Hybrid work within agile software development teams

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Hybridarbete inom agila mjukvaruutvecklingsteam

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Abstract

Hybrid work has become increasingly common within software companies in recent years, largely accelerated by the Covid-19 pandemic and the normalization of remote work. Integrating hybrid work with agile practices presents challenges, as agile principles rely heavily on close collaboration and co-location of team members. Additionally, the shift to hybrid work has significantly impacted employees' daily routines and personal lives, raising questions about its effect on individual team members' well-being. This thesis investigates how hybrid work is currently utilized in agile teams, the challenges it creates, and the practices applied to address these challenges. A case study approach was utilized, where data were collected through five semi-structured interviews and a survey distributed to this company as well as individuals at other companies, amassing a total of 125 responses. We found that most employees will utilize the ability to work remotely to some extent if given the option. Companies commonly implemented guidelines for hybrid work, particularly regarding the amount of remote work allowed. The biggest challenge in incorporating a hybrid work environment in agile teams was creating a successful meeting strategy and getting hybrid meetings to work. Most participants felt that hybrid work had a positive impact on their well-being and the added flexibility was positive for many individuals' work-life balance. The findings describe how hybrid work can be implemented and can provide guidance to agile development teams and companies on how to successfully integrate hybrid work into their work.

Keywords: Hybrid work, agile, Scrum, remote work, team communication, work-life balance

Acknowledgements

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Chapter 1
Introduction

Within agile software development, face-to-face communication is an important principle that facilitates good collaboration among software engineers, a factor acknowledged to contribute to developing functioning software products and IT systems. In this thesis, we investigate how the increased degree of remote work affects agile software development teams and how they achieve sufficient communication in a hybrid work environment. This was done by conducting a case study including semi-structured interviews and a survey. We had one case company where we conducted our interviews. The survey was distributed to this company and to individuals at other companies for validation. In this chapter, we introduce the background of why this subject is relevant alongside the purpose of the research, research questions, and how the work of others relates to our thesis.

1.1 Problem statement

Over the years, remote and hybrid work has gradually evolved within the software industry to enable the development of software in globally distributed organizations and to facilitate continued work during the Covid-19 pandemic. Technological improvements over the past decades, such as increased connectivity and hardware capacity, have enabled this transformation. During the 1990s and 2000s, software development became a global industry, and companies had to establish offices in other countries to remain competitive in an increasingly demanding market. This shift marked the initial move towards remote work, as teams needed to collaborate with their foreign colleagues, effectively communicate, and share project information and resources [13].

The steady development of increased levels of remote work took a leap in 2020 when the global Covid-19 pandemic hit. In many countries, software companies sent their employees home to work remotely to minimize the spread of the virus. Companies and their employees had to quickly find tools and methods that made this shift possible. This demonstrated to both companies and employees that remote work was a viable option and even preferable to some individuals [22]. This boost in remote work led to the popularization of other work arrangements, hybrid work being one of them.

Hybrid work, as the name suggests, is a combination of remote and in-office work. In hybrid work, the individual can work both remotely and from the office. This way of working is relatively new and creates unique challenges compared to both office work and remote work [22]. Interesting questions to ponder arise from this new way of working. How does hybrid work look in Sweden a few years after the restrictions of the Covid-19 pandemic were lifted? What rules and regulations are in place for employees?

The first line in the Agile Manifesto reads, "Individuals and interactions over processes and tools" [5], highlighting the importance of the team and effective communication and collaboration in agile development. This principle underpins techniques such as stand-up meetings in Scrum and pair programming in Extreme Programming [2]. Most of these agile methods were created with the team being in the same location in mind. Hybrid work changes this core pillar of agile development. In hybrid work, the team is divided across different locations, with some members working together in the same place while others are remote. This shift creates new challenges and necessitates new approaches for both communication and collaboration in agile teams. This gives rise to several questions. What challenges do these changes present, and how can they be overcome? For example, how does the team collaborate when some team members are in the office and others are not? How is this communication done? What types of digital tools and programs are required to enable successful digital communication, and can digital communication and in-person interaction be successfully mixed?

Hybrid work does not only impact the development team but each developer as an individual. Studies have shown that many employees have requested more flexible work arrangements to improve their well-being and work-life balance [22]. This raises interesting questions such as is this desire common across agile development teams working in Sweden? Do developers feel that hybrid work gives them the flexibility they need to improve their well-being?

1.2 Aims and research questions

With the problem statement as a base, we formalized the purpose and aim of this thesis. This thesis aims to investigate the current utilization, challenges, and practices of hybrid work within agile software development teams in Sweden. We explored how communication and collaboration are managed within agile teams operating in a hybrid mode, considering the emphasis of agile principles on human interactions and teamwork. Additionally, we seek to examine the impact of hybrid work on individual team members, focusing on its effects on their well-being and productivity.

With this aim in mind, we have formulated three research questions designed to encapsulate these objectives. These questions guided our investigation into the utilization of hybrid work, the challenges faced by agile teams, and the practices adopted to address these challenges and improve individual well-being and productivity.

- **RQ1:** How is hybrid work mode currently used in agile teams?

    - **RQ1a:** What type of company policies exist for hybrid work and to what extent do software engineers work in hybrid mode?

    - **RQ1b:** What kind of tools enable hybrid work?

- **RQ2:** What challenges exist in hybrid work within agile teams at the individual and team level?

    - **RQ2a:** What challenges does hybrid work impose on collaboration and communication within agile teams?

    - **RQ2b:** What challenges does hybrid work incur on employees' well-being and productivity?

- **RQ3:** What practices are applied for hybrid work within agile teams at the individual and team level?

    - **RQ3a:** What communication and collaboration practices are applied?

    - **RQ3b:** What practices are applied at the individual level to enhance employees' well-being and productivity?

1.3 Background

This section includes relevant background information to provide context and explanations of key concepts relevant to the thesis. Two main themes in this thesis are agile development and communication within and between agile teams. Agile development is a broad topic with many different methods and applications. We will provide a broad picture of agile development as well as a detailed look at the Scrum method due to it being used by our main case company. Communication has a large impact both within agile teams and between them, we will look at how communication works in an agile setting and the risks of poor communication.

1.3.1   Agile development

Agile development is a broad methodology that encapsulates several different methods for software development. Scrum, Kanban, and Extreme Programming (XP) are examples of agile methods [8]. Agile methods were created as a reaction to the limitations of traditional software development such as the waterfall method. The goal with agile was to have a more lightweight approach to software development and thus speed up the development process and quickly adapt to changes requested throughout development[2]. All these agile methods have different approaches to the development process. Despite their differences, all these methods are under the umbrella term agile, and a few similarities make a development method agile. Some characteristics of agile development methods are working in shorter iterations and continuous delivery of software [2].

In 2001 17 software engineers met at a conference held at a ski resort in Utah. These software engineers were representatives of several different agile methods at the time. Together, they decided on an agile manifesto, and this manifesto specifies four core beliefs that should permeate every agile method. These four tenants are as follows[5]:

- Individuals and interactions over processes and tools.

- Working software over comprehensive documentation.

- Customer collaboration over contract negotiation.

- Responding to change over following a plan.

These beliefs are open-ended, and there are several ways to achieve them in a software team. This has given way to several different methods with different practices to achieve the goal of the manifesto, even though they often have a lot in common, such as incremental processes [2].

1.3.2   Scrum

Scrum is one of the most well-known and used agile methodologies and the agile method applied at our main case company. One reason for this is that Scrum is mainly focused on the management of the project and not the technical aspects of software development. This makes Scrum easy to adapt to many different kinds of projects and is less limiting in its teachings [2].

In Scrum, the development of a product is split into three main phases, each with different goals and processes to complete. These are Pre-game phase, Game phase, and Post-game phase. In Figure 1.1, the Scrum process is displayed with the different phases marked [1].
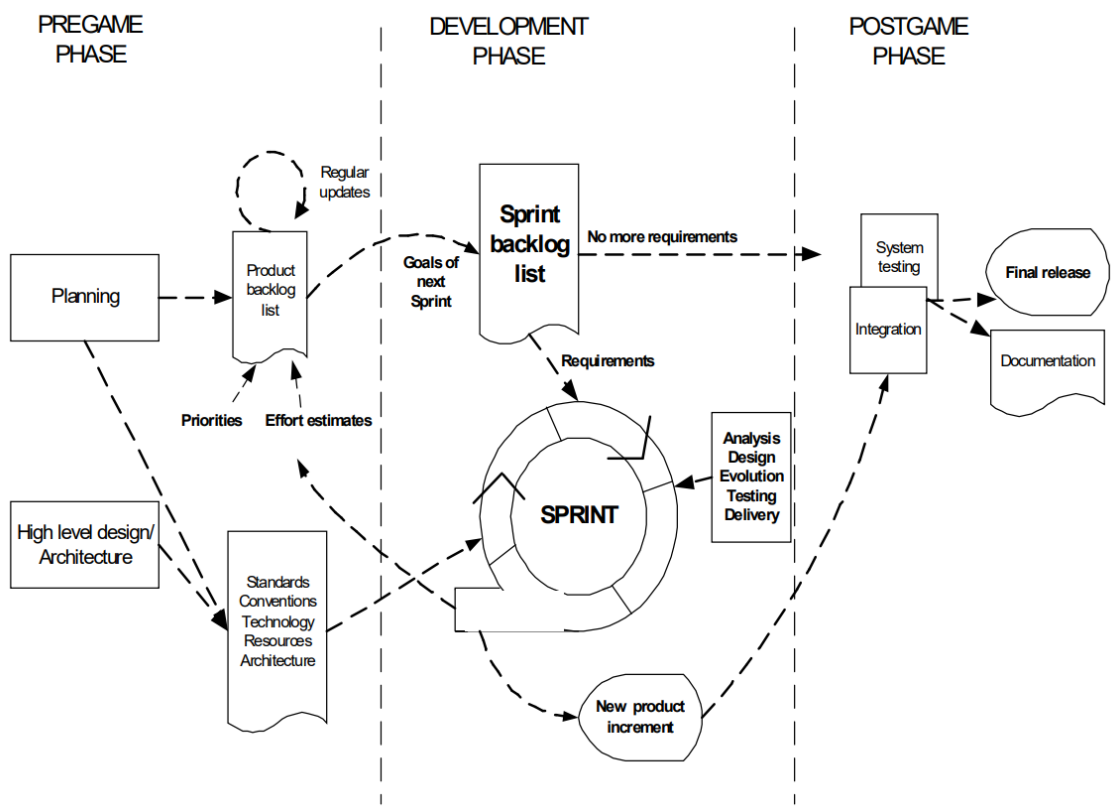
Figure 1.1: The three phases of Scrum[1]

The pre-game phase

This is the first phase and takes place at the beginning of a new project before any coding can begin. The goal of this phase is to develop the general objectives and design of the project. This phase is split into two different parts: planning and architecture/high-level design. During the planning phase, a **Backlog** with the currently known requirements is created. The requirement can have several different origins, from customers to developers. During the second part, the high-level design and architecture are created based on what requirements are in the backlog [1].

