	17
3.1.4.2	Sprints in Scrum	18
3.2	Working from home	19
3.2.1	COVID-19 affects the workforce	19
3.2.2	Increased demand after the pandemic	20
3.2.3	Productivity when working from home	21
3.2.4	Team cohesion and well-being	23
3.3	Being agile from home	24
3.4	Key takeaways	26
4	Empirical findings	28
4.1	Aspects required for Agile methods	28
4.1.1	Communication	28
4.1.2	Autonomy	29

4.1.3	Flexibility	29
4.2	Challenges and possibilities of working from home	30
4.2.1	Communication in a remote setting	30
4.2.2	Team cohesion and cooperation while working from home	32
4.2.3	Productivity when working remotely	34
4.2.4	Well-being in a remote environment	34
4.3	Approaches to overcome presented challenges	35
4.3.1	Navigating obstacles in communication	35
4.3.2	Methods for strengthening team cohesion and team collaboration	36
4.3.3	Ways to optimise productivity	36
4.3.4	Procedures to increase well-being	37
4.4	Key takeaways	37
5	Discussion	39
5.1	Essential aspects of Agile methodologies	39
5.1.1	Communication	39
5.1.2	Autonomy	42
5.1.3	Flexibility	43
5.2	The impact on Agile organisations, teams, and individuals	44
5.2.1	Team cohesion and cooperation	44
5.2.2	Productivity	45
5.2.3	Well-being	47
5.3	Reflection	48
6	Conclusion	50
6.1	Further research	51
7	Sustainability development goals	52
	References	55
	Appendices	61
	Appendix A - Interview questions in Swedish	61
	Appendix B - Interview questions in English	63

1 Introduction

Agile methodologies have become increasingly popular, and many organisations have become Agile to manage projects and improve team collaboration. Agile ways of working emphasise teamwork, communication, and iterative processes, making them particularly effective in uncertain and dynamic environments. However, the emergence of the COVID-19 pandemic led to widespread lockdowns, forcing employees to work from home. This shift was an eye-opener for many employees who now wish to continue working from home even after the pandemic. This demand makes for new challenges for the workplace, having to find out how to adapt their Agile methodologies to remote work and a hybrid workplace. Navigating these challenges is not an easy task for managers and project leaders, and the studies on the subject are sparse as the phenomenon is relatively new.

In this study, the terms working from home and remote work will be used synonymously and refer to the act of working in a place that is not the dedicated office. Additionally, the term Agile will refer to the methodology developed from the Agile Manifesto, and the term agile will refer to the adjective of being flexible.

1.1 Background

The existing research focuses to a considerable extent on how organisations could quickly adapt to working from home when lockdowns forced employees to go home on the day. Many studies also concentrate on the mental and physical well-being of the employees, as the pandemic put much strain on the social environment. However, some studies focus on how Agile organisations adapted to employees working from home.

Schmitdner et al. (2021) conducted a study to research how COVID-19 affected Agile working. The main target of the study was managers and project management experts located in Germany and consisted of a questionnaire. One of the questions was related to how agile they perceived their projects to be on a scale of 1 (low agility) to 5 (high agility). Before the pandemic, the mean was 3.3, and during the pandemic, the respondents answered with a mean of 3.5, leading to a slight perceived increase in perception of agile work. Schmitdner et al. (2021) concluded that while in the past Agile was related to close working teams, the digital communication channels of modern days can bridge the distance gap associated with remote work.

On the other hand, a study by Butt et al. (2021) on the software development industry had a different conclusion. In their survey, it was revealed that remote work had

a negative impact on the influence of the Agile model. One of the reasons for this was that working from home lowered the work pressure, resulting in less productivity related to project development. Another cause was the less coordination among teams and developers due to the physical distance.

Schmitdner et al. (2021) found a slight increase in the perception of Agile work during the pandemic. In contrast, Butt et al. (2021) found a negative impact on the influence of the Agile model due to lower work pressure and coordination among teams.

As previously stated, the Agile methodology focuses on close collaboration teams, customer interaction, and frequent evaluation. These elements of agile work require physical closeness and teamwork to work the best, which can be difficult to achieve while working from home. The COVID-19 pandemic resulted in a widespread shift towards remote work as lockdowns forced employees to start working from home. Many organisations and employees later discovered benefits to this mode of operation. As working from home is likely to continue even after the pandemic subsides, it is crucial to understand how Agile methods can be adapted to this new norm. However, existing research on the impact of working from home on Agile methods has generated conflicting results on whether Agile methods are suited for remote work. With this contrary in mind and the seemingly problematic teamwork situation, it lays an excellent foundation for additional research into the subject to understand further how working from home has impacted Agile methods.

1.2 Purpose

This study aims to analyse how Agile methodologies are affected when working from home is becoming a more permanent part of the work culture.

1.3 Research questions

Agile methods consist of components that do not intuitively go hand in hand with remote work. Therefore it would be interesting to analyse the following questions:

- What aspects are required for an organisation and its teams to be agile?
- Are there any challenges and possibilities related to these aspects when working remotely and do these affect the organisation, team, and individual?
- What is done in order to overcome challenges related to aspects that are negatively affected?

1.4 Delimitations

This study is based on literature review and interviews. The interviews are limited to people working in companies in Sweden. The reason for this is accessibility, as the group found that their network of potential respondents was much more extensive in the national area. Limiting the study to companies located in Sweden would also lead to simplicity while comparing different responses, as there is seemingly a big difference in work culture between countries. However, the literature study was broader than the Swedish research, which could seem contradictory. The case for this is the relatively short timeline of conducted studies. Since working from home has been less popular before the COVID-19 pandemic, the literature on the subject is limited. To find enough high-quality research, searching for conducted studies worldwide was necessary. Furthermore, this study is limited to white-collar workers since this industry is not bound to external factors affecting their ability to work remotely.

2 Method

When performing a study, it is of great importance to understand how to perform a research methodology and why it is done. This section presents facts but also how it was performed during this study.

2.1 Research strategy

Bell et al. (2022) define research strategy as an approach for the research project that is decided for this study. Furthermore, they describe that this includes research design, research questions, and the methods used to answer these questions or at least attempt to answer them. Two research strategies that can be identified are quantitative and qualitative research (Bell et al., 2022). Quantitative research uses an approach that quantifies social phenomena and the connection between them through measurement (Bell et al., 2022). Further, qualitative research methods prefer words over numbers when collecting and analysing data. Another way of differentiating these research methods is that quantitative data is collected through statistics, and qualitative data is gathered through verbal methods (Gustavsson & Säfsten, 2020). However, it is essential to remember that these concepts refer to the collected data and its nature, not the process of collecting and processing it.

This study will focus on qualitative data collected from interviews. The choice of a qualitative study is based on the fact that qualitative research methods are particularly suited for developing an understanding of people's experiences and opinions, which is in line with the purpose and goals of this report (Fossey et al., 2002).

2.2 Research design

Research design can be seen as a framework for business research, that is used when collecting and analysing data (Bell et al., 2022). This is connected to the chosen research strategy, as this lays the foundation for which strategy to use and the research question that the study tries to answer. Bell et al. (2022) talk about five different research designs: experimental, cross-sectional, longitudinal, case study, and comparative.

This study is based on a literature review in combination with semi-structured interviews, and therefore a cross-sectional research design is used (Bell et al., 2022). A more common term for this design is social survey design. However, Bell et al. (2022) point out that this phrase is often associated with interviews, which is only a part of it, and therefore prefer the term cross-sectional design. Cross-sectional design involves

collecting data across different cases to identify patterns and make connections (Bell et al., 2022). Gustavsson and Säfsten (2020) describe the cross-sectional study as a part of a survey research method, and this method is used to examine different variables and the relationship between them. That is relevant for this study since the purpose is to analyse how Agile methods are affected by working from home. In addition, Gustavsson and Säfsten (2020) point out that the data will be collected from a population or a sample of it and it is therefore important to have this in mind when discussing the result and findings.

2.3 Research method

This study's two chosen research methods are literature review, for contextualisation and theoretical implementations, and interviews, to gather information on how it works in practice. The reason for the choice of these methods will be presented in the subsections below, along with instructions on how the data was gathered. The research method chapter will be structured with first a paragraph on method theory and then a second paragraph that describes this study approach.

2.3.1 Literature review

A literature review is a crucial part of relating a report to the existing body of knowledge, according to Snyder (2019). Gustavsson and Säfsten (2020) agree and include that it is crucial to know which knowledge already exists to contribute to the knowledge on the subject in an area. Therefore, it is important to create an overview of the knowledge in the area when creating a new study that can serve as a point of departure during the study. Furthermore, Gustavsson and Säfsten (2020) describe that a literature review can serve several objectives during a study. It can serve a vital role prior to formulating the research problem, to get an overview of the research front and a comprehensive, in-depth review to answer more detailed questions.

During this study a literature review were conducted during two different periods and for two different reasons. Firstly, a literature review was executed to create an overview of the topics related to Agile methods and working from home to create a starting point for the research. Secondly, one review was completed to serve as a comprehensive information source for the framework of reference.

According to Gustavsson and Säfsten (2020), it is important to follow a general process in a structured manner when conducting a literature review. Therefore, it is important to establish a procedure following specific steps and document the results along with the

execution. Gustavsson and Säfsten (2020) present ten steps that a structured literature review should include.

1. Firstly, define the aim of the literature review to facilitate and form the basis of the literature review.
2. Secondly, distinguish sufficient keywords. Keywords can be concepts included in the purpose and as relevant literature is established it is possible to include related suitable keywords.
3. As a third step, conditions for which literature should be included and excluded should be established. The conditions could for example include what types of publications, which time span or which languages the publications are written in.
4. After the conditions are included the search tools and databases should be selected.
5. In addition to choosing the databases, it is also important to formulate a search strategy which includes the identified keywords.
6. As the sixth step, it is important to summarise the literature which is found to know that it corresponds to the expectations.
7. The next step contains a more in-depth review of the literature after the literature is evaluated to be in line with the anticipations.
8. As the eighth step, it is to extract data and form summaries
9. Further, analyse the content which can be done through different techniques
10. Lastly, present the result in the form of a literature overview.

The literature review conducted during this study have followed a structured process. The general process has been designed with inspiration from Gustavsson and Säfsten's (2020) step-by-step guide. This is how this study has been conducted and how closely the step-by-step guide has been followed. An aim and a purpose were clearly formulated to serve as a basis for the literature review. It could be to make an in-depth review of the working from home phenomenon or create a basis for the research questions. After that, sufficient keywords were distinguished.

The keywords that were used, in different combinations and conjugations, were: *Agile project management, Agile management working from home, Management working from home, Managements trends effectivity, Agile management effectiveness, work from home, remote work, flexibility, well-being and productivity, Scrum, Kanban, Agile methodologies.*

With keywords identified, conditions were decided to be research articles published after 2015 with some exceptions. This is to find the most recent information on the phenomenon of working from home and what current Agile practices resemble. Furthermore, the articles were chosen upon how many citations they had. However, these conditions could be neglected when more relevant and recently published articles were found. With keywords and the conditions in place, the databases that were to be used in this report were decided to be Google Scholar and Chalmers Library. After these steps in the process, the method of the literature review was to examine the abstract to view if the article was suitable for the study and then extract data and analyse the content of the articles found.

2.3.2 Interviews

When gathering information about a specific phenomenon from several individuals, a research interview is a suitable technique according to Gustavsson and Säfsten (2020). An interview is a professional conversation with two or more actors who are not equal in the discussion, the interviewer has the power to dictate what subjects and questions will be brought up (Gustavsson & Säfsten, 2020). According to Gustavsson and Säfsten (2020), semi-structured interviews are the most common form of interviews conducted by engineering sciences. Leavy (2020) writes that semi-structured interviews are a better way to maximise the potential knowledge that is produced by the interviewees. Furthermore, they also create an opportunity for the respondent to straighten out potential misunderstandings.

Interview guides are typically associated with semi-structured interviews. An interview guide contains different themes with several associated questions that can be derived from the aim or the research questions of the study, according to Gustavsson and Säfsten (2020). A significant factor that Gustavsson and Säfsten (2020) are bringing up is that the interview guide should be designed to create natural transitions between the themes during the interview.

Gustavsson and Säfsten (2020) bring up several practical factors to consider before conducting an interview. Two of these factors to consider are the location of the interview and if the interview is conducted digitally or physically. They write that a

digital interview can be as good as a physical one. They also write that reflecting on the interviewer and respondent interaction is vital.

During this study, a series of semi-structured interviews were conducted with representatives from various companies implementing Agile work methods in their day-to-day work and consulting firms implementing Agile ways of working. This ensures a high degree of primary data in the report. The choice to interview companies and consulting firms is to give an idea of how these methods are implemented in companies. Initially, the first point of contact with potential interviewees was websites with the nature of, and similar to LinkedIn.

The interviews were conducted digitally in the form of video interviews. This was the case due to the geographical distances between the interviewer and the respondents. Therefore, digital interviews were cost-effective in terms of time and cost. Furthermore, the respondents have experience interacting with people online which makes this not a risk of decreased quality of the response from the respondent. Before the interviews, the interviewer sent an interview guide several days ahead, see Appendix A and Appendix B, which was prepared for the specific role of the respondent. This gave the respondents an opportunity to prepare for the interview and give more impactful answers, rather than being forced to come up with answers haphazardly. The interviewer also researched the respondent and their organisation to be receptive to the respondent's linguistic style and be familiar with their backgrounds. The interviews were recorded if the interviewee agreed to it, and this was done by the digital meeting software program to facilitate transcription. When the interviews were conducted, there were two, if possible, three group members present. One person focused on asking the questions and one or two assisted with transcription and the recording software. The last question of the interviews was asking the respondent if they had any contacts they thought would be valuable for this study, which acted as a snowballing technique to find suitable respondents, that were later contacted.