Game phase

The game phase (or development phase) encapsulates the agile development part of Scrum. The development is separated in **Sprints** during the development phase. A sprint is usually between one week and one month long, depending on the project. A sprint contains all the different stages as more traditional methods are used but in shorter increments. These are requirements, analysis, design, evolution, and delivery [1].

Post game phase

This phase starts when no more requirements remain to be developed, and all parties are happy with the product. In this phase, the product is ready for release, and in preparation for this integration, system testing and documentation are done [1].

Roles

The Scrum method presents different roles for the individuals involved in the development. The three main roles are Scrum master, Product owner, and Development team-member [18]. Three additional roles can be identified in Scrum development these are Customer, User, and Management [1]. We will, however, only be focusing on the first three roles.

Scrum Master
Scrum master is a management role within Scrum. A Scrum master's primary role is to make sure the Scrum principles and values are followed. They also try to remove any impediments, help improve the process and product, and help the development team [18].

Product Owner
The product owner is responsible for the product being developed. Their responsibilities include managing the backlog and prioritizing what should be done during the sprint [1].

Development Team
A team of approximately 3-9 members, the development team is responsible for implementing requirements from the backlog chosen by the product owner [18].

Practices

Product Backlog
Everything that is needed to be done for the product before launch is saved in the product backlog. It can contain anything from features and requests to bug fixes [1].

Sprint Planning
Sprint planning is a meeting taking place before a new sprint. At this meeting, the stakeholders and development team decide on the goals and functionality of the upcoming sprint. Later in the meeting, the Scrum master and the development team focus on how the product increments will be implemented during the sprint [1].

Sprint Backlog
A sprint backlog is created before a new sprint during the sprint planning meeting. It contains items from the product backlog. The items in the sprint backlog are the items that will be worked on during the sprint [1].

Daily Scrum meetings
The purpose of the daily scrum meeting is to keep track of the progress of each team member and also serves as an opportunity to plan forward. This meeting takes place daily and is a relatively short meeting, approximately 15 minutes, depending on the team [1].

Sprint Review meeting
This meeting occurs at the end of a sprint. During the meeting, progress made during the sprint is discussed, new backlog items may arise, and planning for the next sprint begins [1].

1.3.3 Communication

In the realm of software development, communication is crucial, given the complexity of most modern software systems that necessitate collaboration among multiple individuals and teams. Effective communication among all parties involved is essential to the successful development of a product. As Bjarnason et al. explain, "Communication gaps represent a significant source of project failures and overruns" [7]. One example of this involves communication regarding the system requirements. Misunderstood or poorly communicated requirements can lead to the development of a subpar product that fails to meet user expectations, ultimately resulting in poor sales [7].

The importance of communication is prominently highlighted in the Agile Manifesto, which states, "Individuals and interactions over processes and tools" [5]. This principle underscores that human interactions are a cornerstone of the agile methodology. Various agile practices incorporate this principle into their core activities. For example, Scrum includes daily stand-up meetings and retrospectives, while Extreme Programming (XP) emphasizes pair programming [2]. According to Pikkarainen et al., the agile development approach fosters an informal communication climate, enhancing internal team communication [23].

Teams in software development rarely work in isolation; they are typically part of a larger network of teams striving toward a common goal. This interdependence necessitates effective inter-team communication, which is particularly critical in agile environments where communication tends to be organic and informal. Both formal and informal interactions among teams and individuals are crucial for ensuring cohesive progress and collaboration [6].

While agile development emphasizes direct communication within the team, indirect or written communication, such as documentation, still plays a role, albeit to a lesser extent than in traditional methodologies. Internal documentation can encompass a variety of documents, including technical documentation, requirements specifications, design specifications, and the program code itself [29]. The extent of necessary documentation is a contentious topic. The Agile Manifesto advocates for prioritizing working software over comprehensive documentation. However, Alzoubi and Gill argue that documentation becomes more critical in distributed teams where members are spread across different locations and countries. In such scenarios, the inability to engage in quick, informal discussions increases the need for detailed documentation [3].

1.4 Related work

Remote and hybrid work have long been established practices within the software development industry. However, with the onset of the Covid-19 pandemic, remote work became the

norm for many companies, resulting in a proliferation of research papers on the subject. We have examined papers written during and after the pandemic which gives an interesting view of how the changes adopted during the pandemic have influenced the post-pandemic world. These papers explore various angles and aspects of remote and hybrid work, its effects on individuals, companies, agile practices, and more. Given that remote work is integrated into hybrid work environments, our analysis also includes papers focusing on both remote only and hybrid work.

Khanna et al. conducted a mapping study on merging agile development with a hybrid work style [15]. They identified 12 primary studies on the subject, which is fewer than expected. The authors suggest this may be due to the relatively recent rise in the popularity of hybrid work; half of the studies were first published in 2022. Additionally, research lagged after the Covid-19 pandemic, when the focus was on fully remote work rather than hybrid models. They argue that the topic is under-researched and note that companies are conducting their own studies to address their hybrid work challenges. The authors also observed that existing studies tend to focus on the processes of hybrid work, with less emphasis on the people perspective. They recommend that future research should investigate this important aspect.

Reunamäki and Fey examine the impact of remote work on agile teams and companies in their study [25]. They conducted an extensive case study at OP Financial Group, the largest bank in Finland. Their results highlight five common problems with remote agile work, along with potential solutions and pitfalls. These factors are summarized in Table 1.1. A recurring theme among the problems is the challenge of maintaining effective communication and engagement within the team. Remote work tends to make interactions less organic, necessitating deliberate steps to ensure that communication, collaboration, and knowledge sharing remain productive.

Problem	Solution	Pitfalls
Fewer organic interaction opportunities	Create subteams	Risk of informal hierarchies
Lower engagement	Promote engagement in digital meetings	Non-team meetings are prioritized
Meeting overload	Protect nonmeeting time	Lack of respect for calendar bookings
Leaders becoming more controlling and not offering enough support	Be present and build opportunities to interact with employees	More micromanaging and less delegation
Less interaction impedes knowledge sharing	Adopt software solutions and new roles that promote information sharing	Additional burden and varying activeness

Table 1.1: Problems, Solutions, and pitfalls found by Reunamäki and Fey regarding remote agile teams [25].

de Souza Santos and Ralph studied a company during the Covid-19 pandemic when all software development personnel worked from home [11]. They investigated how remote work affected development teams who had previously worked mainly together at the same office. They found making the switch from in-office to remote altered the coordination within software teams. They found factors that positively and negatively impacted team coordination. The positive impact had group cohesion and effective communication, while distrust, parenting, and team-specific communication mechanisms had a negative impact on team coordination

Neumann et al. conducted a case study examining the preferences of members within an agile development team regarding their work arrangements [22]. Their findings concluded that the majority of participants expressed a desire to continue working remotely, with some indicating their intention to be in the office 1-2 days per week. The authors emphasized the significance of providing choice and flexibility to employees, while also highlighting the advantages for both the company and its employees.

Zomerdijk et al. conducted a quantitative study involving 106 respondents from 22 Dutch financial institutions to examine the relationship between agile software development and hybrid work [32]. They concluded that hybrid work is essential due to its positive influence on employee motivation. However, they also found that hybrid work affects some core tenets of agile development. For instance, hybrid work negatively impacts the relationship between business and IT, making it more challenging to obtain quick feedback from customers and accurate requirements. Their research also shows that remote work negatively impacts communication, with 50% of respondents experiencing less effective communication. They conclude that in a hybrid setting, people factors are the most crucial to the success of agile teams and should be prioritized by organizations, alongside obtaining accurate and stable requirements.

Chapter 2

Research method

We explored the phenomenon of hybrid work in depth through a case study based on guidelines by Runeson and Höst [26]. We investigated our three research questions, first through interviews at one case company, and then through a survey of the case company and additional companies. An overview of the case study including its main four phases, i.e. preparation, planning, data collection, and analysis, is shown in Figure 2.1
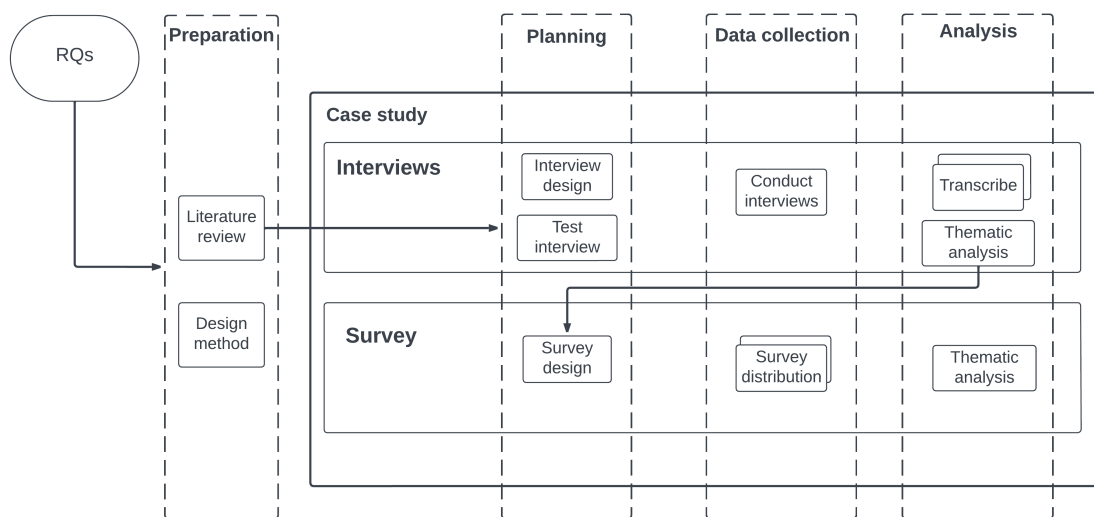
Figure 2.1: An overview of the phases of our case study and our two main data collection methods.