The reason for interviewing companies that implements Agile methods in their day-to-day work was to identify new and current aspects of how companies are affected by the transformation of increased remote work. The group of respondents are summarised in Table 4.1 below, which consists of employees on different levels of the organisational hierarchy to create a diverse and detailed image of the effects. The purpose of the interviews with consulting firms was to both identify what is trending when it comes to Agile methods and identify the effects of working from home in different industries. The data collected through interviews were mainly divided into two periods with a higher density of interview sessions. The reason for this was that throughout the time

the interviews were conducted and analysed, new ideas and perspectives influenced the interviewer’s knowledge about the subject. Therefore, it was vital to have time to discuss within the group and enhance our interview questions in order to receive the best possible answers. The second round of interviews also gave the opportunity to evaluate what type of respondents needed to be included. In the case of this study, it became evident that there was a need to conduct interviews with more team participants and not only team leaders and consultants.

Table: 4.1 *Number, title and industry of the interviews conducted during the study*

Number	Title	Industry
1	Agile Coach	Management Consulting
2	Co-author to the Agile Manifesto	Software Industry
3	Senior Agile Coach	Management Consulting
4	Offer Implementation Manager	Automotive Industry
5	IT Director	Truck Manufacturing
6	Solution Train Engineer	Truck Manufacturing
7	Senior Technical Director	Software Industry
8	Head of Strategy and Office	Automotive Industry
9	Project Manager R&D	Aerospace Industry
10	Senior Developer	Software Industry
11	Scrum Master	Software Industry
12	Director for UX & Technical Communication	Software Industry

2.4 Data analysis

A significant problem with qualitative research described by Bell et al. (2022) is that it generates large and complex data sets due to its reliance on unstructured data collection. Furthermore, they describe that a dilemma of qualitative data is that the richness associated with qualitative data comes with a price, as it can be challenging to find an appropriate way to analyse it.

A common way to analyse qualitative data, according to Bell et al. (2022), is to identify themes which, to some writers, are similar to the coding used in quantitative data analysis. Bell et al. (2022) refer to Ryan and Bernard’s definition of a theme; a theme represents a pattern or meaning, relates to the research question, builds upon the codes

identified in transcripts or other data sources, and contributes to the related literature of the research focus. This definition has been used in this study when identifying themes.

The data collected from interviews during this study has first been gathered into individual documents and after that, sentences and paragraphs that seemed important to the study's purpose have been gathered in an Excel document. The data collected in this Excel document were categorised into relevant themes. This has contributed to an easier understanding of connections between information and interviewees and, therefore also to make conclusions on the subject.

2.5 Research quality

Bell et al. (2022) discuss how quality can be measured in research which uses qualitative research methods. They write that reliability and validity are the standard criteria used to assess and establish the quality of business research. However, Bell et al. (2022) discuss the difficulty of assessing the quality of qualitative research using reliability and validity without alternating the meaning of these concepts to fit with the associated study. On the contrary, Bell et al. (2022) present Guba and Lincoln's, alternative criteria for evaluating the quality used in this study. These criteria are credibility, transferability, dependability, and conformability.

Bell et al. (2022) refer to Guba and Lincoln that a significant reason these aspects are better in evaluating the quality of the research than reliability and validity is that there would exist an absolute truth in social reality. The first aspect, credibility, stresses this idea. It stresses the importance of trustworthiness to increase the acceptability of the findings among other researchers. This can be realised by implementing canons of good practice during the study. To ensure credibility in this study, twelve interviews were conducted with individuals from different companies with different experiences to find patterns from people with different perspectives, which resulted in a triangulation of sources being achieved.

Transferability refers to the aspect of being able to apply the results of the study in other contexts (Bell et al., 2022). The interviews during the study were conducted to understand how companies and individuals in Sweden that are working with Agile methodologies are affected by the increase in people wanting to work from home. Therefore, the result of this study will only apply to other companies with similar work procedures and faces the same challenges by working from home.

Dependability refers to other researchers' ability to replicate the study and receive the

same result (Bell et al., 2022). Furthermore, the authors write that it is impossible to freeze a social setting which makes it essential for researchers to conduct thorough documentation of procedures for the study to achieve dependability. The interview guides, both in Swedish and English, that have been used during this study have been included in Appendix A and Appendix B to increase dependability.

Conformability can never be totally achieved during business research with qualitative research methods according to Bell et al. (2022). However, the authors write that nonetheless, it is impossible for researchers to be completely objective, the researcher can show that they did not allow their own personal values or theoretical inclinations to affect the findings of the study. To address the study's conformability, two measures were conducted. Firstly, during the different activities of the study, the researchers have always been divided into pairs to provide a first layer of protection against the influence of personal values and beliefs. Secondly, the conclusions and analyses drawn have always been after discussion of the topics with all researchers. Still, with these measures taken, there is no perfect protection.

2.6 Ethical considerations

Ethics relates to the norm of what is good and bad, right and wrong, and how actions are related to these valuations (Gustavsson & Säfsten, 2020). However, there is a difference between general ethics and professional ethics. Loyalty to a friend is an important norm in general ethics but can be harmful in professional ethics when for example the conclusion of a scientific paper is more important than the author (Gustavsson & Säfsten, 2020).

This report is a scientific study, and research ethics is therefore a more relevant term since this is not connected to a profession. Gustavsson and Säfsten (2020) describe that research ethics concerns that the study should be both scientific and contribute to the greater societal benefit, but also safeguard researchers, participants, and consumers. Scientific misconduct and fraudulent research are two principles to consider and be aware of when conducting a scientific study (Gustavsson & Säfsten, 2020). Furthermore, scientific misconduct is described as an improper way of acting during the research, while fraudulent research is another common term for this and therefore has a similar meaning regarding performance. Gustavsson and Säfsten (2020) describe fraudulent research through fabrication, falsification, and plagiarism. Moreover, fabrication means that results are made up, falsification relates to misrepresentation of information, and plagiarism is presenting another person's ideas and information as the study's own.

Research that executes interviews, and therefore includes participants, have some principles to follow about how to treat the interviewees. Gustavsson and Säfsten (2020) describe that both individual damage and disrespect should not occur, which could be regarding protecting personal data, confidentiality/anonymity, and informed consent.

Gustavsson and Säfsten (2020) present a summary of guidelines to consider while performing research ethics, and in this study, several of these are considered, and these are:

- **Integrity** - Agreements and promises shall be kept.
- **Confidential** - Information and conversations shall be protected.
- **Precision** - Carelessness shall be avoided, and keep good order in your research.
- **Objectivity** - Biases shall be avoided during the study; keep an objective mind.
- **Respect humans** - Respect human privacy and avoid doing things that could injure the person or exposure to risks.
- **Honesty** - Be honest during the entire study, e.g. when reporting results and not making up or misinterpreting data.
- **Openness** - Share your findings and be open to criticism.

The ethical aspects discussed in this section have been carefully considered throughout this study. The group has maintained integrity, within the group and to the participants, and respected the confidentiality of the interview respondents. In presenting empirical findings, the group has considered honesty, precision, objectivity, and openness, which are fundamental to avoid fabrication, falsification, and plagiarism.

In the framework of reference, ethical aspects regarding the effect on individuals connected to the purpose of this thesis are discussed and presented.

3 Framework of reference

The framework of reference starts with presenting the origins of Agile methodologies and their main ideas, values and principles. Further some relevant methodologies for implementations of Agile methodologies are given. Following this, relevant research on remote work and how COVID-19 accelerated the demand to work remotely is given. At the end of the section recent studies of the combination of Agile methods and remote work are presented.

3.1 Agility

In a dictionary, agility refers to “the ability to think quickly and clearly” (Cambridge, n.d). It implies that something is flexible and responsive and can cope with change. In the context of organisational structure, the essence of agility lies in the ability to create and respond to a change in both business and technical domains rapidly and flexibly (Dingsøyr et al., 2012).

Conboy and Fitzgerald (2004) describe that changes in competition, customer demand, technology or social factors push organisations to become more agile. Therefore, organisations will benefit from creating an environment that is able to respond to changes in these factors. The Agile Manifesto for software development presents four core values, combined with twelve principles, to follow in order to develop software in an agile manner (Beck et al., 2001). Although the manifesto was written specifically for software development, the ideas and principles can still be relevant in other non-software business domains.

3.1.1 The Agile Manifesto for software development

The lack of agility in software development was something that developers identified as a major factor as to why many software development projects were failing. In response to traditional plan-driven and highly bureaucratic software development, agile approaches grew popular at the end of the 1990s (Boehm, 2002). According to Highsmith and Cockburn (2001), comparing the end product with the original plan, when developing software, is not an essential part of a project. Instead, the most important aspect is to satisfy the customer at the time of delivery.

The traditional approach when planning a software project was that with enough planning effort, all the conditions and requirements for the product could be anticipated. The idea was that eliminating change would reduce costs. Highsmith and Cockburn

(2001) argue that the traditional way assumes that variations are the results of inaccuracies. Therefore, the approach was to remove these variations from the process. However, Highsmith and Cockburn (2021) argue that while some errors are caused by the method, the critical variations derive from external environmental changes. Factors that both are unpredictable and almost impossible to influence. In response to the traditional practice of software development shortcomings, Highsmith and Cockburn (2021) as well as 15 other people that represented different alternative approaches to software development, gathered to sign the Manifesto for Agile Software Development.

The Manifesto for Agile software development consists of four core values and twelve principles (Beck et al., 2001). The four core values consist of attributes which are displayed in bold text that should be emphasised over the other non-bold attribute. The idea is not to eliminate the non-bold attributes; instead, prioritising the attribute on the left over the right one.

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

In addition to the 4 core values, there are 12 principles that guides agile software development.

- “Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.”
- “Welcome changing requirements, even late in development. Agile processes harness change for the customer’s competitive advantage.”
- “Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.”
- “Business people and developers must work together daily throughout the project.”
- “Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.”
- “The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.”

- “Working software is the primary measure of progress.”
- “Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.”
- “Continuous attention to technical excellence and good design enhances agility.”
- “Simplicity—the art of maximising the amount of work not done—is essential.”
- “The best architectures, requirements, and designs emerge from self-organising teams.”
- “At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behaviour accordingly.”

In line with the Manifesto, common characteristics that Agile practices often share is iterative processes, close communication and collaboration between members of teams. Additionally, the elimination of activities that do not contribute to customer value is an essential aspect of Agile practices (Cohen et al., 2004).

One of the principles in the Agile Manifesto states that face-to-face communication is the most effective way of conversation. Face-to-face communication has some clear advantages compared to Computer Mediated Communication (CMC). Face-to-face allows parties to incorporate verbal and non-verbal cues into their conversation. This ensures the communication is more effective as the transmitter of the information gets immediate visual feedback of the receiver’s body language if the message is well received (Derks et al., 2008). The recipient, in turn, benefits from a much higher throughput of information flow, compared to CMC, in terms of subtle social cues, such as nuances in voice, hand gestures and eye contact (Derks et al., 2008). This type of communication is essential when building rapport and new relationships with people. It is difficult to reach the same level of throughput using CMC.

To be more effective in responding to sudden change, teams will be better off if they can reduce the cost of moving information between people. In similar fashion Agile methods aim to reduce the time between a decision and the outcome of a decision (Cockburn & Highsmith, 2001). To reduce the cost of moving information, agile teams should strive to be physically co-located, replacing extensive documentation with people and improving the team’s sense of community and morale.

3.1.2 Feedback in Agile practices

Work is done incrementally, and having user experts near the team is a method to reduce the time from decision to feedback (Cockburn & Highsmith, 2001). Agile methods depend on early and continuous customer involvement and maintaining their engagement throughout a project's life cycle. This is to set the objectives of a project and gather feedback (Dybå & Dingsøy, 2008). The iterative nature of Agile methods facilitates frequent communications with stakeholders enabling quick adjustments and modifying project requirements in response to new insights and customer demands. In a similar fashion, Agile methods encourage learning which is something that is highly valued. Instead of viewing mistakes as failures, Agile methods recognise this as an opportunity to improve and learn (Boehm & Turner, 2005). When working with Agile methods, during iterations, teams often plan for improvement and learning.

3.1.3 Responsiveness in Agile practices

As Cockburn and Highsmith (2001) highlight, an important aspect of agile teams is the focus on the individual's competence. When people have the right competence, processes are not the factor that will create the desired outcome. Instead of using strict processes, Agile practices aims to leverage the strengths of the individual and the team. Dybå and Dingsøy (2008) describe that Agile methods aim to tackle the problem of uncertain and unpredictable environments by emphasising the people and their creativity. Agile teams aim to be self-organising and to develop their processes depending on what works best for them to achieve their targets, being collaborative and having the ability to deal with uncertainty (Cockburn & Highsmith, 2001). The goal is for the team to collaboratively troubleshoot problems to find a solution. This nurtures a culture of problem-solving, innovation and constant improvement. Agile teams intend to cover gaps in competence and support members within the team (Boehm & Turner, 2005). To add on, being able to structure and create processes that suit the specific team can be beneficial. To enable this, Agile methods draw strength from breaking down a task into smaller bits, perpetually eliminating waste and increasing the proficiency of the process.

3.1.4 Agile methodologies

Agile methodologies are a set of tools to help organisations with Agile Project Management (APM) whilst adhering to the Agile Manifesto's core values and principles; this includes planning, managing and executing projects. There are a plethora of Agile methodologies, but one of the most commonly used is Scrum (Lei et al., 2017). The

Agile team's methodology depends entirely on the industry and what kind of product the organisation in that industry is developing.

3.1.4.1 Scrum

Scrum is widely, but not exclusively, used in software development. It is a relatively lightweight and iterative approach that emphasises teamwork, communication and continuous improvement (Sliger, 2011). Scrum originally got its name from rugby, where its implication means teamwork.