2.1   Case company

Before deciding on a method, we approached our case company to gauge their interest in participating in our thesis and to determine the extent of their involvement. We were able to interview several of their employees and distribute a survey. Their interest formed the foundation of our research, and the method was tailored with this company in mind.

Our case company is a Swedish company specializing in interior design with a global presence. Their IT operations play a crucial role in production, logistics, and customer-facing applications. The company employs a diverse workforce of employees and consultants from around the world.

Our case study was conducted within one of the IT departments located in the south of Sweden. In this department, the company offers its employees and consultants the option to work in a hybrid mode. The department consisted of around 300 employees when the study was conducted and focused on developing products for end-users and customers. Despite being based in the south of Sweden, the department includes employees and consultants from various nationalities and backgrounds. All development teams in this department use agile development methods, primarily Scrum.

Common roles in their agile teams include developers, Scrum masters, product owners, architects, and UX designers. To plan and enable good communication within the teams, they use agile meetings such as daily scrum meetings, sprint start, and retrospectives. There are no strict processes for how to communicate and collaborate between teams. If two teams know they need to collaborate extensively, they might sync their roadmaps and backlogs with each other. The same toolchain and methods of describing their work are used across all teams, enabling smoother collaboration. There is also an expectation for the teams' product owners to be aware of their surroundings and to stay informed about organizational activities and other teams. Additionally, managerial roles, such as project managers, help organize work on a larger scale, separate from the agile team structure.

2.2   Preparation phase

We started our study with a preparation phase where we designed a method for investigating our research questions, see Figure 2.1. When designing our method we looked at the case study guidelines by Runeson and Höst [26]. In their paper, they define a general method for conducting a case study within the sphere of software engineering. Runeson and Höst discuss briefly how surveys can be integrated into a case study but do not go into greater detail. To design our survey we looked at other sources primarily the paper by Kelly et al. about producing and conducting a survey to a high standard [14]. We discussed the best way forward with our supervisor and decided on the method presented in this chapter.

We conducted a preliminary literature review to gain a deeper understanding of our topic, identify existing research, and locate any knowledge gaps. Studies relevant to our research can be found in the related work section of this thesis. We mainly looked at published and

peer-reviewed research. In a few cases, we looked at new academic research that had yet to be peer-reviewed. To identify potential studies for review, we utilized two search engines: Google Scholar and LUB Search. LUB Search is Lund University's internal search system, which provides access to books, papers, and other published research available through the library. We used various search phrases such as *"hybrid work"*, *"hybrid work in agile teams"*, and *"hybrid work software development"*. We employed a tool called Lateral [17] to categorize and analyze the literature we identified. This tool allowed us to mark and categorize sections within the texts. It provided an overview displayed in a grid pattern, enabling us to correlate literature with the categories we defined.

2.3 Interviews

We conducted five semi-structured interviews with participants from our case company. A company contact provided us with the contact information for relevant individuals they believed might be interested in participating. We contacted these individuals and also asked them if they knew any other potential participants, and if so, if they could provide their contact information. We received responses from individuals with varying degrees of leadership responsibility within their agile teams. An overview of our interview participants is provided in Table 2.1.

We performed semi-structured interviews since this allowed us to investigate our research questions in an explorative manner. Questions were defined before the interviews and the semi-structured approach allowed us to ask follow-up questions or request the interviewees to explain further on a specific point[26].

Before conducting our interviews, we developed an interview guide, which is available in Appendix A. We followed the guidelines provided by Runeson and Höst when creating our interview guide [26]. The development of the guide was an iterative process, with input from our supervisor to ensure the questions were clear and comprehensive, addressing all our research questions.

The guide was divided into different sections, each corresponding to a specific research question. We began with a few generic questions to establish a baseline understanding of our interviewees and to ease them into the interview process.

We also conducted a trial interview to test our guide and ensure that all questions were relevant and easy to understand. This trial interview was conducted with an employee from our case company via an online video call. Note that this interview is not included in our results but was solely conducted to review and improve our interview guide.

All interviews were conducted face-to-face at the case company's office. They were digitally recorded using a mobile phone, and the interviewer took notes of any noteworthy details. Before starting each interview and recording, participants were informed that participation was voluntary, they could withdraw at any time, and all responses and recordings would be handled anonymously without sharing identifiable data.

All five voice recordings were transcribed by the researcher who was present during the interview. Only the interviewees' responses were transcribed, except when the interviewer asked questions not present in the interview guide. Filler words without meaning were removed to enhance the clarity of the transcribed text. Since all but one interviewee responded in Swedish, those recordings were transcribed in Swedish. However, the analysis of our transcriptions was conducted in English, and any citations used in the results were translated into English as well.

We utilized thematic coding to analyze our transcribed interviews. Thematic coding categorizes the data into different sections or themes, facilitating analysis, comparison, and identification of similarities within different sources [10]. This approach enabled us to gain a comprehensive overview of the interviews and structure our results and discussion into meaningful categories. We used Lateral to structure and categorize our transcripts.

Interviewee	Position	Consultant	Time at Company	Time in team	Days at office per week
I1	Product Owner	No	2 years	3 months	3
I2	Product Manager	No	13 years	2 years	3
I3	Product Owner	No	1 year	1 year	5
I4	Solution Owner	No	8 years	8 years	3
I5	Product Owner	Yes	2 years	2 years	3

Table 2.1: Overview of interviewees at case company

2.4   Surveys

We created and distributed a survey to achieve greater triangulation of data and method. Our interviews only focused on our main company and individuals with leadership responsibilities within their teams. We wanted to get a wider picture of our case company and see if our findings were reflected in team members without this leadership lens. We were also interested to see if our findings were reflected in other companies than our case company. We wanted the quantitative data provided by a survey to see trends over a larger group of individuals.

This survey was developed by examining our research questions and formulating questions based on their content, as well as by reviewing our interview answers. We identified trends and themes that emerged during the interviews and incorporated these into our survey to validate our interview findings. This process was done iterative with the guidance of our

supervisor.

When formulating the question we looked at the guidelines given by Kelley et al. We aimed to avoid any double-barreled questions, double meanings, leading questions, or ambiguous wording to obtain the most accurate results possible [14].

We used a five-point Likert scale, allowing participants to choose between the answers: *Strongly Disagree*, *Disagree*, *Neutral*, *Agree*, and *Strongly Agree* [30]. For several of our questions, we added an optional explanation text bar for participants who wanted to explain their choices.

We conducted a small pilot run with a few individuals working in agile development teams whose employers offer a hybrid work mode. This was done to get feedback on the questions and evaluate if they were clear and easy to understand. Based on the feedback from the pilot run, we made small modifications to the questions before distributing the survey.

We distributed the survey to two different groups, both groups got identical surveys. The first group consisted of employees from our case company who worked within an agile software development team. The second group included individuals working in agile software development teams at companies that provided a hybrid work mode, which we will refer to as "other companies." The survey was distributed through a survey program called SurveyReport and is provided by Lund University.

To reach as many individuals as possible, the survey was distributed differently for the two groups. At the case company, the survey was given to our interview participants as well as our company contact to distribute to their teams. It was also shared on the company intranet. This approach aimed to reach a wide range of employees, including those in roles other than our interviewees.

The second group was reached primarily through social media, mainly LinkedIn, and it was shared by the researchers and supervisor. This method was chosen because we did not have direct contact with the other case companies. People meeting the criteria and interested in participating could take the survey. The eligibility requirements for the survey were clearly displayed on the first page before any questions were presented to ensure that only qualified individuals participated.

The data gathered from the survey was structured, sorted, and categorized using Microsoft Excel. Each question's data was represented in diagrams specific to each survey group. Optional text answers for some questions were categorized and analyzed using thematic coding, similar to our approach in the interview section. Importantly, we maintained records of which Likert score corresponded to each question and text answer.

Chapter 3

Results: Interview study

The interviews provided insight into how hybrid work is performed at one company and how this impacts the communication within their agile development teams and the individual engineers. The interview results are presented herein based on the thematic coding of the interview transcripts. Information and direct quotes from the five interviewees are referenced by using the code I1-I5 specified in Table 2.1 of the previous chapter.

3.1 Working in hybrid mode

After the pandemic, our case company started to implement a hybrid work model. This shift in the company and its structure has influenced many different aspects of the company. New guidelines of how hybrid work will be implemented have been created, a greater reliance on tools, both new and old, and differences between individuals and teams need to be navigated.

Certain parts of this shift have been more difficult than others. During the interviews, several challenges about implementing and working in hybrid mode were discussed. We have highlighted these difficulties in the text by starting the paragraph with **Challenge**.

3.1.1 Company guidelines

Hybrid work looks different depending on which company the employee works for and their rules and guidelines. I2 stated during the interview, *"We believe in coming together. We believe in teams sitting together, discussing things, and meeting face to face.".* This has impacted how they stand regarding hybrid work and their chosen guidelines. I2 explained that they have chosen to call it guidelines instead of rules due to them not being extremely strict. I2 explained it as *"But it is not set as it has to be three days a week or it has to be Mondays, Tuesdays, Wednesdays. The freedom is in how you apply it."*

These are the company guidelines, but each team has a choice in how they apply them and how they work as a team. According to the interviewees, most teams have, in practice, translated the majority of the time to at least three days a week. In most teams, we got the insight that they tried to all be in the office at the same time. According to I5, they had two days a week where they tried to be at the office, while the team I1 was part of had three days. One reason for this is trying to avoid hybrid meetings for certain topics, such as retrospective and difficult discussions, that are better suited to in-person meetings. Another is team spirit and collaboration. Both aspects are harder for many teams to achieve without in-person interactions. One interviewee did share that not having fixed days to be at the office was beneficial. I4 who has a more management role in the company stated that *"I think part of the benefit of being flexible is that you can adjust the time yourself".*

I2 explained as a leader they felt it was important for them to follow the guidelines and lead by example. If they do not follow them how can they expect their team to do it. *"How can we expect them to come together if we are not giving a good example."*

Our case company has, besides its own employees, hired consultants from different companies. They have decided that their guidelines regarding hybrid work will apply to any consultant they are hiring. I5 explained that the consultant companies have their own rules regarding hybrid work, but as long as they have an assignment at the company in question, it is their rules that apply.

Challenge
Both I4 and I5 talked about the challenges they faced regarding getting the hired consultants to want to work most of the time at the company office and not at home or the consulting

company office. I5 talked about how many members of their team who were consultants were also relatively young and had not worked before the Covid-19 pandemic. Therefore, they had not seen the positive aspects that can occur when people come together and work on something collaborative. I4 speculated that they did not want to be at the office because they had a good team feeling at their consultant office and, therefore, would rather be there. Both stated that the solution to this difficulty was good leadership.

3.1.2 Tools

The interviewees mentioned several tools that helped them with hybrid work. I4 explained that they have had most of the tools for several years and before the Covid-19 pandemic. However, they have become more relevant than ever to make certain work procedures possible in a hybrid environment. In Table 3.1, the tools most frequently mentioned during the interviews are shown. In this section, we give an insight into which tools are used, what their purpose is, and the potential pros and cons associated with them. Some tools are mentioned and discussed further in a later section due to the nature of the program and the setting in which they are used.

Tools	Purpose
Slack[28]	Chat communication
Teams[20]	Video meetings, chat communication
Jira[4]	Task management
Miro[21]	Virtual whiteboard

Table 3.1: Tools used by interviewees

Task management

Jira is a project management and issue-tracking tool that enables teams to organize their work, collaborate, and monitor progress. It is created by Azure and is part of a larger library of tools Azure offers. It provides features like creating virtual boards, managing tasks, and tracking issues. At the company where the interviewees worked, Jira was mainly used to keep track of tasks and, to some extent, requirements. To keep track of tasks, they used a virtual board similar to a Kanban board. This board has different states a task can be in, and developers can be assigned to a task and ask questions about it. Jira is not the only program with this or similar functionality. I5 stated that she preferred the Azure DevOps[19] program they had used before. They have similar functionality, but I5 found Azure DevOps easier to use.

Online communication

There is a great need for employees and team members to be able to communicate with each other no matter their location. A large array of different tools and programs can fulfill this need. Traditional solutions would be email and phone communication. Both of these are used by our main case company. However, more modern web-based tools are becoming popular.

At this specific company, Microsoft Teams (MS Teams) and Slack are used.

MS Teams is primarily used in the company at large often for video meetings. MS Teams have chat functionality, but when speaking with the participants, it became clear this is not as commonly used by some teams. Slack is a program entirely dedicated to chat conversations. It can be both one-on-one and group conversations, a channel can be created where several individuals can be part of the same conversation. At the main case company, several participants mentioned that the development teams, to a greater extent, used Slack rather than Teams and email. I3 stated that they only used Teams for more official video meetings but Slack for everyday conversations. They also clarified that email is seldom used and so rarely get emails that they often forget to check. This sentiment was shared by I4 but at the other end of the spectrum. In their more management role, they use teams and email to a greater extent and feel they often can miss something if it is said on Slack. As mentioned, Slack has the functionality to create different channels, and I4 feels that they have become too innumerable, and it is hard to keep track of them all.

Challenge

I4 stressed the importance of digital and information safety when using several tools. Keeping track of what is done and written in a system is essential. For example, I4 explained how some developers started using Discord during the pandemic, but they unfortunately had to stop. The reason is that Discord owns the information shared using their platform. Another concern I4 raised was the issue of information security, specifically, who has access to which data. One example here was Slack and the ability for everyone to create private chat groups. This makes it hard for the responsible individual to see who has access to which information, and it is easy to share information with someone who does not have authorization to view it.

3.1.3   Personal preferences

At the company, the individual needs to take into consideration the company policy and the agreement within their team when choosing where to work. This still leaves room for some personal choices regarding how they want to plan their work week. Do they want to be at the office every day or use the opportunity to work from home on certain days? If nothing is decided by the team, which days do they want to spend at the office and which at home?

In Table 2.1, the number of days spent in the office by the interviewees is displayed in the last column. This shows that within our pool of interviewees, all but one, on average, spent three days a week in the office and two at home. The one outlier chooses to spend every day of the week at the office. For many of the interviewees, one of the main reasons to spend the available days at home came down to wellness and work-life balance. This is a topic we will discuss in further detail in the coming sections. I3 has chosen to spend all his working time at the office; there were several reasons for this decision. One is that after the pandemic, I3 was tired of working from home and appreciated the switch of coming back to the office. Another reason is that they were quite new to their role; therefore, they found it much easier to be at the office, talk to people, and get help when necessary.

The ability to focus better from home was an aspect brought up. I1 discussed during their

interview how some tasks were simpler to complete from home due to the ability to keep focus. In the I1 experience, when they worked from the office, there was a greater risk of being disturbed by questions from colleagues and thus getting their focus broken. I4 had a similar experience, and they saved certain tasks for the days they were working from home; their reason had, however, more to do with privacy. I4 had tasks that were confidential due to their nature concerning consultants at the company. These could not be done where others could see them, and in an open work environment, this is hard to avoid. The solution was to do them at home where no one could see their screen, which worked well for I4.

3.2 Impact on team communication and collaboration

Communication and the challenges that hybrid work brings to this aspect of software development and teamwork, were something we asked the participants a significant amount about. The Covid-19 pandemic led to challenges with communication due to a large amount of remote work for the company. Now, with hybrid work, some challenges have lessened, and new ones have emerged. A lot of lessons and tools used during the pandemic have been helpful in navigating this new territory. However, not all new challenges are easy to solve.

3.2.1 Hybrid meetings

Hybrid meetings have become much more common at our main case company. This is naturally due to them adopting a hybrid work style. Hybrid meetings were something our participants had a lot of feelings about, and a lot of challenges about how they are implemented were brought up. Most of the opinions on the subject were negative, and most preferred either everyone at the same location or completely remote. I4 had a somewhat different opinion that if the meeting was 50-50, so 50% online and 50% in the meeting room hybrid meeting worked fine.

Challenge
A major challenge voiced during the interviews was to get a balance between the participants joining the meeting remotely and the participants at the office. I4 talked about how participants joining remotely could often be forgotten if the majority of participants were in the same room in the office. In that case, I4 stated they preferred to be fully online but noted that the personal connection was lost in that scenario. I5 found that half at the location and the other half remotely worked poorly. When some participants join remotely, the meeting becomes de facto remote, in their opinion. Everyone in the meeting room looks at their own computers and doesn't interact with the other people in the room. As a visual person, I5 preferred to work with a whiteboard and be able to give the pen to a person who is explaining something. There are tools for creating a virtual whiteboard. The company used the tool Miro. Miro is a virtual whiteboard enabling several individuals to edit in the same document. I5 confirmed that Miro was helpful but still preferred the real deal.

Challenge

Hybrid meetings have different technical challenges than a fully remote meeting. At the company, they had big screens and microphones in the meeting room to help in hybrid meetings. Getting this technology to work correctly and making sure everyone can hear and see correctly can be a challenge. I2 talked about how this was a challenge, especially when they switched from fully remote to hybrid. They had to spend time at the beginning of every meeting just getting everything set up, but they are learning daily and getting better at it.

Challenge
The last challenge discussed with hybrid meetings during the interviews had to do with planning. Which meetings are hybrid meetings? Can you always join remotely, or does it need to be discussed beforehand? I2 talked about this aspect of hybrid meetings, and especially at the beginning of starting hybrid work, knowing what was hybrid and what was not was challenging. I2 explained how the transition part was hard and how prior agreements are important to prevent misunderstandings: *"You assumed that this meeting was supposed to be live, and two people are online, and then you didn't think about that. So I think that transition period has been super hard; agreements are super important."*

3.2.2   Online meetings

Even if the company has adopted a hybrid work style, online meetings are still commonly used within the company. There are several reasons for this: everyone in the meeting can be working from different locations, or they want to avoid the negative aspects of hybrid meetings discussed above.

3.2.3   Planning

Planning is an important part of any company. In an agile software development team, the team needs to plan their next sprint, the release schedule needs to be planned, and much more. Several of the participants in the interview study noticed a new need for planning when the team worked hybrid. Several teams planned which day they would be in at the office. They had noticed if this was not planned, people would be in the office on different days and miss each other. They found the solution of deciding one or two days to be spent in the office helped them to be in on the same days and made it easier, for example, to plan important meetings on those days.

I4 talked about how his team had begun to start each day during their short morning meeting to check how everyone was feeling and where they were working on that day. It is similar to the development team's daily meetings but for more management roles. They started with this during the pandemic and found it very helpful. They have continued with this now when they work in hybrid mode.

3.2.4   Collaboration

Collaboration was something we talked about with several of your interviewee participants, and they put a great emphasis on the importance of collaboration at their company. I2 stated

in their interview *"Things are solved faster, things are solved nicer when you have a little bit of collaboration around it."* I5 was of the same mind that even if some people find they are more focused at home, when the team collaborates at the office, problems can be solved faster due to the team's input. I2 was positive about how the company was collaborating. I2 found that due to the majority of work being at the office, they had good collaboration. However, they emphasized the importance of regular check-ins with everyone on the team. This is to ensure the team is constantly coming together, and it can be done both online and in the office. I2 found that the Scrum daily meetings some teams used worked well to achieve this.

I1 talked about how their team had found they often forgot to collaborate when they were working remotely. A developer takes a task, finishes it, and puts it to review, and another takes over. The team had discussed trying to implement more pair programming to combat this and encourage more collaboration within the team. I1 also discussed the importance of a clear vision and goals when team members work a lot from home. They found that this was harder for team members to get a sense of if they worked a lot remotely. I1 stated *"You understand your part, but how does it fit into the big picture that we're building? Because then you also need to understand your part in the context."*

To collaborate successfully, a good team spirit is important. I1 found this team feeling was easier to achieve when the team could meet face to face. In their opinion, it was hard to do fully remote, and they found that a hybrid solution when the team meets on certain days of the week was beneficial. I5 shared the opinion that it was beneficial for the team's spirit to meet in person. However, they also mentioned when they had worked fully remotely, they were better at using digital tools such as Slack to connect, and now, with hybrid, they feel that they miss out at home. For most of the teams, the majority of the social interactions take place at the office.