A popular tool that is used extensively in Scrum is the Kanban board, sometimes known as Scrum board. Kanban boards give an excellent visual overview of all work in progress (Kirovska & Koceski, 2015). This makes it easy for a team to prioritise, manage and optimise the workflow effectively. The board can be either physical, with post-it notes signifying the tasks, or digital in the form of a software program. The board is divided into columns that represent what stage a product or feature currently is in development. These stages of development could for example be: to do, work in progress, testing, and done (Kirovska & Koceski, 2015). The post-it notes or cards, that represent tasks, are then moved from left to right on the board depending on what stage they belong to.

A Scrum team usually consists of ten or fewer people, where the people are divided into the roles of Product Owner, Scrum Master and Scrum Developer. The Product Owner is the connection between the Scrum team and the customer and works closely with the Scrum team to ensure the product satisfies the customer's requirements (Sliger, 2011). The Product Owner keeps track of the product backlog and decides what product features and requirements need to be prioritised.

The Scrum Master's task is to ensure the team works within the Scrum methodology, e.g. Scrum values, principles and practices (Sliger, 2011). The Scrum Master helps the team to alleviate any blocks or hindrances in developing the product; this helps with an optimised and increased delivery flow.

The Scrum Developer Team's main task is to assemble an actual product, based on the customer's specifications that are communicated via the Product Owner (Sliger, 2011). The developer team is self-organising and cross-functional in the sense that they possess all knowledge to develop and deliver the product. Based on previous experience, the team knows how much workload they can take on for an upcoming sprint, and how fast the work can be completed.

3.1.4.2 Sprints in Scrum

The Scrum methodology heavily relies on iterative cycles, usually referred to as sprints. A sprint is a fixed duration that usually lasts for 1-4 weeks. It is important that this interval is fixed, as it gives the Scrum Developer team vital feedback regarding their forecast of delivery planning (Sliger, 2011). The team's delivery forecast grows incrementally more accurately over time as this feedback is processed and analysed. The fixed time schedule also offers the team a sense of urgency to complete the task in a timely fashion.

The Scrum team always meets for a sprint planning meeting at the beginning of every sprint. During this meeting, the Product Owner presents a list of prioritised features and requirements from the product backlog (Sliger, 2011). The Scrum team then chooses items on the list that they predict they can finish during the allotted time frame. These are the features that, towards the end of the sprint, should be tested and released to the customers as a finished product.

During the sprint, the Scrum Master conducts stand-up meetings or Scrum meetings. In the morning, team members gather for a 15-minute meeting. During these stand-ups, each member reports on their previous day's progress, planned work for the day, and any potential blockades (Sliger, 2011). It's the Scrum Master's task to help the team members alleviate any blockades in order to ensure a good flow in the work process. The team also keeps close contact with the Product Owner to make sure the product meets the stakeholder's requirements.

When a sprint comes to an end, the team invites stakeholders as the Product Owner runs a Sprint Review meeting (Sliger, 2011). The team presents and demonstrates the finished products, and the stakeholders offer feedback. The Product Owner documents the feedback and updates the product backlog accordingly.

After the sprint is complete, the team comes together for a Sprint Retrospective. During this meeting, the team members share, discuss and document what worked out and what went wrong in the sprint (Sliger, 2011). This is an important reflection, as this is the time for the team to collectively review their performance, identify areas of improvement, and take action to address any issues or challenges they faced during the sprint. The Retrospective is also an opportunity for the team to celebrate their successes and acknowledge each other's contributions. By conducting regular retrospectives, the team can continuously learn and improve its processes, leading to a more efficient and effective Scrum implementation.

It is essential that the team feels safe and encouraged to provide honest feedback dur-

ing the Retrospective, as this promotes transparency and trust within the team and ultimately contributes to a better work environment and better results (Sliger, 2011).

3.2 Working from home

As this study aims to research the relationship between Agile methods and working from home, it is of relevance to lay some theoretical foundation on how the workforce has implemented remote work. Specific jobs have offered the possibility for their employees to work from home for a long time, but the COVID-19 pandemic made working from home a widespread phenomenon. Even after the pandemic subsided, employees wish to stay home during work hours. This has affected not only the productivity and effectiveness of employees but also their wellness and mental health. Some aspects have had a positive impact, but there are also negative consequences to this newly adopted normality of working.

3.2.1 COVID-19 affects the workforce

The COVID-19 pandemic has significantly impacted society as a whole, including the way of work. The widespread implementation of community lockdowns forced the adoption of new working methods, with the concept of working from home becoming more prevalent.

Previous studies by Eurofund (2020) have shown that prior to the pandemic, only a small proportion of European workers chose to work from home, with estimates suggesting that merely 13-14% of workers occasionally work from home. However, during the pandemic, the proportion of people working from home increased significantly. Eurofund's estimates indicate that approximately 50% of European workers worked from home to some extent during the pandemic.

In a previous research conducted by Bankwest Curtin Economics Centre on the topic of working from home pre-pandemic in Australia, it was found that employees found value in being able to do part of their work hours from home every week. The ability to be flexible about where and when to work was one of the most valued traits associated with working from home, as it led to a better work-life balance (Dockery & Bawa, 2018).

However, as highlighted by Dockery and Bawa (2020), it is essential to note that previous research on remote work and its effects on employees may not be directly applicable to the context of remote work during the COVID-19 pandemic. Most research conducted before the pandemic has focused on individuals who work from home by mutual

agreement with their employer. In contrast, many workers during the pandemic were forced into remote work due to the response to COVID-19. As a result, the experiences and challenges faced by these employees were different from those who had chosen to work remotely previously.

The Work After Lockdown project, funded by the Economic & Social Research Council, was written to investigate the impact of working from home during the COVID-19 lockdown on the future of work in the UK (Parry et al., 2021). The research project sought to understand how this unprecedented shift to remote work would impact the way people work in the future. One key finding of the report was that the COVID-19 pandemic accelerated trends towards flexible and remote working. The report notes that many white-collar employees have been able to work from home during the pandemic and that this trend will likely continue. The report suggests that this could have several benefits, including reducing commuting times, increasing productivity, and improving employees' work-life balance.

Parry et al. (2021) also highlight, besides the benefits, some potential drawbacks of the move toward remote work. Parry et al. (2021) point out that some white-collar jobs may be more difficult to perform remotely. In addition, remote workers may be at risk of deskilling if they are unable to develop and maintain their skills when they are not in the work environment. The main challenge of working from home was communication. In particular, this was problematic at the beginning of lockdowns when people had yet to adjust to the situation and learn new digital tools. The report shows that communication among team members was the biggest problem, not between managers and employees. The number of unplanned interactions and the barrier to asking for help from another team member was higher during work from home (Parry et al., 2021).

Overall, the COVID-19 pandemic appears to have significantly affected white-collar jobs in the UK, with remote working becoming more prevalent and likely to continue. Although this trend may benefit employees and employers, some potential downsides and challenges must be addressed (Parry et al., 2021).

It is interesting to relate this study to the actual outcome of working from home even after the pandemic. Even though the project mainly focused on the British workforce, many of these findings are applicable to the Swedish workforce.

3.2.2 Increased demand after the pandemic

As previously stated, the COVID-19 pandemic forced the world into social distancing and working from home became a widespread phenomenon. This change in the way of

work allowed people and companies to endorse more flexible working arrangements.

A study by Eurofund (2020) found that 22 % of Europeans were still working from home. Results from this further suggest that a majority of respondents were satisfied with their experience of working from home and would like to continue to do so in the future. According to another study by Brinkley et al. (2020), the number of people working from home increased by 15 % for those who worked remotely full-time and 9 % for those who worked remotely at least one day per week. The same study also stated that employees had higher expectations of the managers to be offered the opportunity to work from home. Most participants in the study valued the flexibility that came with remote work and did not wish for it to be a full-time arrangement (Brinkley et al., 2020). Similarly, a study conducted in Ireland by Stefaniec et al. (2022) found that 78 % of respondents expressed a desire to continue working from home to some extent post-pandemic.

In line with the increased demand for remote work after the pandemic, the requirements of the way of work must also be reconsidered. The digital technologies used need to be updated, and the company need to restructure work policies and how to communicate with each other (Adekoya et al., 2022).

3.2.3 Productivity when working from home

Initially, there were some concerns about productivity when working from home, however, research suggests that productivity levels have remained high, with the majority (88.4 %) of employees reporting that they have been able to get as much, if not more, work done at home than in the office (Parry et al., 2021).

Farooq and Sultana (2021) argue that there are several ways in which to describe employee productivity; organisational performance, employee performance and corporate performance are some of the terms discussed. Regardless of how to describe employee productivity, one thing is in common, and that is the complexity of measuring it.

The job characteristics model developed by Hackman and Oldham (1974) is one of the most famous frameworks for job satisfaction. The framework links a range of job factors to job satisfaction and in turn, to employee productivity. Ali et al. (2014) clearly state that employees who are happy and satisfied with their job are more productive. Therefore, the job characteristics model could be used to make a better work environment for employees' well-being and increased productivity. The framework identifies the five core job dimensions: autonomy, feedback, skill variety, task identity, and task significance (Hackman & Oldham, 1974).

Working from home is shown to positively affect job autonomy, as employees felt that they possessed a higher degree of control over their work environment. This allowed them to make their own decisions regarding work time, workplace, and means of completing tasks. The freedom to make their own decisions regarding their work situation without the need for strict observation and obligation to follow certain work cultures related to the office helped employees enhance their performance (Peros Khan et al., 2018).

A study conducted by MacRae and Sawatzky (2020) proves that regular feedback on employees' work is of great importance. The study results show that annual performance feedback is not enough for employees working from home and that there is a need for more regular feedback and a clear performance management framework. The study also showed that the most preferred method for feedback was face-to-face communication, even though the respondents preferred to work from home. This finding is interesting, as it means that the digital feedback methods are insufficient for most respondents and they still value face-to-face interactions regarding important topics (MacRae & Swatsky, 2020).

When employees work from home, the nature of their job and tasks might not differ significantly (Wang et al., 2020). As a result, the skill variety, task identity, and task significance could be argued to remain relatively the same, regardless of whether they are working in an office or from home. However, Thi Thu Ha (2021) argues that the changed work circumstances could lead to changed job characteristics. Additionally, the report means that the increased use of digital platforms and communication tools demands higher technological skills in employees leading to skill variety. Furthermore, Thi Thu Ha (2021) argues that the limit of communication could lead to misunderstandings of information about the dedicated tasks. This could in its turn, mean less task identity due to less understanding. Lastly, Thi Thu Ha (2021) claims that working from home could even affect the task significance. With limited face-to-face interactions with both customers and colleagues, it is harder for employees to observe the actual impact of their work.

Working from home has also affected the way in which managers can observe and ensure productivity. Hill (2020) coined the term arms-length managers in the article about the new leadership challenges associated with working from home. Hill (2020) states that some of the challenges with management when working from home are communication and trust. Management on a distance emphasises the need for managers to act more as supporters and coaches for their employees, with the aim to provide them vision and clarity. With this also comes trust, believing that the employees will do their best work

autonomously (Mawson, 2020).

Wang et al. (2020) wrote a paper about achieving effective remote work with a perspective of work design. In this paper, it was found that many managers chose to incur many costs in setting up monitoring systems for their employees during the COVID-19 outbreak. The findings of Wang et al.'s (2020) paper suggest that the desired outcome of monitoring the employee's effectiveness was not as effective as they initially thought. Instead, Wang et al. (2020) imply that managers could get a better outcome if they focused on engaging in more supportive management practices and that well-implemented meetings could lead to increased motivation. Communication with employees using motivating language, building trust with and within teams, and sharing information was all practices that significantly impacted productivity more than monitoring (Wang et al., 2020).

Barbieri et al. (2021) provide an overview of management's changes in response to employees working from home. Organisations have been forced to redefine their management logic and have been repelled to abandon the old management models based on power and control in favour of a more open and flexible model. The new management model lays weight not only on innovation and knowledge but also on employees' mental health and quality of life (Barbieri et al., 2021).

3.2.4 Team cohesion and well-being

According to Aczel et al. (2021), there are many benefits in an individual's private life when working from home, such as many people experiencing an increase in motivation and a feeling of more control over the daily schedule. The authors also assert that individuals are more productive when working from home. Additionally, the ability to handle household tasks and manage family life feels easier when the possibility of where and when to work is more flexible (Aczel et al. 2021).

However, while some people argue for being more effective when working from home, the possibilities for spontaneous face-to-face meetings decrease. The reduced number of informal meetings results in fewer opportunities for light-bulb moments due to the lack of spontaneity (Felstead & Henseke, 2017). Waizenegger et al. (2020) argue it hampers knowledge sharing, primarily affecting new employees. Felstead and Henseke (2017) further argue that some people may have difficulty balancing work with spare time when working remotely. To overcome this, companies must establish routines that make communication and cooperation within the company function.

A study by Bennett et al. (2021) discusses videoconference fatigue, an exhaustion event, after engaging in a meeting online with the camera on. The authors claim that persistent awareness makes videoconferences more draining than face-to-face meetings. The number of faces on the screen and the feeling of constant monitoring are unnatural for the human brain.

Parry et al. (2021) point out some potential well-being issues with remote work. In some cases, white-collar workers reported feeling isolated from their coworkers. As a result of this, their mental health declined, this was shown by many employees reporting low scores on the WHO-5 Well-being Index (Parry et al., 2021).

Furthermore, it can be discussed how the team's well-being is affected when working from home. The demands on the team leader are different when working remotely, and it is easy to overlook someone not coping with their work tasks or being displeased with some decision when not having face-to-face interaction (Knight, 2020). To overcome this, it is important to regularly have one-on-one meetings to see how they feel and cope with work and daily life. Knight (2020) also discussed the importance of setting protocols and practices with the team about handling communication. Moreover, they emphasise the importance of having fun together and continuing to connect with the team on a daily life basis.

3.3 Being agile from home

Whether or not Agile methodology is suited for working from home has been discussed and researched in several studies. Some studies claim that Agile methodology is beneficial when working from home with higher productivity. Meanwhile, other studies suggest the opposite and mean that Agile methodology can not be carried out well when working from home.

Russo et al. (2021) suggest a correlation between well-being and productivity. Their study found increased well-being of team members when working from home thanks to increased autonomy and better daily routines. This led to higher productivity when working from home. In contrast, Ralph et al. (2020) conducted another study dealing with the correlation between well-being and productivity and evidence found that the productivity of Agile software development teams decreased when working from home. However, this study was conducted during the COVID-19 pandemic, meaning that much mental stress was related more to the pandemic rather than the remote work situation. The factor of worse ergonomic work situations due to non-suiting home offices found could still be relevant even during non-pandemic times (Ralph et al.,

2020). A commonality both these studies share, is the finding that productivity and employee well-being are strongly linked, suggesting that employees feeling mentally and physically well make for better work-related output.

Neumann et al. (2021) investigated how working from home affected the performance of Agile software development teams. Their research revealed that German Agile software development teams did not experience a decline in perceived performance due to transitioning to working from home. Neumann et al. (2021) found a positive influence on performance thanks to the increased transparency when working from home. The authors highlight that digitising Kanban boards and using digital communication channels improved the transparency of the development process. This made the company more inclusive and allowed for better involvement of the entire organisation. Neumann et al. (2021) also found that when working from home, employees used their time more efficiently and that digital meetings were more goal-oriented and factual.

Regarding communication, several studies have been conducted to investigate how working from home affects this essential part of agile teamwork. Marek et al. (2021) state that bringing Agile home means the need to overcome several communication-related obstacles and that it is important to create a transformation strategy, to implement the Agile methodology to its fullest, even when working from home. Marek et al. (2021) found that respondents tended to experience increased communication when working from home. Respondents found that when moving all communication to online platforms, it was easier for every employee to take part of the information, something that had not been the case when discussions were taking place in closed-off meeting rooms at the office. Overall, Marek et al. (2021) found that working from home did not affect Agile methodology and communication negatively. Instead, the study suggested that working from home led to increased productivity, thanks to more efficient meetings, and that communication became more transparent and inclusive.

According to a study conducted by Ozkan et al. (2022), effective leadership, cohesion, and communication are some of the biggest challenges faced when working from home. These factors are critical components of the Agile work approach, as they help ensure that team members are able to collaborate effectively. Ozkan et al. (2022) also argue that if an effective communication flow is not established, the team's productivity will suffer, creating rifts within the team and leading to additional work. The study highlights several potential conflicts that may arise in the context of a sustainable work situation for teams working from home with the Agile approach, but also for the individual. The act of working from home presents a significant ethical implication in demonstrating to one's employer that the individual is efficiently fulfilling their job

responsibilities and doing so in a timely fashion. If working from home hinders productivity due to ineffective communication channels, it can contribute to a feeling of inadequacy and result in stress for the employee.

Furthermore, Asfaw et al. (2022) emphasise that communication is vital for efficient, agile work and that working from home harms team communication. Face-to-face communication is essential for getting clearly understood without the risk of misinterpretation. When employees are working from home, Asfaw et al. (2022) suggest that it is more likely that the understanding and scope of the project are misunderstood, leading to a problematic team experience when different team members have different visions. Asfaw et al. (2022) imply that this problem could easily be solved with face-to-face communication and employees being on-site.

3.4 Key takeaways

These are some of the most important key takeaways to keep in mind when discussing Agile and remote work.

The Agile Manifesto highlights key aspects of Agile practices which include iterative processes, communication and close collaboration among team members, and eliminating non-value-adding activities (Beck et al., 2001). Effective face-to-face communication is preferred, as it enables the use of verbal and non-verbal cues. Feedback is critical, and Agile methods prioritise early and continuous customer involvement to set objectives and gather feedback (Dybå & Dingsøy, 2008). Agile teams place value on individual competence rather than strict processes and aim to be self-organising and adaptable to uncertain and unpredictable environments (Cockburn & Highsmith, 2001). The goal is to create a culture of problem-solving, innovation, and continuous improvement by breaking tasks into smaller bits (Boehm & Turner, 2005).

Scrum is a popular Agile methodology focusing on team collaboration and continuous improvement. It involves three roles - Product Owner, Scrum Master, and Scrum Developer - who work together to break down problems into smaller tasks into iterations called sprints (Sliger, 2011). Communication with stakeholders is crucial to ensure the project meets expectations. Sprint retrospectives are conducted to improve the process for the next sprint. Scrum promotes autonomy, trust, and a culture of continuous learning (Sliger, 2011).

According to Eurofund (2020), large parts of society went through a fast transition from working on-site to working from home during COVID-19, leading to organisations needing more knowledge and culture of full-scale remote work. However, the literature

indicates that high productivity levels can be maintained while working from home (Parry et al., 2021). Several factors that contribute to this are job autonomy and regular feedback. This aligns with the job characteristics model by Hackman and Oldham (1974) and its link to employee satisfaction and productivity. On the other hand, managers face new challenges (Barbieri et al. 2021) in the need for trust and communication (Hill, 2020) when managing remote workers.

While remote work benefits individuals' well-being, such as better work-life balance (Dockery & Bawa, 2018) and reduced commuting times, Parry et al. (2021) present potential downsides, such as social isolation, difficulties in communication and deskilling. Furthermore, literature shows that motivation rose for employees working from home due to flexibility. However, a negative effect of working from home is the decreasing informal meetings and balancing spare time (Felstead & Henseke, 2017). Another key takeaway is that working from home led to increased autonomy, better daily routines and increased productivity (Russo et al., 2021). Effective leadership, team cohesion, and communication are essential for agile teams to collaborate effectively (Ozkan et al., 2022). The lack of these factors can lead to decreased productivity, employee stress, and team conflicts (Asfaw et al., 2022).

4 Empirical findings

This section presents the interview results and is structured according to the thesis research questions:

- What aspects are required for an organisation and its teams to be agile?
- Are there any challenges and possibilities related to these aspects when working remotely and do these affect the organisation, team, and individual?
- What is done in order to overcome challenges related to aspects that are negatively affected?

Every research question has been divided into themes identified during the compilation of the interviews.

4.1 Aspects required for Agile methods

During the compilation of the interviews, three categories were identified as prerequisites that respondents brought up as conditions to work in an agile manner. The following aspects are communication, autonomy and flexibility.

4.1.1 Communication

During the interviews, communication was often brought up as one of the most significant aspects of an effective workplace that has implemented Agile methods. As in most companies, having a structure and a set of base rules for communication is crucial.

One of the management consultants said that Agile methodologies are all about communication. Without effective communication productivity decrease. Additionally, the Head of Strategy and Office in an automotive company spoke about the importance of every team member being aligned in communication, structure, clear objectives, deadlines and Agile practices. It is necessary that everyone at the workplace is familiar with Agile concepts, both how they are executed and how they are understood, he added. When working with Agile methods, there are many teams, and the Head of Strategy and Office argued that it is important that the workers are able to discuss and cooperate between these teams. Furthermore, it is more important to have collaboration across competencies than being a specialist on their part of the product.

One perspective that the Senior Technical Director brought up during the interview was that software development is not a skill that is learnt through talking. It is more

of a craftmanship that team members learn by doing. Therefore, this company uses a mentorship program for new employees to learn this craftmanship. Several interviewees are working and collaborating within a team distributed around the globe, which comes with the challenge of being available during different periods of the day. This makes it hard to have stand-ups or similar regular meetings. One of the interviewees argued that it is important that there are clear structures and principles for how communication is to be handled within the company when employees are working from home. Furthermore, one of the interviewees argued that handling the unstated work culture and making everyone follow the same conditions, although people are based in different locations, is crucial.

4.1.2 Autonomy

Conducting the interviews, it became abundantly clear that Agile project management (APM) has no chance to work unless the team reaches a certain level of autonomy. Agile teams are encouraged to make decisions based on their previous experiences and collective expertise. This fosters a culture of accountability and ownership among the team members.

According to three interviewees, agile teams are self-organising. They manage their own work and are responsible for making decisions on how to achieve their goals. This includes what work should be prioritised, who should do what, and general task allocation. For this to work efficiently, the team needs to consist of team members with different skill sets. According to the Senior Technical Director, team members need to be self-driven to a point where they seamlessly consult with their colleagues if problems occur that they may not be able to solve by themselves. Two respondents opined that not only should they work amongst themselves, but agile teams also need to work closely with the stakeholders to ensure the work aligns with the business objectives.

4.1.3 Flexibility

Flexibility is one of the conditions that often was brought up and emphasised in the interviews. It is referred to as the ability to quickly adjust the team's approach based on feedback and new information rather than being locked into a rigid plan or schedule. One interviewee mentioned that subdividing big problems into smaller tasks helps tremendously with time management in a project and makes the team more resilient to unwanted surprises along the way.

According to one of the Co-authors of the Agile Manifesto, being prepared to change is one of the biggest conditions of APM. He believes that every team has to create their

own practices. As the situation changes and as they learn, they should update these practices. In the interview, the Co-author stated that "If you are doing the same thing now as you were doing a year ago, then by definition you are not an agile team". The Co-author continued by adding that an agile team should be brave and experiment, to keep the things that work and throw away what does not work.

Flexibility is critical because it allows teams to adapt quickly to changing situations and requirements, which is essential in today's fast-paced business environment. An interviewee proposed that customers never really know what they want. The interviewee meant that it is important to place a product proposal in front of the customer as soon as possible, so the customer can get a feel of it. This allows the customer to notify the team if they think the product is heading in the wrong direction. It is better to fail fast, otherwise, the project risks steering in the wrong direction.

4.2 Challenges and possibilities of working from home

The following section presents what the respondents expressed as challenges and possibilities when people are working remotely from the perspective of how it affects the agility of the workplace. In the compilation of the interviews, the effects could be categorised into four different topics. These topics include the effects on communication, team cohesion and cooperation, productivity, and well-being.

4.2.1 Communication in a remote setting

The Senior Agile Coach talked about how the organisation needed to change their communication when employees work remotely to not decrease in effectiveness. However, the consultant did not necessarily view this as an advantage or disadvantage. The respondent meant that communication could either have a positive or negative outcome depending on how this is solved within the company. The IT Director from the truck manufacturing industry and one of the Agile Coaches agreed with the previous respondent and added that it is more challenging to communicate a message without body language. Furthermore, the Agile Coach added that communication gets even worse if the video or messaging software lags.

The IT Director later addressed the problem that employees are not used to this digital shift, resulting in people scheduling more meetings. The respondent stated that this is about how digitally mature the company is and the individual's digital mindset. This has increased the velocity of companies' digitalisation, which the respondent thought was positive. The Director for UX & Technical Communication was on the same track

and discusses that a team need to have certain agreement and principles regarding how communication is supposed to work. The Solution Train Engineer also discussed culture and mentioned that it was easier to ask a colleague at the office how it was going than through a phone call. According to the respondent, when a subject requires a phone call, people perceive it to be of higher severity, making it harder to check if someone is struggling.

This respondent, the Solution Train Engineer, discussed the possibility that through digital meetings, meetings are becoming more democratic. This is because it is harder for people with great charisma to influence the other participants through a screen, and on a video call, people are often allowed to speak without getting interrupted. Additionally, the respondent added that the processes are becoming more democratic, as all communication flows through channels accessible by everyone. The Head of Strategy and Office in the automotive industry argued that there is a risk of employees feeling and being less engaged while doing meetings digitally than in the office.

Another aspect throughout the interviews is that it is hard to replace the discussions the employees had while using a whiteboard. The Senior Agile Coach discussed that it is hard to find software that works as well and at the same time is as easy to use as a whiteboard. The Senior Technical Director emphasised the extent of losing the whiteboard, and meant that the whiteboard is the most essential tool a team can use. He adds that it is a tool that is hard to replace with software.

Nine interviewees brought up informal meetings, that happen spontaneously at an office, as a challenge when employees spend more time working from home. The Senior Agile Coach argued that when people work from home, it is harder to collaborate between functionalities and that the lightbulb moments disappear, which is where the team members get many of their ideas. The other management consultant argued that the most significant difference between remote work and work on-site is that there are not many possibilities for unofficial meetings to occur between the employees. A Manager from the automotive industry agreed that it is a challenge that people do not stay after meetings and discuss various topics. Therefore, it is harder for new hires to get to know the other employees, and if people do not know or feel connected to each other, they will rarely offer help as well. Both interviewees working within the truck manufacturing industry argued that working from home decreases the possibility of creating a more extensive network and communicating with people not in the closest team. The Solution Train Engineer also added that it is harder to discuss matters that are not the primary topics of the meeting, after the meeting has ended.

Several interviewees are currently working on teams that consist of team members located in different sites around the globe. A challenge that has arisen is that if a group works on-site and other employees work from home, it is complicated to integrate all employees on equal terms. The Senior Technical Director within the software industry said that this is a disadvantage with having an on-site group that can get to know each other and another group only working remotely. The Project Manager from the aerospace industry has the same experience where remote people are often forgotten and have difficulty making their opinion heard. The Senior Developer explained that at the beginning of remote work, a significant challenge was to communicate efficiently.