3.3 Individual impact

3.3.1 Work-life balance

The general consensus of the participant of our interview study was that hybrid work had a lot of benefits for their and other's work-life balance. Many of them found challenges and negative aspects of both in-office and remote work. However, with hybrid, they got the positive impacts of both while minimizing the negative aspects.

The participants cited various reasons why hybrid work had a positive impact on their work-life balance and well-being. One of the key benefits was the ability to work from home on certain days. This brought several advantages that contributed to their overall well-being.

Commuting

During the interviews, it was found that many people considered commuting as a major issue. They believed that by avoiding the daily commute to work, they could save a lot of time in the mornings and evenings, allowing them to engage in different activities before and after

work without any hassle. For instance, one of the interviewees, I1, shared how taking a walk before work helped enhance their mental well-being. Another interviewee, I4, mentioned that they preferred working from home on certain days to have enough time for their post-work activities and reduce stress.

I2 has a long commute of 4 hours to and from the office, which takes a toll on their mental state. Staying away from home for over 12 hours makes it harder for them to fit in other important aspects of their life, for example, working out. Despite facing these difficulties every time they come to the office, I2 understands the importance of the team being in the office for the majority of the time. As a leader, I2 thinks it is unfair to expect their team to come in without doing the same.

Flexible

Many participants mentioned that hybrid work provides flexibility, which is a major positive aspect. Being able to work from home on certain days, depending on personal circumstances, was highly appreciated. One participant, I3, stated that many people enjoy working from home due to the freedom and flexibility it offers. For instance, they can work out or visit the hairdresser during lunchtime. I3, personally, felt that they could do all of this when working from the office because the company was flexible and had no problem with employees taking a bit longer lunch breaks, for example.

Household chores

The ability to do certain household chores during the day when working from home was also mentioned to help improve people's work-life balance and make the everyday puzzle a bit simpler. I2 stated during the interview *"Then there's this practical aspect that many people bring up, I think. I have small children, a laundry basket that's always overflowing, being able to throw in a load during lunch. It really makes a big difference in managing the daily puzzle."*

Challenge
An aspect one interviewee found problematic about people working remotely to improve their work-life balance was the reluctance to come into the office on days they had planned to be at home. I5 talked about how people would be reluctant to come on certain days of the week because of their personal life. The example given was, for example, people not wanting to come to their office due to dogs or children at home. I5 talked about how they felt if the work required you to be at the office, you should be able to do that, and remote work was a privilege, not a right. With all this said, I5 reflected that this might be a generational opinion, and perhaps their older generation should prioritize them-self above work more often.

3.3.2   Well-being

During the interviews, we asked the participant how their mental and physical well-being was impacted by remote or in-office work. We got both positive and negative opinions regarding both of the working arrangements. A good work-life balance was something mentioned by

several participants as something beneficial to their well-being. As this has been discussed in greater detail in a previous section, it will not be talked about more in this Section.

Social Interactions

Social interaction is a big part of working in an office and many find this to be one of the positive aspects of working at the office. Interviewee I1 talked about how they had more fun at work when they worked in the office. This had a big part to do with the social aspect the office brings. *It is more fun, laugh more during the day, [I] have time to take a coffee break and share some nonwork-related chatter.* Interviewee I5 shared this opinion, explained that the days they work from home they find it much more boring than working in the office.

This, however, is not the case for everybody. I2 was one of the individuals who related to this second group. They explained that as an introvert, their mental health took a toll when being at the office. I2 said during their interview: *I am an introverted person, and my job requires a lot of extrovert stuff to do. I manage, I find ways to also have good things to come out of that. But it is super tiring for me to be out in the field all day.* I2 explained that their mental health took a toll when at the office and tried to find calm spots where they could work by themself while still being present if their teams needed them. There is, however, a different side of this coin discussed by I5. I5 talked about how they were worried about people who are introverts and prefer to only work from home. Talked about for some individuals, their main source of social interactions was through working in an office. At their interview, interviewee 5 said: *I'm an extrovert so I make sure to meet people privately anyway, but if you're an introvert person you might not make sure to do that but the human contact you get with people is at work.* Their worry was if you never met anyone outside of work and you worked only from home, you could, in the end, be too scared of leaving your safe place at home.

Routines

The difficulties with routines when working from home were discussed during the interviews. I3 talked about how, in their experience, many people had problems establishing good routines when working from home. It is easy to wake up and go straight to the computer to start working and continue to sit behind the computer all day.

Breaks were something many felt came easier and more natural when working in an office. There are often natural breaks between, for example, meetings due to the need to change location before and after a meeting. In the office, there is a culture of taking coffee breaks together, introducing a natural break and an opportunity to socialize with colleagues. All this also creates an environment where people have to get up from their desks and get some movement in, something that was found important for many interviewees. When working from home, there is the risk of just switching between MS Team meetings and never getting up from your seat for hours at an end. I1 talked about how their team, during the pandemic, had been good at reminding each other to take breaks when working remotely. This was not as big of a focus now when the company had switched to hybrid. However, I1 had a new tactic when booking meetings to ensure a natural break for most people. Their solution was never to book meetings for half or whole hours. So they booked 25 minutes instead of 30 and

55 minutes instead of 60, for example.

Hybrid work

All of the participants thought the mix between in-office and remote work was the best way of working. The reason for this is that they all could see the positive aspects of both working styles regardless of their own personal preferences. Hybrid gave people a chance to choose what worked best for them and get the benefit of both approaches. I1 put it like this during their interview: *Well, the mix for me is probably the best. There are positive aspects to both so this arrangement X has where they say 2 days from home, 3 days in the office works very well for me. A couple of days of being able to get that morning walk and the other days get a lot of this positive that you can just walk around and look at someone's computer and really collaborate..*

3.3.3   Coming back to work after Covid-19

Struggling to come back to the office after the Covid-19 pandemic was something that was brought up by some of our interviewees. The feeling was that after working so long from home, the negative aspects of office work felt much greater. I4 explained their experience of coming back to the office as following: *Then when we came back, I almost felt that it was harder than when we went home. That's because you suddenly realise how much of the day is actually lost in just travelling to and from work.* I5 had a similar experience to I4; now, when they are used to it again, they are experiencing almost the reverse feelings. Due to a switch in office location, they might have to work more from home for some months; this is something they are a bit stressed about, and they do not want to go back to working fully remotely.

Chapter 4
Results: Survey

With the assistance of two surveys, we were able to collect a larger sample of opinions and more quantifiable data. As outlined in the method chapter, we administered identical surveys to two distinct groups of participants, with their responses saved separately. The first survey was accessible to anyone working in an agile team, constituting group A. The second set of responses was gathered from employees and consultants from our main case company, forming group B. Group A consists of 30 participants and group B of 95. In the subsequent chapters, we will present the results of this survey, distinguishing between the responses from group A and group B.

4.1 Demographics of the participants

In this Section, we provide an overview of the demographics of the participants who responded to our survey. Specifically, we asked participants about their roles within their current teams and the duration of their tenure in their teams. Below, we present the results, which are divided between group A and B.

The primary group of participants in our survey was developers. As shown in Figure 4.1, in group A, 56% of participants were developers, closely followed by 55% in group B. The second largest group, categorized as 'other,' comprised 20% of participants in group A and 22% in group B. This group included individuals with diverse roles such as system architect, defect manager, test leader, UX designer, and manager
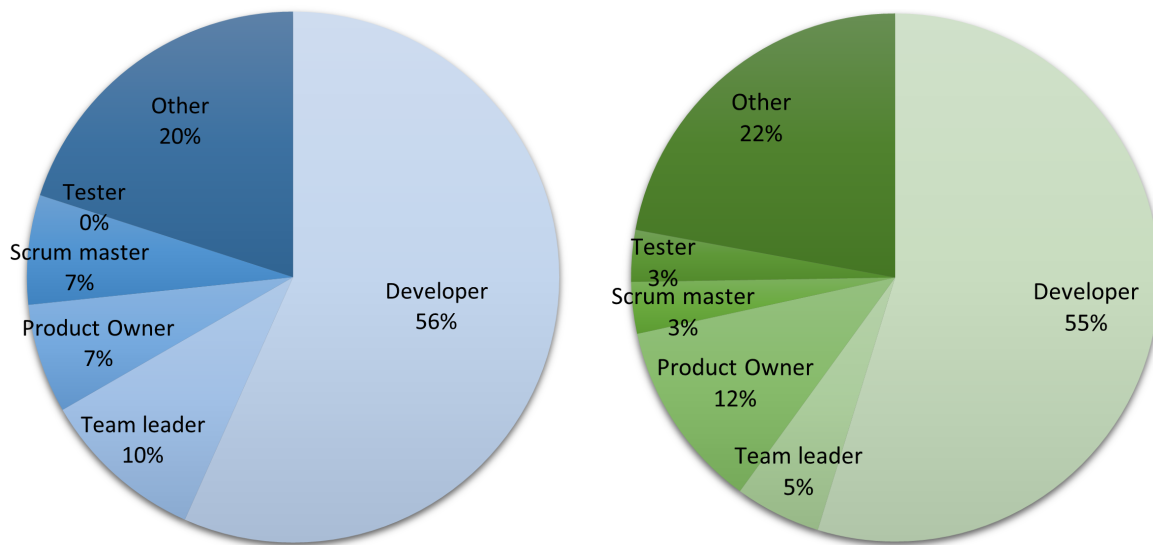
Figure 4.1: Distribution of roles in the survey: group A (left) and group B (right).