4.2.2 Team cohesion and cooperation while working from home

Five respondents described that team cohesion and team spirit were negatively affected while working remotely. Three of these thought that people became more formal towards team members. Something brought up by the same three respondents was related to how teams aligned with their targets. The Scrum Master in the software development field, described how mediating the overall picture and what different value members bring becomes harder when remote. This is something that the Solution Train Engineer and Director of UX & Technical Communication both were agreeing on. The latter discussed how leadership changed when people were remote. Some team members feel that when a task is done, their job is done. This means that it needs more significant efforts for someone leading a group to reach out to members in order for them to continue contributing to the work. Other team members are better at seeing the overall picture, however, it is hard to understand if everyone is aligned with what should be done. The respondent did not experience this to the same extent when people were at the office.

The views on how this might affect the team's cooperation differed. The Head of Strategy and Office, from the automotive industry, believed that socialising is crucial in making agile teams more effective, and states that "It's the socialising and the chat and the opportunity to ask the stupid questions and, you know, talk too much and get that sort of bonding that actually makes an agile team more efficient". The respondent proceeded to explain that when people are in different places, it creates more effort for team members to bond. The respondent continued to explain that, when people better know each other, it is easier to adapt and help a specific person. The Offer Implementation Manager agreed with what the Head of Strategy and Office previously stated, and describes that employees do not learn to know each other as well when remote and that it might make people more hesitant to help other people.

Others argued that collaboration works as well as if people were in the office. One interviewee, a Senior Software Developer, argued that employees do not have and need close relationships with everyone in the office, and the same goes when people are remote. However, something that is important is to put trust in the members of the team. The Director of an IT department in the truck manufacturing industry, thought that as a leader, it is required to put greater trust in the team when people are working from home.

Another situation that two respondents expressed that a potential concern is when one team member is remote while the rest of the team meets up in the office. The Senior Technical Director discussed how the employees on another site might be left out of the group without realising it. The person staying remote might have the impression of being more well-informed than they are. This may cause the individual to form strong opinions not based on current information, putting them at risk of becoming excessively opinionated. The person staying remote might have the impression of being included more than they are. Co-workers might forget about the person, take them for granted and not include them in discussions. Another challenge the Senior Technical Director brought up was that it is easy to miss that an employee wants or needs to educate themselves when a team is working remotely. A respondent from the automotive industry had a similar view; when someone always works remotely, it might make the person disconnected from their team and could further lead to decreased motivation and productivity.

When companies were forced to operate their businesses from home during the pandemic, they encountered another difficult challenge, namely the onboarding of new personnel. One interviewee reported that people they hired during the pandemic did not stay within the company for as long as people they hired before the pandemic usually did. Additionally, this respondent believed that this has to do with new hires having a much harder time integrating themselves with their new colleagues and embodying the company's culture. The Director for UX & Technical Communication stated that colleagues that are well established in the company and already know each other may oftentimes choose to talk with each other instead of inviting the newly hired into the social group. The Senior Technical Director described that this can amount to new employees feeling less engaged with the company and their work, which leads to lower job satisfaction.

4.2.3 Productivity when working remotely

Several of the respondents believed productivity increased when working from home. The Senior Technical Director surmised it was because of the higher responsibility to accomplish the work tasks and the time saved when not commuting. In order to increase productivity, the company also minimised the meetings that were not necessary. The respondent also stated that employees felt motivated to work productively on their own in order to reduce meetings. Four other interviewees all claimed that one reason for being more productive when working from home is that the employees are less likely to be disturbed.

One of the Agile Coaches argued that meetings are more effective when having them in the office. However, another interviewee, the Project Manager, argued the meeting is more effective remotely since they have been able to implement an effective meeting standard.

The Senior Developer highlighted that it is not possible to be productive for eight hours straight, which makes a flexible working environment profitable because it allows individuals to choose when and where to work, which may include working from home for part of the day.

One interviewee argued that remote work can harm productivity when organisational problems occur and must be solved on short notice. It is easier to solve urgent problems face-to-face. He further stated hiring new employees is more challenging if the organisation does not offer hybrid work terms. Another respondent argued that when the individual is most productive is not the same for all. The respondent claimed that if there is only one person joining digital, that person is likely to be less productive.

4.2.4 Well-being in a remote environment

The opinions regarding well-being are split between the respondents. According to one Agile Coach, people's stress levels seem lower when working from home. Meanwhile, the Project Manager argued that working from home makes it hard to notice if the employees are overstrained.

Furthermore, another interviewee, the Senior Technical Director, stated that it is hard to know how his employee's well-being is when working from home. Three respondents, including the Senior Technical Director, also highlighted the concern about how working from home increases the risk of social isolation and the negative impact that has on an individual's overall well-being. One of these interviewees also talked about the responsibility the managers hold against the individual's health and what obligation

the company have if an employee's mental health is negatively affected by the working conditions.

4.3 Approaches to overcome presented challenges

The following section presents what the respondents brought up as approaches to bridge the challenges presented in the section above.

4.3.1 Navigating obstacles in communication

The interviewees presented several ways to overcome challenges when more work was done from home. Four of the respondents, the IT Director and three respondents working in the software industry, answered that by changing the culture within the team or organisation, it is possible to reach the same level of efficiency in communication. The Director of UX & Technical Communication added that it is also important to have the right tools and software, such as Zoom and Slack, to overcome communication challenges. Another important aspect that was brought up is to establish the company's work culture and pass it on to the teams, although it is remote. It is essential that everyone operates from the same foundation. Other software brought up during the interviews that helped companies overcome the communication challenges were Skype, Teams, Google Docs and regular e-mail. However, the way different interviewees use this software differs. The Senior Developer explained that their organisation, in the early stage of their digitalisation, had a call that was always active so that other colleagues could overhear everything that was discussed. This led to decisions being made at a fast pace. However, they shifted to a pairwise arrangement, working for a minimum of four hours at a time, which also made room for informal communication. While the Solution Train Engineer explained that they changed their way of holding meetings to adapt to the participants that are using digital solutions. On the other hand, the Senior Technical Director uses Slack to communicate with each other due to their organisation being on different sites all over the globe. This makes it possible to send a question during the day and have a response the day after.

The Solution Train Engineer explained that their organisation tried to implement a new type of meeting to create a place for informal meetings. This was implemented by having an extensive meeting with people from the whole division and then splitting them up randomly in a breakout room where they could discuss different matters. This was a great success at first, but it lost its appeal after a while, and now they have implemented a system that forces people to come by the office at least two days every week. The two interviewees from the automotive industry, solved the challenge of

creating informal meetings through different kinds of meet and greet. The Offer Implementation Manager's company schedule a meeting on-site once every quarter where employees can meet the people they work with.

4.3.2 Methods for strengthening team cohesion and team collaboration

Three respondents argued that, if possible, team members should occasionally meet each other in person, with one of the objectives being to strengthen team cohesion. Digital channels for informal meetings, discussed in the above section, are another method that respondents bring up to strengthen bonds within the teams. One respondent discussed the importance of having more apparent norms and expectations from the different team members when people are remote.

Companies today are more prepared to receive new personnel and begin the onboarding process virtually. According to the Senior Developer, their company has invested in proper infrastructure and technical equipment to make socialising and communication more seamless. This may, for example, be a virtual town hall, which two of the respondent's companies have implemented, where team members hang out in a virtual space, almost like they would in a normal office. Another interviewee stated that companies need to create and establish a safe and inviting company culture that encourages people to reach out to each other when they encounter challenges in their workday.

To further ease the new employees into the company's culture and social structures, one interviewee described that every new team member is assigned a mentor. The mentorship usually lasts anything from 3 months up to 6 months. During this period, the new team member tags along with their mentor to practically everything, the mentor and mentee code together and attends every meeting together. The mentor also informs what members of the team possess certain expertise so that the new hire knows whom to ask for help in the future. The Director of UX & Technical Communication proclaimed that their newly acquired employees must have a high on-site office attendance for a year or two to increase the pace at which they are integrated with the company.

4.3.3 Ways to optimise productivity

All of the respondents were of the opinion that productivity did not decrease while working from home. Three interviewees saw the opportunity of increasing productivity by being able to recruit employees with certain qualifications worldwide instead of from a limited geographic area.

Another opportunity that the Project Manager pointed out is that the teams can be more efficient. Furthermore, he described that the company now has almost all meetings online, even though all participants are on-site. This made it possible for employees to work on other objectives instead of focusing on the meeting when their expertise was not needed. He also highlighted that if a meeting is digital, it is possible to have a conversation with someone that participates in the meeting without interrupting the others. Additionally, it is possible to reach out to someone in another meeting via chat messages and ask them to join the meeting briefly. There was also the possibility of having more people involved and participating in the meetings digitally, which was a key to unlocking more competence, and avoiding extra meetings.

4.3.4 Procedures to increase well-being

One downside of working from home is the isolation it can bring, and the Senior Technical Director believed employees need to work on-site at least one day a week to prevent this. Another downside the respondent also talked about is that it can be hard to keep long-term discipline. Lastly, he claimed the importance of having a good home office, otherwise, it is hard to cope with remote work.

Two other respondents also argued for the ergonomic benefits of digital meetings; even if all participants are on-site, digital meetings are still preferred. When all participants join the meeting from their own workplace with their own computer, desk and chair, the risk of unnecessary physical strain is minimised.

4.4 Key takeaways

In the empirical findings, three aspects can be summarised as prerequisites to being agile. Communication is a crucial aspect for working with Agile methodologies. Effective communication is necessary for productivity and collaboration across teams. Autonomy is essential for APM to work efficiently. Agile teams are self-organising and responsible for making decisions on achieving their goals. Flexibility is critical for APM as it allows teams to quickly adapt to changing situations and requirements. Agile teams must be prepared to change their approach based on feedback and new information.

Regarding challenges and possibilities, communication can be more difficult when working remotely, particularly without body language and with the potential for technical issues. Also, whiteboards and spontaneous in-person meetings are difficult to replace when working remotely. Remote work can also make it harder for employees to form informal networks and get to know each other, which impacts team cohesion and collab-

oration negatively. However, it makes for possibilities to broaden the competencies of a company by being able to hire outside the nearest area. Teams with remote and on-site members may struggle with integration and equal participation, which may affect an individual's well-being.

To bridge issues related to communication, respondents suggest changing the culture within the organisation and using appropriate tools such as Zoom, Slack, Skype, Teams, Google Docs, and email. Strengthening team cohesion can be achieved by scheduling occasional in-person meetings and digital channels for informal meetings, investing in technical equipment, and establishing a safe and inviting company culture. To increase productivity, some respondents suggest having all meetings online, reaching out to people in other meetings through chat messages, and having more people participate in meetings digitally. To increase well-being, employees should work on-site at least once a week to prevent isolation and have a good home office. That being said, some respondents claim that participating in online meetings instead of being in the same meeting room could be beneficial from an ergonomic standpoint.

5 Discussion

This study aimed to analyse how Agile methods are affected when working from home. The result identified the following aspects required or affected by remote work: communication, autonomy, and flexibility. Other important themes in the empirical result also taken into consideration were team cohesion and cooperation, productivity and well-being. The discussion is therefore divided into two main sections, one for the identified essential aspects of Agile methodologies, and one for how remote work has impacted the agile team, organisation and individuals. In the first section, it will be discussed how and why the three identified aspects required for agility are affected by remote work, as well as the presentation of some solutions. In the second section, some main important themes related to how agile teams, organisations and individuals are affected when working from home are discussed in relation to the result of the interview study and literature review. There will also be some discussion about contradictions and other topics worth highlighting for the sake of the study.

5.1 Essential aspects of Agile methodologies

Through the empirical study, three aspects have been identified as particularly important: communication, autonomy, and flexibility. These three aspects are discussed under their own subsections for simplicity and to be easily followed. Each of these aspects will be discussed in detail, linking empirical findings with relevant theoretical frameworks to understand how they are affected by remote work.

5.1.1 Communication

The empirical findings claim that communication was one essential prerequisite for an effective agile workplace, which aligns with the principles of the Agile Manifesto (Beck et al., 2001). Marek et al. (2021) state that several communication-related obstacles must be overcome to implement Agile methodologies when working from home. When people start to work remotely, the way communication proceeds is changed, so ensuring that effective communication channels still exist is therefore crucial. The respondents have expressed both advantages and disadvantages with how communication is carried out when working remotely.

Several respondents imply that communication when working from home is inferior to face-to-face communication. MacRae and Swatsky (2020) addressed this topic in their study, showing that employees still preferred face-to-face feedback on important topics even when working from home. Echoing this point, the results from the con-

ducted interviews showed that the lack of visual body language is problematic for clear communication. However, this could be solved to some extent with new digital technology allowing for better video meetings. If all participants turn on their cameras for meetings, most of the body language can still be read, even when working remotely. Nevertheless, as one of the respondents said, lag and a slow internet connection can make for trouble, creating demand for high-speed internet together with acceptable microphone and camera quality at every employee's home.

An interesting aspect that one of the respondents discussed was how information flows might become more democratic when people are remote. One of the reasons is that people's charisma influences people less than when people are at the office, and people are more likely to speak without getting interrupted through a video call than in person. Similarly, when remote, information flows through channels accessible by more people, instead of being shared in an informal meeting between a few team members. Neuman et al. (2021) argue as an example digitising Kanban boards have a positive influence on transparency and the inclusiveness of the organisation. This is a solution that the interviewees reported using. This sentiment parallels Marek's et al. (2021) findings which argue that when moving communication online, it is easier for every employee to take part in the information.