In Figure 4.2, the number of years the participants from both groups A and B have been a part of their current team is displayed. In group A the amount of years covers a greater span with some participants working 10+ years in the same team. In group B the longest period in one team was 6 years. However, in both groups, the most common time spent in their team was 1 to 3 years.
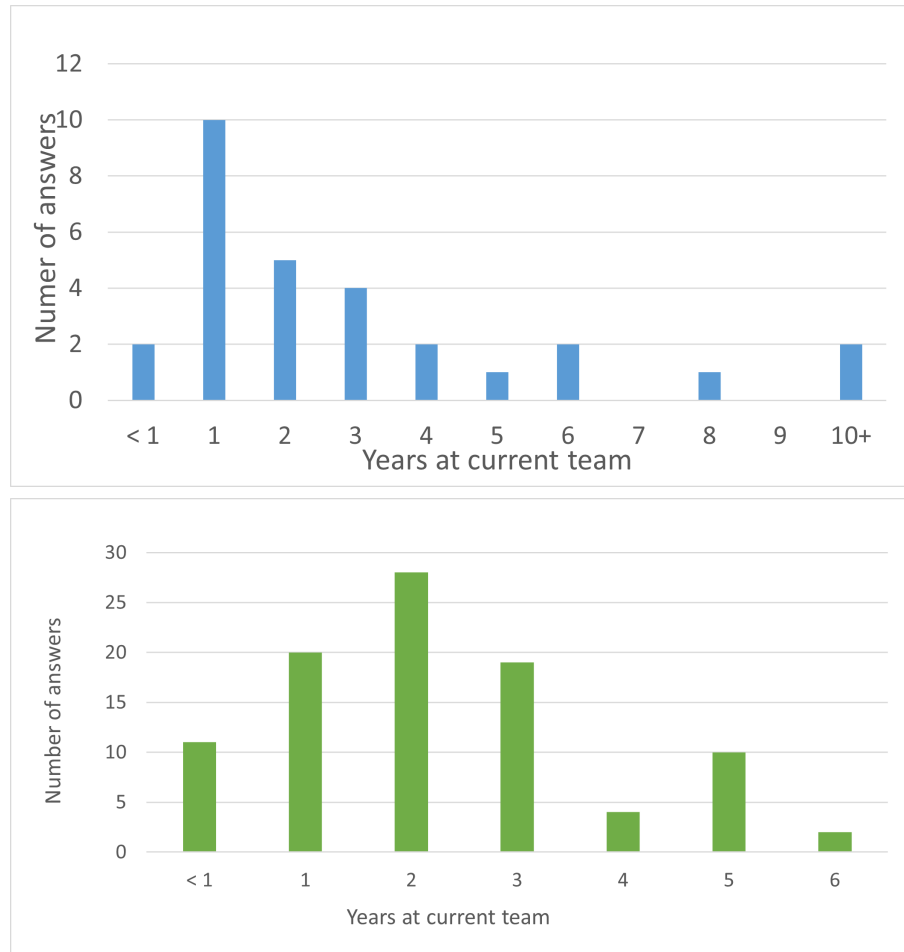
Figure 4.2: Years worked in current team: group A (first) and group B (last).

4.2 Remote vs in office work

This Section delves into the varying guidelines across companies regarding remote and office work, as well as individuals' personal preferences. It addresses the enforcement of company guidelines among participants and explores their approximate distribution between remote and office work.

4.2.1 Guidelines for hybrid work

A majority of survey respondents stated that their company had guidelines regarding remote and in-office work, with 67% in group A and 49% in group B. Approximately a third of respondents from both group A (27%) and group B (33%) reported not having any company guidelines. See Figure 4.3.

The respondents described a wide range of different policies for hybrid work covering both very specific policies and more open-ended ones. In group A, the four most common solu-

tions were: the majority of time at the office, a minimum of 2 days at the office, a minimum of one day at the office, or fully remote. While there were some minor differences between the answers within these groups, the main point was within the classification we chose. In group B, of the 49% answering affirmative most answered that they should spend the majority of time at the office. Some explained that this was the official guideline, but their team did not follow it exactly as it did not work for them. One participant explained it as follows: *"Officially more than 50% in the office, but in our team we have an informal agreement that you can work from home as much as needed/wished, since we are all located in different offices anyway, so going to the office doesn't give any value."* However, some participants provided varying responses, including a 50-50 split between home and office, two days at the office, or leaving the decision up to the team.
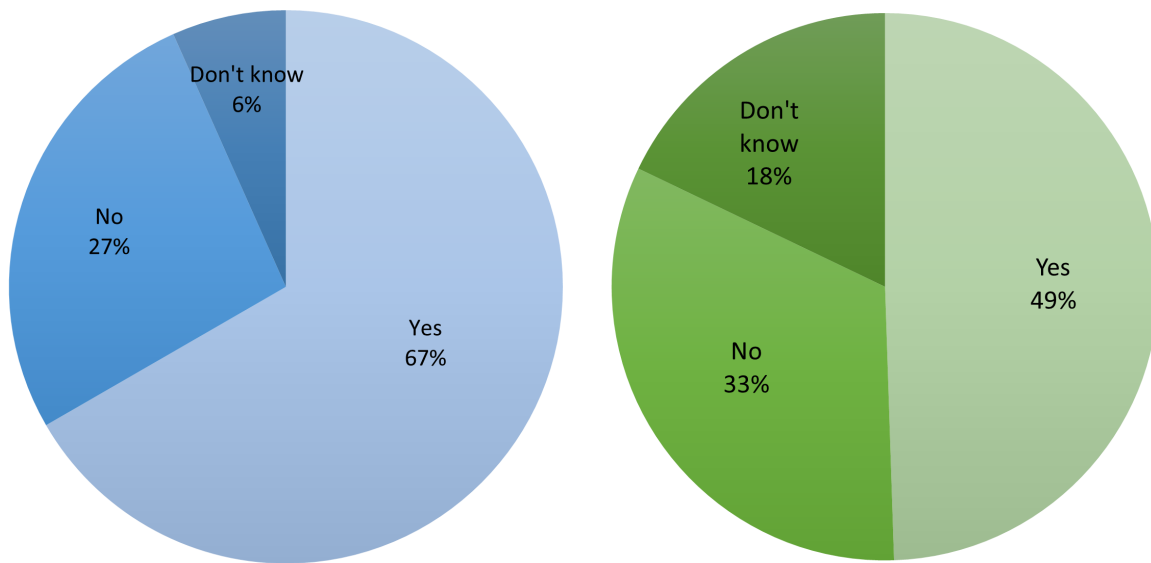
Figure 4.3: Company has guidelines regarding remote and in-office work: group A (left) and group B (right)

4.2.2   Remote work

The percentage of remote work varied greatly among our participants in group A from none (0%) to working exclusively remotely (100%), see Figure 4.4. There were no clear preferences among the different categories and at least one individual has chosen each alternative. In contrast, group B exhibited a greater trend in remote work distribution. The majority indicated that they spent more than 50% of their work time remotely. Specifically, the largest group, comprising 20 individuals, estimated that they work between 71% and 80% remotely.
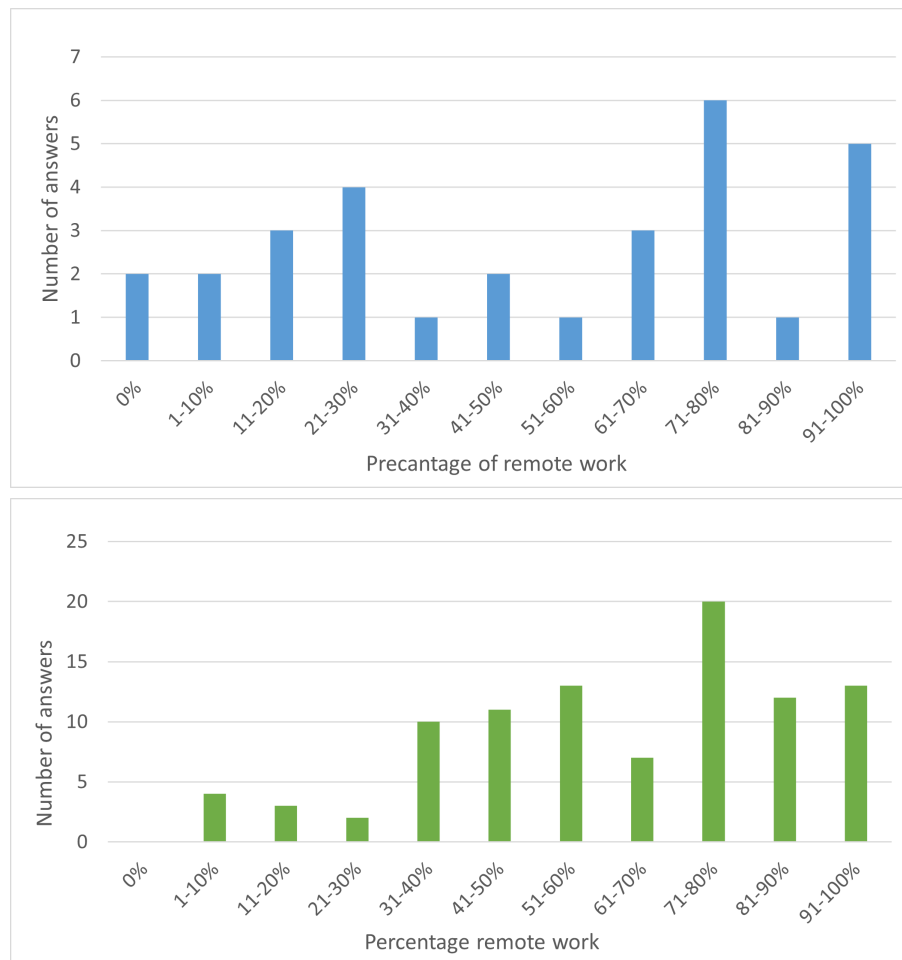
Figure 4.4: Estimated percentage of remote work: group A (first) and group B (last).