More accessible information could arguably be a positive result of the lack of informal and unofficial meetings when people are remote. However, nine respondents expressed the absence of informal meetings as a challenge, which was also something that was brought up in the study by Parry et al. (2021). The main concerns respondents thought the absence of informal meetings created were two things. First, teams communicated more inside their own team and interacted less with people from other functionalities. Spontaneous meetings, perhaps at the coffee machine, do not occur when people are working from home. Two respondents complained that it is harder to communicate with people, not in the closest teams. However, this is not in line with Parry et al. (2021), who suggest that communication among team members was negatively affected and that communication between managers and employees was maintained well. The second concern, agreeing with Felstead and Henseke (2017), expressed in one interview, was that situations for lightbulb moments would decrease. These moments might come from a discussion with a person outside the own team or a discussion that might occur after a meeting. Fewer opportunities for communication lead to fewer interactions with stakeholders, which according to theory, is highly emphasized in Agile methodologies (Beck et al., 2001; Dybå and Dingsøy, 2008; Sliger, 2011). Two respondents expressed that when people are working remotely, it takes more work to be updated and for

everyone to align with the scope, which might be an effect of fewer informal interactions. Even though all respondents experience an absence of informal meetings, everyone does not view it as an issue. One respondent discussed that there are digital solutions to the problems that can bridge the gap. After all, Agile methods revolve around adapting and evolving the processes depending on the situation. If teams can find alternative ways of replacing informal meetings, communication issues related to this absence will not remain.

A common method of overcoming the lack of informal meetings that respondents mentioned was to form digital meeting places. The implementations that respondents reported varied. For instance, this could be an extensive meeting where people split into breakout rooms where different people could discuss different subjects. Another implementation brought up was having an open channel where people could pitch in and talk whenever they felt like it. Whilst this was often appreciated, it could only partially replace informal meetings, and the concept started to feel watered down after some time. No matter how sophisticated Voice over IP, chat programs Teams, Zoom, and other software are today, we are undeniably faced with certain limitations. Video chat set aside; it is challenging to construct an organic hangout room similar to the ones one might find in a workspace. Team members cannot overhear what someone in a different virtual room is discussing and add to that with their perspective. Employees who join a breakout room are limited to a conversation only with those people in the same breakout room. Whilst in a chat room, only one person can speak at a time; the conversation easily becomes cluttered. This risks the conversation becoming disengaging.

A common theme from the interviews was that the employees instead opted to schedule occasions where they would be at the office to meet and bond with colleagues. Derks et al. (2008) discuss that face-to-face communication exposes the recipient to a higher throughput of information flows compared to computer-mediated communication. Furthermore, face-to-face communication is notably crucial when building rapport and relationships with people. Asfaw et al. (2022) discussed the benefits of face-to-face communication, with efficient communication about the scope of projects, reducing the risk of misunderstandings and not creating different visions between different team members.

5.1.2 Autonomy

Autonomy is a property that is defining for what Agile methodologies are. Three of the principles written in the Agile Manifesto (Beck et al., 2001) directly focus on the team's ability to make their own decisions and develop as a team. This has motivated the organisation to break down the hierarchy and create a more horizontal organisation with autonomous teams (Dybå & Dingsøy, 2008). Accordingly, Agile methods already require a great amount of trust from the managers, Scrum Masters or Product Owners that the team will deliver what they promise. The importance of autonomy was also evident according to the findings of the interviews during the study. The interviewees expressed that the team should be responsible for handling most of the challenges and the daily work within the team. However, when employees work from home, the management needs to place an even higher level of trust in their employees, which several interviewees highlights, may put strain on the managers. In the empirical findings, two interviewees argued that a solution for this problem is that the managers plainly need to place even greater trust in their team members.

According to Hackman and Oldham's (1974) motivation framework, autonomy is one of the core factors for employees to feel satisfied with their work. Another of Hackman and Oldham's core factors is feedback which also is included in Scrum principles. Additionally, Peros Khan's (2018) findings show that employees feel that working from home has increased their job autonomy and that they have more control over their life-work balance, which could result in increased output and job satisfaction from the employees. A challenge with autonomous remote teams is how managers are supposed to discover that employees need to develop a specific skill, one respondent claimed. This is easier when the employees are on-site and informal meetings occur naturally where these subjects are brought up.

Agile methods already have a high baseline requirement of trust from the management in the employees. Therefore, Agile methodologies are better suited for remote work than other practices, such as Waterfall methodologies. On the other hand, there is room for improvement in handling the autonomy aspects of Agile methods remotely. It could be by placing an even higher level of trust in the employees, as two interviewees simply put it. This could be accomplished by team members meeting each other more often with an informal structure that encourages rapport building, which in turn improves general trust.

Another way of overcoming the autonomy challenge is for leaders in the organisation to communicate the big picture of the project clearly and create a feeling of accountability

for the project's outcome. Furthermore, this could help solve the problem of employees not contributing to tasks on the Scrum board when they have completed their responsibilities. Nevertheless, with a team working remotely with Agile methodologies, the manager will always need to trust that the team fulfils their work responsibilities.

5.1.3 Flexibility

The findings concerning flexibility from the empirical result did not stray from already known theories regarding APM. One of the Agile Manifesto's 12 principles states "The most efficient and effective method of conveying information to and within a development team is face-to-face conversation" (Beck et al., 2001). Working from home in an agile setting might then seem like a clear contradiction to this principle. However, a successfully flexible agile team makes the most of the situation and implements tools and technology to diminish the impact of this shortcoming.

When it comes to how people work, as argued in the frameworks of reference, people have the will to keep working remotely (Eurofound, 2020; Brinkley et al., 2020; Stefaniec et al., 2022). The flexible nature of Agile methods creates a great starting point to turn the new conditions into advantages with the emphasis on constant improvement. Flexibility in Agile is always making the best of the situation, so making working from home function in APM is, in its very essence, a great sign of flexibility. One respondent added a perspective on the potential possibilities of having a spread-out team in different geographical locations. The respondent meant that this could be turned into a strength by offering the opportunity to have technical support covering multiple time zones.

In a fast changing world, Conboy and Fitzgerald's (2004) described that organisations are compelled to increase their agility in response to shifts in competition, customer demand, technology, and social factors. Hence, creating a conducive environment that can adapt to changes in these factors is advantageous for organisations. The notion of Conboy and Fitzgerald calls to mind the Agile Manifesto's (Beck et al., 2001) value of "Responding to change over following a plan". This was further emphasised on multiple occasions throughout the conducted interviews. As this is one of the key components of why Agile is such a powerful management tool, the majority of the respondents agreed that this is a value a company must adhere to in order to remain agile. A stakeholder's needs and requirements may change on an irregular basis. Three respondents reinforced this, meaning that an agile team must be willing to fail fast. Otherwise, the product will be moving in the wrong direction.

5.2 The impact on Agile organisations, teams, and individuals

The shift to remote work has seemingly affected the Agile methodologies and the way of work. This section will further discuss how affected aspects of Agile methodologies impact the team and individuals working remotely in Agile companies. As mentioned in the introduction to the discussion, the empirical result, with support from the theory, has identified that team cohesion and cooperation, productivity and well-being are some of the most brought up themes. These themes will be discussed under separate subsections, even though they, to some extent, intersect.

5.2.1 Team cohesion and cooperation

Several of the respondents in the empirical study claimed that team cohesion and cooperation were negatively affected by remote work. This is supported by the theory where Ozkan et al. (2022) state that leadership, cohesion and communication are some of the biggest challenges related to remote work. One of the main issues is team members not being aligned on the same target. In line with the previously discussed problems with communication, it is harder for a team leader to mediate a clear vision for all team members, as also stated by Asfaw et al. (2022). Thi Thu Ha (2021) discussed that remote work could affect the core job dimension that is task significance, as it is harder for employees to observe the impact of their work. The reduced task significance could make employees less likely to do their best and help each other. Working from home also leads to problems concerning helping team members by means of less transparency. Some respondents stated that there was a great need for clear norms and expectations regarding communication among team members, agreeing with what was discussed by Knight (2020).

According to an interviewee, a challenge when the teams work remotely is that some team members do not feel they have to contribute more after completing their tasks. It is harder for team members to see if somebody is done with their task and if a fellow member could need extra help. Therefore, it became more difficult for the team leaders and Scrum Masters to discover when team members were finished with their work and motivate them to continue contributing to the team. This could be an effect of team members never meeting and getting to know each other and, therefore, losing the will to help each other out. To cope with this and build better team cohesion to cooperate more, respondents found it essential to schedule occasions at the office and meet in person. It could also be that the manager or Scrum Master needs to communicate the project's vision with more clarity to the team members to motivate them. These challenges align with the literature's findings. According to Knight (2020),

working remotely creates other demands for the team leader. It is harder to discover if team members cannot complete the tasks or are unsatisfied with certain decisions. Knight presented a solution to this challenge by scheduling regular one-on-one meetings. Another solution presented in theory is Hill's (2020) arms-length managers, who are supposed to coach and support the team members to provide clarity.

When companies and teams are working remotely, integrating new people into their organisation has been a more significant challenge than before. One interviewee noticed that people hired during the pandemic had a more challenging time integrating, which led to them leaving the company to a higher degree than before. Waizenegger et al. (2020) suggest that remote work hampers knowledge sharing in teams and that this mainly affects new hires. This makes them feel less engaged in their work situation. Employees feeling disengaged about their work leads to lower job satisfaction. Another interviewee mentioned that colleagues established within the company tended to not invite newly hired to social happenings. This was solved by companies investing more in an infrastructure that offers more support during a virtual onboarding, and other organisations solved this with virtual town halls to hang out in a virtual space. Another interviewee emphasises the importance of creating a work culture where people reach out to each other.

5.2.2 Productivity

The empirical result showed that some respondents experienced increased productivity when working from home. One reason for this was the opportunity to work with their own tasks while participating in digital meetings in a way which would not be possible when participating in a meeting in-house. It is unacceptable to appear unfocused in a face-to-face meeting. There is a higher need for alertness and expectancy of feedback combined with eye contact when meetings occur physically in the same room. It is easier to work alongside a meeting without it being as noticeable when having digital meetings. The respondents that mentioned this found this to be a positive aspect, making them more productive and getting more done during their work day. Another respondent also emphasised that it is possible to have conversations with other meeting participants during meetings, without interrupting, via, for instance, chat functions. The respondent claims that this leads to more effective meetings.

However, this increased productivity comes at the cost of active meeting participation. As stated in the theoretical part, Cockburn and Highsmith (2001), emphasised the value of teams collaboratively troubleshooting problems and supporting each other in innovation to achieve constant improvement in their processes. An essential aspect of

this is participating in other team members' work. When several people choose to work on other tasks than focusing on their meetings or perhaps checking their emails during a meeting, there is a higher risk of missed opportunities of helping others with their projects, and therefore teams lack problem-solving opportunities.

To counter-argue this, another respondent believed that remote work led to more effective work and better problem-solving. Their solution to this was the possibility of having more people involved in each meeting, unlocking even more competence to solve problems. When working on-site, being a part of a meeting where one might not be needed would be very unproductive. However, when working from home, the employees could multitask and still be productive in meetings, as stated by several respondents. These people could work on their own projects and only jump in and be active in the meeting if needed. This way, more people could be involved without decreasing their productivity. In line with this, another respondent highlighted the convenience of reaching out to other persons and easily getting them to join a meeting for a brief moment in a way that would be unnecessarily time-consuming if meetings were held in different physical locations.

Regarding meeting productivity, one respondent states that when working from home, the company could minimise meetings that were not necessary, leading to increased productivity, as also stated by Neumann (2021). This could align with several respondents claiming they were more effective remote, thanks to less disturbance. In connection with the already discussed problem with lag and non-visual meetings, there could be an increased will to get the meetings over with, and fewer employees likely to chit-chat with each other meanwhile. As one of the respondents stated, this effectiveness could also be thanks to an implementation of a new meeting standard when working remotely. Wang et al. (2020) discussed how to achieve effective remote work with a new work design perspective and highlighted that for the managerial side, well-implemented meetings with much motivational language could lead to increased productivity for the employees. Barbieri et al. (2021) are on the same track, stating that remote work forces managers to make a redefined management logic in order to stay productive. This new logic emphasises a more open and flexible management model, reinforcing the notion Mawson (2020) says about remote work demands for high employee trust. Higher trust in employees means less need for check-up meetings, making more time for employees to work on their projects without strict supervision. In turn, this could mean that employees feel less disturbed by regular check-up meetings and instead can stay focused during the work day.

However, this increased trust and eliminating seemingly unnecessary meetings could also backfire. An interviewee argued that remote work could negatively affect productivity regarding urgent problematic situations. As previously discussed under communication, the empirical study and the theoretical framework showed that face-to-face communication was the most preferred method when discussing important topics. This could mean that when problems arise, problem-solving is less productive when working from home. There could be a risk with removing too many meetings, as these meetings could be an important possibility to catch up with eventual problems before they even occur, corresponding with the theory by Boehm and Turner (2005). Therefore, reducing to fewer meetings could also possibly lead to decreased productivity as it could make for an increased rate of mistakes and longer time needed to later solve these problems.

Overall, the empirical result tends to lean towards employees being equivalently productive, if not more productive, when working from home. One respondent believes this is because employees feel more responsibility to complete their projects when working remotely. Ozkan et al. (2022) explain that this is probably because employees feel that completing projects is the only way to demonstrate to their managers that they are fulfilling their work responsibilities.

5.2.3 Well-being

Well-being was initially not considered prioritised when starting this project, which is why the interviews regarding the topic could have been more thorough. When learning more about the subject from empirical findings and during the work of this thesis, well-being was found to be a key to work performance and a functioning work environment.

When investigating the subject further, the connection between well-being and performing Agile principles from home became more distinct. As Ali et al. (2014) state, there is a clear relationship between satisfied and happy employees who are more productive and able to do a better job. Nevertheless, one respondent highlighted that when working from home for a long period of time, it can be hard to continue having the motivation required to be disciplined and productive.

As discussed earlier under productivity, several respondents expressed their belief that remote meetings are much more efficient than face-to-face due to the flexibility and productivity they offer. Two respondents also argue for the improved ergonomic conditions online meetings bring. However, Bennett et al. (2021) claim it can be mentally draining to participate in remote meetings, especially when encouraged to have the camera turned on. This can lead to videoconference fatigue and exhaustion, which instead cause decreased productivity and well-being.