A majority of participants (60% and 59%), in both groups, indicated that their team had no system in place for tracking team members' working locations, as shown in Figure 4.5. The respondents who had to report their location described various methods for doing this. Common approaches included updating their status in a group text channel, such as in MS Teams or Slack, or directly changing their status within MS Teams. Other methods included recording it in their time reports or discussing it during daily stand-up meetings. In group B, several participants explained that their team used a Slack bot, which asked them daily about their working location, and they responded with an emoji corresponding to their location.
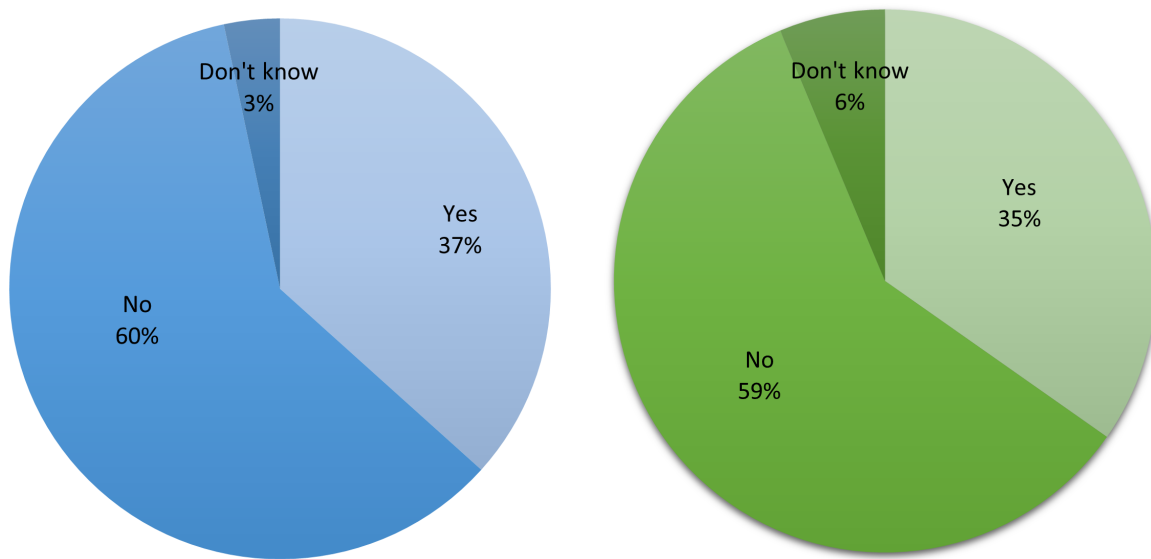
Figure 4.5: Teams keeping track of team members' working location: group A (left) and group B (right).

The vast majority of participants in both groups A and B agreed or strongly agreed that they were satisfied with their current split of remote and in-office work, as depicted in Figure 4.6. One common reason given for their satisfaction was the flexibility to choose their preferred working style, balancing both remote and in-office work. The significance of choice for employees is evident in the various reasons for strong agreement. Some individuals expressed satisfaction with the option to work from home, explaining that benefits such as avoiding commuting and having an uninterrupted focus on tasks. For instance, one participant from group B who strongly agreed stated, *"The benefit of working from home is that you avoid commuting and have time to focus on your tasks. That's excellent for developers. However, for some kinds of meetings, being at the office makes discussions easier."* Another participant from the same group who also strongly agreed explained their reasoning, stating, *"Not easy to work from home due to small kids in the family. Hence I try to be in the office as much as possible, but it's really nice to be able to work from home when needed."*

Among those who disagreed and expressed dissatisfaction with their balance of in-office and remote work, the reasons were divided between a desire for more office work and a preference for a higher amount of remote work. One individual who disagreed explained their dissatisfaction, stating: *"I choose to work a lot from the office, but I find that I feel better when I work more from home."* Another participant who was dissatisfied because they would like to spend more time at the office reasoned: *"I would like to be more on-site, but there is no value since the team is working remotely on those days."*
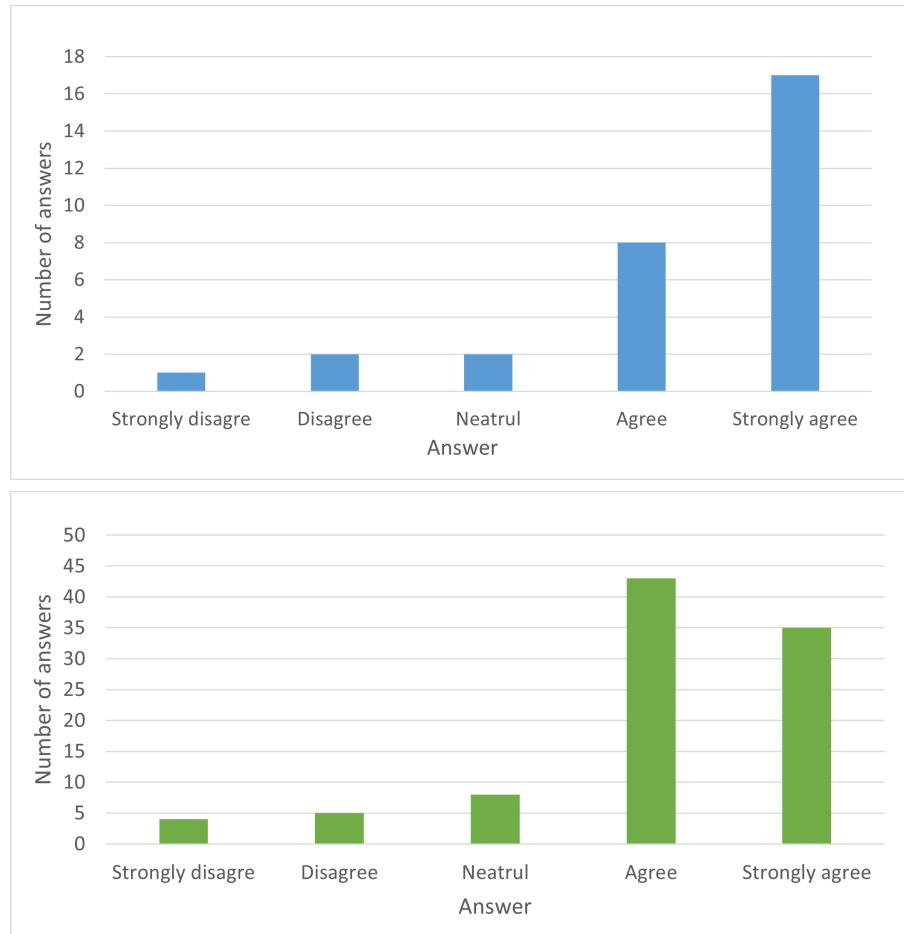
Figure 4.6: Satisfied with working arrangements: group A (first) and group B (last).

4.3 Hybrid works impact on teams

Given that working in teams is integral to agile development, we examined the impact of hybrid work on teams, with a specific focus on communication dynamics and the application of agile principles within a hybrid work environment. We looked at three main themes regarding working in a team in a hybrid work environment. These are **Implementing hybrid work**, **Agile in a hybrid work environment**, and **Team communication**.

4.3.1 Implementing hybrid work

The majority of respondents in both groups indicated that their teams had not encountered challenges in implementing a hybrid work environment. Notably, in group A, a larger percentage chose the neutral answer compared to group B, as illustrated in Figure 4.7.
The question concerning difficulties in implementing a hybrid workplace evoked strong opinions across the spectrum. For example, a participant from Group B who strongly disagreed stated, *'No challenges whatsoever.'* Conversely, another respondent from the same group,

who agreed with the statement, offered a different perspective, noting, '*All teams suffer somewhat when adopting a hybrid model; it's a classic dilemma. While individuals may thrive in remote settings, team cohesion suffers due to communication difficulties.*'

Participants gave the international nature of their work as a key factor in their relatively smooth transition to hybrid mode. In group B, several individuals elaborated on this point, highlighting that as part of a large international company, they were already accustomed to remote collaboration with colleagues worldwide. Conversely, a participant in group A offered a contrasting viewpoint, noting that the smaller size of their team and the segmented nature of their tasks minimized the need for collaboration, thus reducing difficulties in implementing hybrid work.

Several respondents from group B mentioned that it was harder to learn something new when people worked remotely. This was explained by a participant who even if they disagreed with the general statement saw this negative aspect of hybrid work. *"It is hard, when you shall learn a new area and new people. Sometimes it is easier to understand, when you hear other people talk about it (even if you don´t have to be involved, it can give other insights)."*

Another challenge highlighted by group B in the survey pertained to implementing meetings in a hybrid work setup. Participants noted that while some meetings were more successful when conducted remotely, others posed significant difficulties. It was generally agreed upon that certain types of meetings were harder to conduct effectively in a remote setting. For instance, meetings involving extensive discussions were explained to be particularly challenging. One employee expressed frustration, stating, *"Discussions and decisions take much longer time when in online meetings."* Another participant elaborated on their experience, stating, *"There have been challenges in determining which types of meetings are more suitable for in-office or remote settings. Generally, meetings involving extensive discussion among multiple participants, such as scrum retrospectives or planning meetings, are more effective when conducted in the office."*

Technical issues emerged as a difficulty mentioned by individuals in both groups A and B during the implementation of hybrid work in their teams. In group A, two participants who agreed with this notion pointed out specific challenges related to managing hardware and test computers when team members were not present in the office.
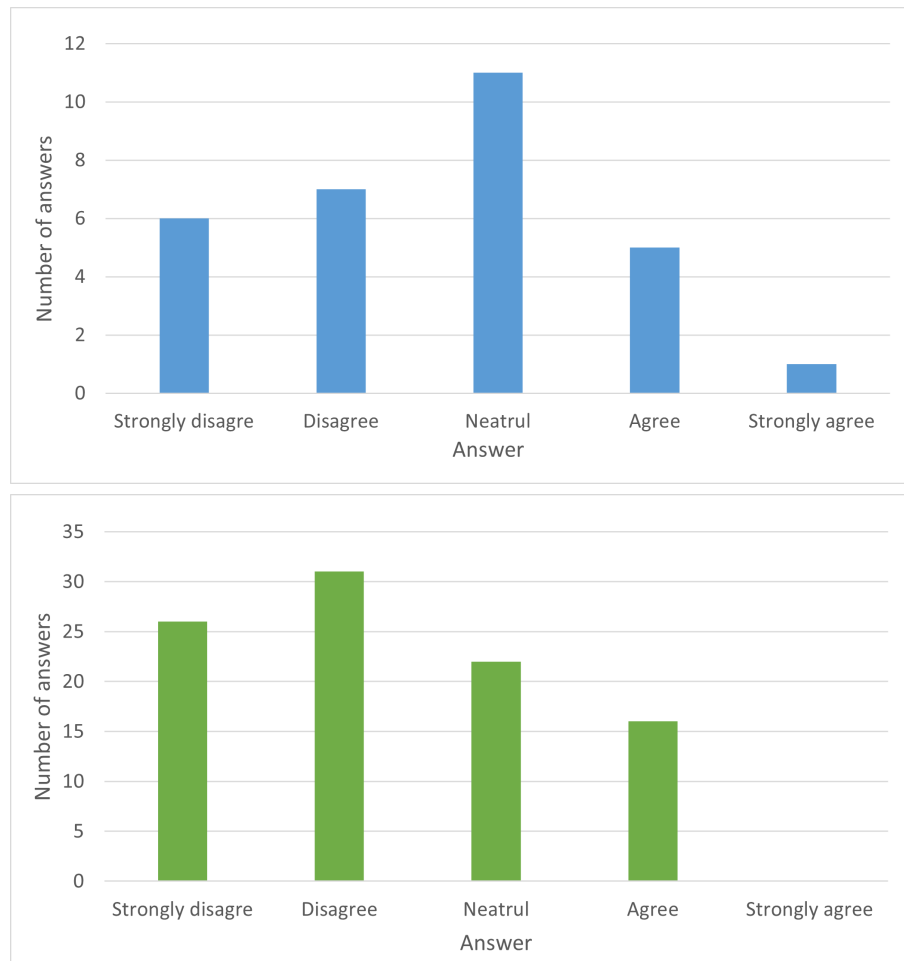
Figure 4.7: Challenges with implementing hybrid work: group A (first) and group B (last).