According to some respondents working from home has a positive effect on health due to decreased stress. This perspective contends with Aczel et al. (2021) as well as Dockery and Bawa, (2018), who highlight the potential of achieving a more balanced daily everyday life when working remotely. On the other hand, Perry et al. (2021) argue for a significant risk of feeling isolated when working from home, which will negatively affect the employee's mental health. This is further emphasised in several of the interviews where one of the respondents raised an interesting ethical question; who is responsible for the well-being of the individual? Is the company ultimately responsible for the well-being of the employees and establishing a mental health protocol for remote work, or is the individual responsible for creating a balanced working environment? This is a topic that could be further analysed and something that cannot be answered in this study.

5.3 Reflection

At the start of the project, all group members needed to familiarise themselves with Agile methodologies. Understanding and defining Agile methodologies for the thesis became a more significant challenge than initially anticipated. Agile methodologies are not a set of concrete processes and practices that must be implemented for something to be called agile. Instead, it is a set of values and principles based on the Agile Manifesto that can be interpreted and adapted to suit the specific work environment, and how it is implemented depends. Accordingly, the theoretical part that would define Agile methods was based on these values and principles, which became quite general. The perception of an agile way of working is likely to differ between the interviewees. Correspondingly, this is also likely to differ from the group's collective interpretation. The interview questions were therefore formulated with this in mind. However, a risk of an error source is that there might be different ideas on what Agile methods mean.

When conducting the interviews, the questions were formulated to avoid steering a respondent in a specific direction. The questions were open, which sometimes made them slightly deficient. Sometimes there were subjects that the group would have liked to learn more about. However, without adding a question that would be leading, it was hard to come by this piece of information. Additionally, it would be relevant to ask more regarding how respondents used Agile methods and perceived autonomy, flexibility and well-being. The three latter identified aspects respondents at times loosely talked about. There were no direct questions regarding these three aspects in our interview guide, although some of the respondents themselves brought up these aspects. Therefore, not all respondents discussed these aspects, which might have led to a less detailed result.

If there were a third interview period, this would be added to the questions.

The empirical findings were mostly in line with some of the initial speculations in mind when developing the idea for the thesis. For instance, a lack of informal meetings would be something that some respondents were missing when working remotely, or there will be communication issues that must be addressed. Some more exciting aspects not considered when starting the thesis were also discussed. As an example, a respondent meant that the passing of information when digital made it more democratic or that working with other tasks when in a meeting often was perceived as a benefit.

The empirical study was based on interviews, which might have led to various error sources. These can come due to respondents' personal experiences and subjective opinions. Likewise, the thesis authors' interpretations of the answers can be considered a source of error. Additionally, the sample size of respondents is small, especially considering that the interviewees came from different roles in various industries. The sample size was too small to find similarities and differences between roles and industries, which could have been interesting to examine. Limiting the study to specific roles in a company or targeting specific industries would perhaps be a relevant delimitation. Approaching the project's end, one aspect the group realised was that the respondents were exclusively male. A more diverse sample of respondents might bring other perspectives to the study that for this thesis might be relevant to include.

6 Conclusion

The purpose of this study aims to analyse how Agile methodologies are affected when working from home is becoming a more permanent part of the work culture. This conclusion answers the research questions of this study and identifies key takeaways.

Effective communication is essential for agile teams to work cohesively. When communication is insufficient, a big part of the essence of being agile is lost. Therefore, an Agile organisation must have well-implemented channels and a flow of communication. Face-to-face communication has been considered the most efficient and preferred method of communication in both the theory and the empirical study. This important method of communicating is lost when working remotely. Without face-to-face communication, there is a more considerable risk of misunderstandings which could lead to significant issues in a team. This can, to some extent, be solved with video meetings where participants are encouraged to turn on their cameras to be able to see each other. This could, however, potentially be damaging to the individuals' health due to videoconference fatigue. The possibility to get informal meetings, for example, by the water cooler and therefore gain greater connections is also a vital part of communication, team cohesion and innovation. In order to try and replace this, several organisations started digital meeting places where employees could connect and disconnect as they liked. Regarding team cohesion and cooperation, respondents found these were negatively affected when working from home. Communication between teams as well as within teams was lacking, leading to a less cohesive organisation. To address this issue, many teams found the need to schedule occasions where the teams had to be at the office simultaneously.

Autonomy is another essential aspect of Agile methodology. Agile methodologies emphasise self-organising teams without needing to communicate through many layers of hierarchy to make decisions. However, autonomy has always been a core part of Agile methodologies, and therefore, it is not naturally a significant change in the perceived autonomy in a remote setting. When a team or organisation transitions to remote work, there is an elevated necessity for autonomy within the team and sometimes even for individual team members. Although teams that work with Agile methodologies have an easier transition with their experience in autonomy, managers and other leaders in organisations expressed concern about noticing if team members are struggling or contributing to the team's goals. With increased autonomy, which increases job satisfaction, leaders are forced to place a higher level of trust or increase the number of meetings.

Flexibility is an essential aspect in order to work agile. As Agile methodologies focus on iterative processes and strong collaboration with customers, the need for teams to be able to rethink and readjust their processes is prominent. A successful flexible agile team adapts to whatever situation they encounter and implements tools and technology to overcome challenges. Flexibility has always been essential as Agile methodologies emphasise the value of responding to change over strictly following a plan. This flexibility is not necessarily affected when teams are working from home.

Productivity is a key indicator of how well an organisation or team works. The empirical findings are divided into the question of the productivity increase or decrease as an effect of working from home. Some teams minimise the number of meetings they have, which gives them more time to work on projects. In contrast, other teams schedule more digital meetings for convenience but work in the meantime, when their focus is not required, on other projects to streamline their work. This could impair problem-solving, which is one of the purposes of the meetings. However, the overall experience is that productivity is higher when working remotely.

6.1 Further research

The objective of this study was to examine how well the Agile methodologies operate in the context of remote work. Further research could focus on how specific work groups experience this. It would be interesting to examine if managers have a different perspective than the project group. Another interesting approach in further research could be to focus more on how well-being is affected when working from home with Agile methodology, both from individual and organisational standpoints. This was something found interesting in the empirical study, and further research could follow up on this study to deepen that point of view.

7 Sustainability development goals

The Member States of the United Nations founded 17 sustainability development goals in 2015 (United Nations Development Program, 2021). Several of these are applicable in this thesis and presented below.

The eighth sustainable goal treats decent working conditions and economic growth. One of the sub-goals within this goal is to increase resource efficiency and protect workers' rights, which are connected to the influence of management trends on the work environment. Management methodologies aim to create the most productive work culture possible, where different methods have varying levels of success depending on the company's structure and area of business (Biron et al., 2011). Regarding resource efficiency, the Agile methodologies have proved to be significantly more effective than other methods, such as the Waterfall methodology (Kisielnicki & Misiak, 2017). Management methodologies primarily contribute to cost-effectiveness and better utilisation of human resources. However, depending on the conditions of the method, it can also lead to a more structured and streamlined workflow (AbuKhamis & Abdelhadi, 2022).

Today, a shift has occurred where a more significant proportion of workers are working from home. This change requires purchasing various technical products for home offices, which contradicts the UN's 12th goal regarding sustainable consumption and production. Many could temporarily borrow necessary equipment from work during the COVID-19 pandemic, both because it was not being used at the office and to the strained semiconductor market. However, when working remotely continued after the pandemic, many were in need of acquiring additional equipment. How can this shift be managed sustainably and responsibly? How should the limited natural resources be managed for a sustainable future? At the same time, working from home can also lead to reduced consumption; Mackovic and Jansson Åkerberg (2020) argue that spontaneous purchases decrease when people work from home. Furthermore, it can also be argued that once the shift to remote work has taken place and the technical equipment has been procured, consumption will also decrease. Additionally, it can be debated whether the large quantity of office waste falls when working from home because individuals now have the responsibility to dispose of it.

As previously mentioned, remote work had significant growth during the pandemic due to quarantine measures imposed by authorities. The impact of remote work on an individual's health has been discussed by Oakman et al. (2020) in their report. They concluded that the health effect of remote work is individual. One pattern the authors noticed was that the ability to have effective communication with colleagues

reduced the adverse effects of working more isolated. As remote work continues to be widely practised, companies need to establish guidelines for monitoring their employee's well-being and the financial impact on their personal economy that the increased energy consumption contributes to. Remote work can positively and negatively affect an individual's health and well-being, which is addressed by the UN's third sustainable development goal.

Working from home can promote more sustainable urbanisation and reduce migration from the countryside, which can be related to goal 11. It allows people to live outside the city where the workplace is located, potentially reducing pressure on more prominent cities. This also means fewer people have to commute daily, contributing to a lower burden on traffic and public transportation. This also reduces the environmental impact of commuting. It should also be noted that increased remote work may have negative consequences in the form of unused office spaces. Therefore, companies that change their work patterns should also evaluate if they can optimise their office space to further contribute to sustainable urban development.

Not all people have the opportunity to access a workplace, and this can be linked to goal 10, which aims to reduce inequality. The difficulties in accessing a workplace may, for example, be due to geographical barriers or functional variations. Remote work allows people to choose whether they want to be physically present at their workplace or not. They can decide to work where it is best for them.

The result of this study can be strongly linked with three of the United Nations Sustainable Development goals above:

- Goal 3, Good Health and Well-Being
- Goal 8, Decent Work and Economic Growth
- Goal 10, Reduced Inequalities

As seen in the result, team members' well-being can be affected positively or negatively, which is connected to goal three. The study's result of the effect on productivity can be linked to goal number eight. The literature above aligns with the empirical findings that productivity increases with remote work. The result of this study concludes that there is an increased possibility of working for organisations over great geographical distances. This makes the job market more democratic worldwide and enables people to have more equal work conditions.

It is difficult to argue how this study's result could positively affect goal 11, Sustainable Cities and Communities, and goal 12, Responsible Consumption and Production.

Furthermore, the interview guide was not formulated with these goals in mind, which is why these goals are not linked to the result of the study. While it is not immediately apparent how the study's empirical findings are connected to these goals may be affected by the study's result. However, remote work may contribute to responsible consumption and more sustainable cities.

References

- AbuKhamis, F., & Abdelhadi, A. (2022). A Critical Analysis of Agile and Lean Methodology to Fulfill the Project Management Gaps in Nonprofit Organizations (NPOs). *Prince Sultan University, 12*(11), 5467. <https://doi.org/10.3390/app12115467>
- Aczel, B., Kovacs, M., van der Lippe, T., & Szaszi, B. (2021). Researchers working from home: Benefits and challenges. *The University of Hong Kong, 16*(3). <https://doi.org/10.1371/journal.pone.0249127>
- Adekoya, O.D., Adisa, T.A. & Aiyenitaju, O. (2022). Going forward: remote working in the post-COVID-19 era, *Employee Relations, 44*(6), 1410-1427. <https://doi.org/10.1108/ER-04-2021-0161>
- Ali, S., Said, N., Yunus, N., Kader, S., Latif, D., & Munap, R. (2014). Hackman and Oldham's Job Characteristics Model to Job Satisfaction, *Procedia - Social and Behavioral Sciences, 129*, 46-52. <https://doi.org/10.1016/j.sbspro.2014.03.646>
- Asfaw, L., Clemmons, M., Hayes, C., Letnaunchyn, E., & Rabieinejad, E. (2022). Challenges of Implementing Agile Processes in Remote-First Companies. *arXiv preprint*, <https://doi.org/10.48550/arXiv.2209.04376>
- Barbieri, B., Balia, S., Sulis, I., Cois, E., Cabras, C., Atzara, S., & De Simone, S. (2021). Don't Call It Smart: Working From Home During the Pandemic Crisis. *Frontiers in Psychology, 12*. <https://doi.org/10.3389/fpsyg.2021.741585>
- Beck, K., Beedle, M., van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., Kern, J., Marick, B., Martin, R. C., Mellor, S., Schwaber, K., Sutherland, J. & Thomas, D. (2001). Manifesto for Agile Software Development, *Manifesto for Agile Software Development*. <http://agilemanifesto.org/>
- Bell, E., Bryman, A., & Harley B. (2022). *Business research methods* (6th ed.). Oxford university press.
- Bennett, A. A., Champion, E. D., Keeler, K. R., & Keener, S. K. (2021). Videoconference fatigue? Exploring changes in fatigue after videoconference meetings during COVID-19. *Journal of Applied Psychology, 106*(3), 330–344. <https://doi.org/10.1037/apl0000906>
- Biron, M., Farndale, E., & Paauwe J. (2011). Performance management effectiveness: lessons from world-leading firms. *Papers in International Human Management, 22*(6), 1294-1311. <https://doi.org/10.1080/09585192.2011.559100>

- Boehm, B. (2002). Get ready for agile methods, with care, *IEEE Computer*, 35(1), 64-69. <https://doi.org/10.1109/2.976920>
- Boehm, B., & Turner, R. (2005). Management challenges to implementing agile processes in traditional development organizations. *IEEE Software*, 22(5), 30-39. <https://doi.org/10.1109/MS.2005.129>
- Brinkley, I., Willmott, B., Beatson, M., & Davies, G. (2020). Embedding new ways of working: implications for the post-pandemic workplace, *Chartered Institute of Personnel and Development, London*. <http://hdl.voced.edu.au/10707/561937>
- Butt, S. A., Misra, S., Anjum, M. W., & Hassan, S. A. (2021). Agile project development issues during COVID-19. *Lean and Agile Software Development, LASD2021 Lecture Notes in Business Information Processing 408*, 59-70. https://doi.org/10.1007/978-3-030-67084-9_4
- Cambridge University Press. (n.d). Cambridge Dictionary. Retrieved 2022-05-03. <https://dictionary.cambridge.org/dictionary/english/agility>
- Cockburn, A., & Highsmith, J. (2001). Agile software development, the people factor. *Computer*, 34(11), 131-133. <https://doi.org/10.1109/2.963450>
- Cohen, D., Lindvall, M., & Costa, P. (2004). An introduction to agile methods. *Adv. Comput*, 62(03), 1-66.
- Conboy, K., & Fitzgerald, B. (2004). Toward a conceptual framework of agile methods: a study of agility in different disciplines. *Proceedings of the 2004 ACM workshop on Interdisciplinary software engineering*. 37-44. <https://doi.org/10.1145/1029997.1030005>
- Daantje Derks, Agneta H. Fischer, Arjan E.R. Bos (2008), The role of emotion in computer-mediated communication. *Computers in Human Behavior*, 24(3), 766-785. <https://doi.org/10.1016/j.chb.2007.04.004>
- Dingsøyr, T., Nerur, S., Balijepally, V., & Brede Moe, N. (2012). A decade of agile methodologies: Towards explaining agile software development, *Journal of Systems and Software*, 85(6), 1213-1221. <https://doi.org/10.1016/j.jss.2012.02.033>
- Dybå, T., & Dingsøyr, T. (2008). Empirical studies of agile software development: A systematic review, *Information and Software Technology*, 50(9-10), 833-859. <https://doi.org/10.1016/j.infsof.2008.01.006>

Dockery, A.M., & Bawa, S. (2018). When two worlds collide: Working from home and family functioning, *International Labour Review*, 157(4), 609-630.

<https://doi.org/10.1111/ilr.12058>

Dockery, A.M., & Bawa, S. (2020). Working from home in the COVID-19 lockdown. *BCEC*. https://bcec.edu.au/assets/2020/05/BCEC-COVID19-Brief-4_Working-from-home.pdf

Eurofound. (2020). Living, working and COVID-19, COVID-19 series, *Publications Office of the European Union Luxembourg*

<https://www.eurofound.europa.eu/publications/report/2020/living-working-and-Covid-19>

Felstead, A., & Henseke, G. (2017). Assessing the growth of remote working and its consequences for effort, well-being and work-life balance. *Wales Institute of Social and Economic Research, Data and Methods*, 32(3), 195-212. <https://doi.org/10.1111/ntwe.12097>

Farooq, R., & Sultana, A. (2021). The potential impact of the COVID-19 pandemic on work from home and employee productivity, *Measuring Business Excellence*, 26(3), 308-325. <https://doi.org/10.1108/MBE-12-2020-0173>

Fossey, E., Harvey, C., Mcdermott, F., & Davidson, L. (2002). Understanding and Evaluating Qualitative Research. *Australian & New Zealand Journal of Psychiatry*, 36(6), 717-732. <https://doi.org/10.1046/j.1440-1614.2002.01100.x>

Gustavsson, M., & Säfsten, K. (2020). *Research Methodology - For engineers and other problem-solvers*. Studentlitteratur.

Hackman, J.R., & Oldham, G.R. (1974). *The Job Diagnostic Survey: An Instrument for the Diagnosis of Jobs and the Evaluation of Job Redesign Projects*. Yale Univ., New Haven, Conn. Dept. of Administrative Sciences.

Highsmith, J., & Cockburn, A. (2001). Agile software development: the business of innovation. *IEEE Computer*, 34(9), 120-127.

<https://doi.org/10.1109/2.947100>

Hill, A. (2020, June 24). Arms-length managers must channel their inner coach. *Financial Times*. <https://www.ft.com/content/cae7a15c-aa63-11ea-abfc-5d8dc4dd86f9?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8>

Kirovska, N., & Koceski, S. (2015). Usage of Kanban methodology at software development teams. *Journal of Applied Economics and Business*, 3(3), 25-34.

<http://www.aebjournal.org/articles/0303/030302.pdf>

Kisielnicki, J., & Misiak A. M. (2017). Effectiveness of Agile Compared to Waterfall Implementation Methods in it Projects: Analysis Based on Business Intelligence Projects. *Foundations of Management*, 9(1), 273-286.

<https://doi.org/10.1515/fman-2017-0021>

Knight, R. (2020). How to manage a hybrid team. *Harvard Business Review*.

<https://hbr.org/2020/10/how-to-manage-a-hybrid-team>

Leavy, P. (Eds.). (2020). The oxford handbook of Qualitative Research. *Oxford University Press Inc.* <https://doi.org/10.1093/oxfordhb/9780190847388.001.0001>

Lei, H., Ganjeizadeh, F., Jayachandran, P.K., & Ozcan, P. (2017). A statistical analysis of the effects of Scrum and Kanban on software development projects. *Robotics and Computer- integrated Manufacturing*, 43, 59-67.

<https://doi.org/10.1016/j.rcim.2015.12.001>

Mackovic, M., & Jansson Åkerberg, J. (2020). Kan Coronakrisen främja en mer hållbar livsstil?: En studie om individers konsumtions- och transportvanor före och under krisen samt förväntningar inför framtiden. *Bachelor thesis, Jönköping University*. DiVA.

<https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1439496&dswid=3957>

MacRae, I., & Sawatzky, R. (2020). Remote working: Personality and performance research results. <https://static1.squarespace.com/static/Remote+Working+Personality+and+Performance+Research+Results.pdf>

Marek, K., Winska, E., & Dabrowski, W. (2021). The State of Agile Software Development Teams During the COVID-19 Pandemic. *Lean and Agile Software Development. LASD 2021. Lecture Notes in Business Information Processing*, 408, 24-39.

https://doi.org/10.1007/978-3-030-67084-9_2

Mawson, A. (2020). *Managing the virtual workforce*. Advanced Workplace Institute. <https://www.advanced-workplace.com/report/managing-the-virtual-workforce/>

Neumann, M., Bogdanov, Y., Lier, M., & Baumann, L. (2021). The Sars-Cov-2 Pandemic and Agile Methodologies in Software Development: A Multiple Case Study in Germany. *Lean and Agile Software Development. LASD 2021. Lecture Notes in Business Information Processing*, 408, 40-58.

https://doi.org/10.1007/978-3-030-67084-9_3

Oakman, J., Kinsman, N., Stuckey, R., Graham, M., & Weale, V. (2020). A rapid review of mental and physical health effects of working at home: how do we optimise health? *BMC Public Health*, 20 (1). <https://doi.org/10.1186/s12889-020-09875-z>

- Ozkan, N., Erdil, O., & Gök, M.Ş. (2022). Agile Teams Working from Home During the Covid-19 Pandemic: A Literature Review on New Advantages and Challenges. *Lean and Agile Software Development. LASD 2022. Lecture Notes in Business Information Processing*, 438, 38-60. https://doi.org/10.1007/978-3-030-94238-0_3
- Parry, J., Young, Z., Bevan, S., Veliziotis, M., Baruch, Y., Beigi, M., Bajorek, Z., Salter, E., & Tochia, C. (2021). *Working from Home under COVID-19 lockdown: Transitions and tensions, Work after Lockdown*. <https://eprints.soton.ac.uk/446405/>
- Peros Khan, F. F., Mohammed, N., & Mohamed Harith, N. H. (2018). The Relationship Between the Impacts of Telecommuting Engagement and Employee Performance in Oil and Gas Industry in Kuantan, Pahang *Malaysian Journal of Social Sciences and Humanities*, 3(5), 1 - 9. <https://msocialsciences.com/index.php/mjssh/article/view/141>
- Ralph, P., Baltes, S., Adisaputri, G., Torkar, R., Kovalenko, V., Kalinowski, M., Novielli, N., Yoo, S., Devroey, X., Tan, X., Zhou, M., Turhan, B., Hoda, R., Hata, H., Robles, G., Fard, A.M., & Alkadhi, R. (2020). Pandemic programming. *Empir Software Eng* 25(6), 4927–4961. <https://doi.org/10.1007/s10664-020-09875-y>
- Russo, D., Hanel, P.H.P., Altnickel, S., & van Berkel, N. (2021). Predictors of well-being and productivity among software professionals during the COVID-19 pandemic – a longitudinal study. *Empir Software Eng* 26(4). <https://doi.org/10.1007/s10664-021-09945-9>
- Schmidtner, M., Doering, C. & Timinger, H. (2021). Agile Working During COVID-19 Pandemic. *IEEE Engineering Management Review*, 49(2), 18-32. <https://doi.org/10.1109/emr.2021.3069940>
- Sliger, M. (2011). Agile project management with Scrum. *Project Management Institute*. https://irantypist.com/media/new_research/samplefile/1621186018_5646.pdf
- Snyder, H. R. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333-339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Stefaniec, A., Brazil, W., Whitney, W., & Caulfield, B. (2022). Desire to work from home: Results of an Irish study, *Journal of Transport Geography*, 104. <https://doi.org/10.1016/j.jtrangeo.2022.103416>
- Thi Thu Ha, N. (2021). Workplace Isolation in the Growth Trend of Remote Working: A Literature Review. *Review of Economics and Business Studies*, 14(1) 97-113. <https://doi.org/10.47743/rebs-2021-1-0005>

United Nation Development Programme. (24th of June 2021). The 17 Goals: History. <https://sdgs.un.org/goals>

Wang, B., Liu, Y., Qian, J., & Parker, S.K. (2020). Achieving Effective Remote Working During the COVID-19 Pandemic: A Work Design Perspective. *Applied Psychology*, 70(1) 16-59. <https://doi.org/10.1111/apps.12290>

Waizenegger, L., McKenna, B., Cai W., & Bendz, T., (2020). An affordance perspective of team collaboration and enforced working from home during COVID-19, *European Journal of Information Systems*, 29(4), 429-442, <https://doi.org/10.1080/0960085X.2020.1800417>

Appendices

Appendix A - Interview questions in Swedish

Intervjufrågor

Tekniska detaljer

- Får vi spela in detta samtal - i syfte att transkribera?
- Denna intervju kommer att användas som underlag för vår kandidatuppsats. Arbetet kommer att publiceras och vara publikt.
- Godkänner ni att vi kan komma att referera och citera till denna intervju?

Allmänna frågor

1. Vilken position har du i företaget?
2. Vad arbetar ni med? Berätta lite brett om ert företag.
 - (a) Hur är ert företag organiserat? Hur många anställda är ni? Hur stora är era projektgrupper?
3. I hur stor utsträckning arbetar ni på plats/distans? Vad har ni för erfarenhet av distansarbete?

Frågor om förutsättningar för agilt arbete

4. Vilka förutsättningar krävs för ett agilt arbete?
5. Vad finns det för faktorer till att ni valt att jobba agilt?
 - (a) På vilket sätt är ni agila och hur länge har ni arbetat så?

Frågor om vad som försvinner vid hemarbete & hur detta kan kompenseras för

6. Hur påverkas tidigare nämnda förutsättningar för ett effektivt agilt arbete av att medarbetare jobbar hemma?
7. Vad har ni gjort för att överbrygga detta? Vilka agila metoder har ändrats och hur?
 - (a) Hur påverkas Face-to-face kommunikationen vid distansarbete och påverkar det arbetet?

- (b) Hur påverkas den sociala gemenskapen och sociala interaktioner på arbetsplatsen till följd av distansarbete?
- (c) Hur kan man få tag på medarbetare? Hur är tilliten till att andra medarbetare gör sitt jobb?
- (d) Hur påverkas produktiviteten i team vid distansarbete? Och påverkas antalet arbetstimmar som följd av distansarbete?
- (e) Hur utformar ni nya team och integrerar nya medarbetare/nyanställda i team till följd av distansarbete?

Allmänt om agilt

- 8. (a) Vilka är de främsta utmaningar med att jobba hemifrån ur det agila arbetssättet?
- (b) Vilka är de främsta möjligheterna med att jobba hemifrån ur det agila arbetssättet?
- 9. Kommer ni jobba mer eller mindre hemifrån i framtiden?
 - (a) Om medarbetare blir tvingade tillbaka till kontoret, hur tror du att detta påverkar arbetet?
- 10. Är det något mer du vill tillägga?
- 11. Har du förslag på någon person att intervjua?

Appendix B - Interview questions in English

Interview Questions

Technical details

- Can we record this conversation for the purpose of transcription?
- This interview will be used as a basis/foundation for our thesis. The work will be published and made public.
- Do you consent that we can refer to and quote you from this interview?

General questions

1. What position do you hold in the company?
2. What does your company do? Tell us a bit about your company.
 - (a) How is your company organized? How many employees do you have? How large are your project teams?
3. To what extent do you work on-site/remotely? What is your experience with remote work?

Questions about prerequisites for agile work

4. What prerequisites are required for agile work?
5. What factors led you to choose to work in an agile way?
 - (a) In what ways are you agile, and how long have you been working this way?

Questions about what is lost with remote work & how to compensate for it

6. How are previously mentioned prerequisites for effective agile work affected by employees working from home?
7. What have you done to overcome this? Which agile methods have been adapted and how?
 - (a) How is face-to-face communication affected by remote work, and how does it impact the work?
 - (b) How are the social community and social interactions in the workplace affected by remote work?

- (c) How can you get in touch with employees? How is the trust in other employees doing their job?
- (d) How does productivity in the team change with remote work? Does the number of working hours also change?
- (e) How do you design new teams and integrate new employees into teams due to remote work?

General agile questions

- 8.
 - (a) What are the main challenges of working from home in an agile work setting?
 - (b) What are the main opportunities for working from home in an agile work setting?
- 9. Will you work remotely more or less in the future?
 - (a) If employees are forced back to the office, how will this affect the work?
- 10. Is there anything else you would like to add?
- 11. Do you have any suggestions for someone else we could interview?

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