4.3.2 Agile with hybrid work

There were mixed opinions in both groups A and B regarding whether their teams' approach to agile development had changed due to a hybrid work environment. This split was particularly pronounced in group B as can be seen in Figure 4.8. Several respondents from group B stated that they were unable to assess potential changes in their work practices caused by their hybrid work environment since they had joined the team after the transition to this way of working.

Some of the participants in group B who agreed with hybrid work changing the way they worked agile claimed hybrid work had made them better at working agile. One participant explained their experience as follows: *"To the better, due to that they work remote a lot there is a stronger need to communicate and involve people in a better way. This enforces structure and discipline according to agile principles that has improved a lot."*

Meetings and their frequency were topics brought up by several participants in group B. Some noted an increase in scheduled meetings since transitioning to a hybrid setup. Tasks

that previously might have been resolved informally through in-person interactions now necessitate scheduled meetings due to the hybrid work arrangement. One participant observed a rise in stand-up meetings and syncs within the team, attributing it to the hybrid nature of work. However, contrasting perspectives were also voiced. Another participant disagreed, explaining that the improved utilization of Slack, which reduced the need for meetings. A third individual supported this viewpoint, acknowledging the enhanced use of Slack and MS Teams, which fostered greater self-sufficiency and independence among team members, ultimately leading to improved efficiency in a hybrid environment.
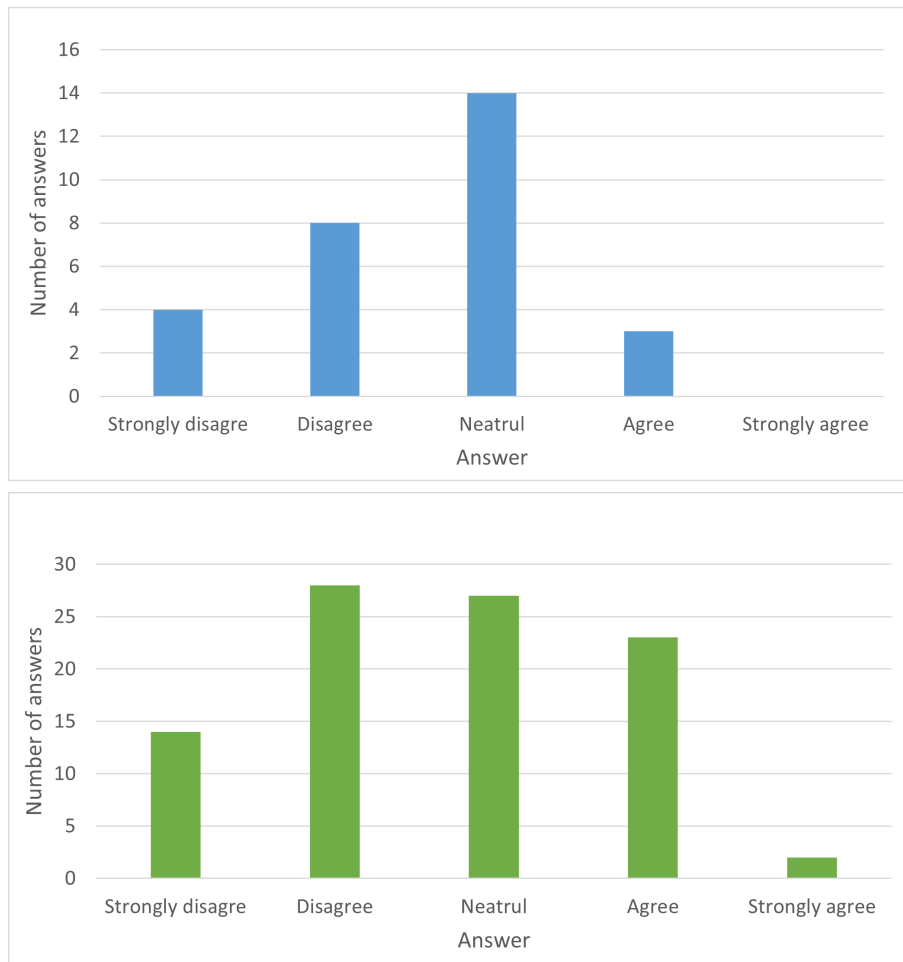
Figure 4.8: Approach to agile development changed due to hybrid work: group A (first) and group B (last).

4.3.3   Team communication

We asked our participants about their opinion of whether a hybrid working environment has a negative impact on their team's communication. The findings, illustrated in Figure 4.9, show varied responses, with a slight preference towards the disagree option in both groups A and B. Several respondents from Group B, who disagreed with the statement, stated that their online communication tools (Slack, MS Teams) are sufficient for effective collaboration. This was described by one participant: *"Regardless of who is working at the office, we have*

a great way to collaborate. JIRA for the tickets, Slack to keep everyone informed, and huddles when needed to discuss something." This sentiment was shared by individuals in group A as well, but the tool mentioned there was Zoom.

Among those in groups A and B who agreed with the statement, a common rationale was the perceived higher quality and quantity of discussions when conducted in person. Participants gave reasons such as the ease of initiating meaningful conversations, the ability to ask questions more readily, and the overall efficiency and depth of in-person discussions. Another factor influencing agreement was the concern that if some team members were at the office discussing work-related matters, the risk of excluding remote team members was higher. However, one individual who mentioned this concern also emphasized that the information missed during these work discussions is seldom something crucial.
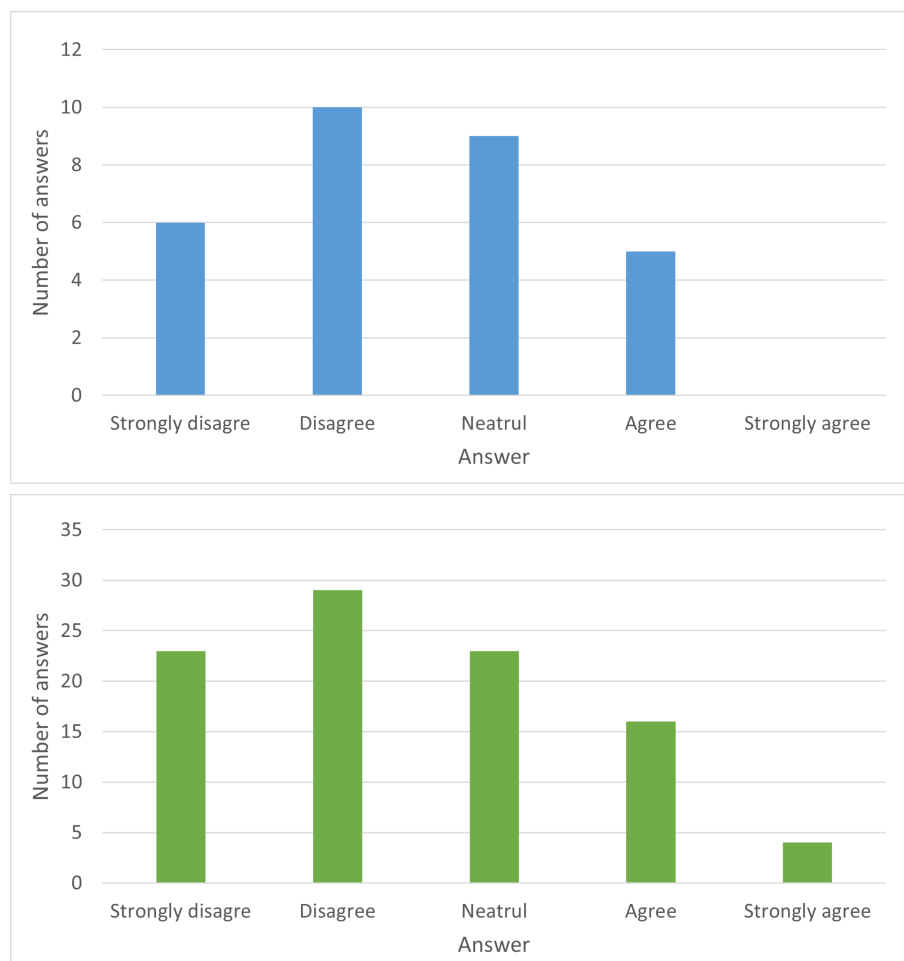
Figure 4.9: Team communication negatively impacted by hybrid work: group A (first) and group B (last).

4.3.4 Individual impact of hybrid work

The survey revealed that the vast majority of participants in both groups agreed or strongly agreed that their mental and/or physical health had been positively impacted by hybrid work.

The majority disagreed with the notion that hybrid work had negatively affected their well-being, see Figure 4.10. There were four main factors mentioned by participants regarding their mental and physical health in a hybrid work environment. These were **Work-life balance**, **Mental health**, **Focus and productivity**, and **Physical movement**.
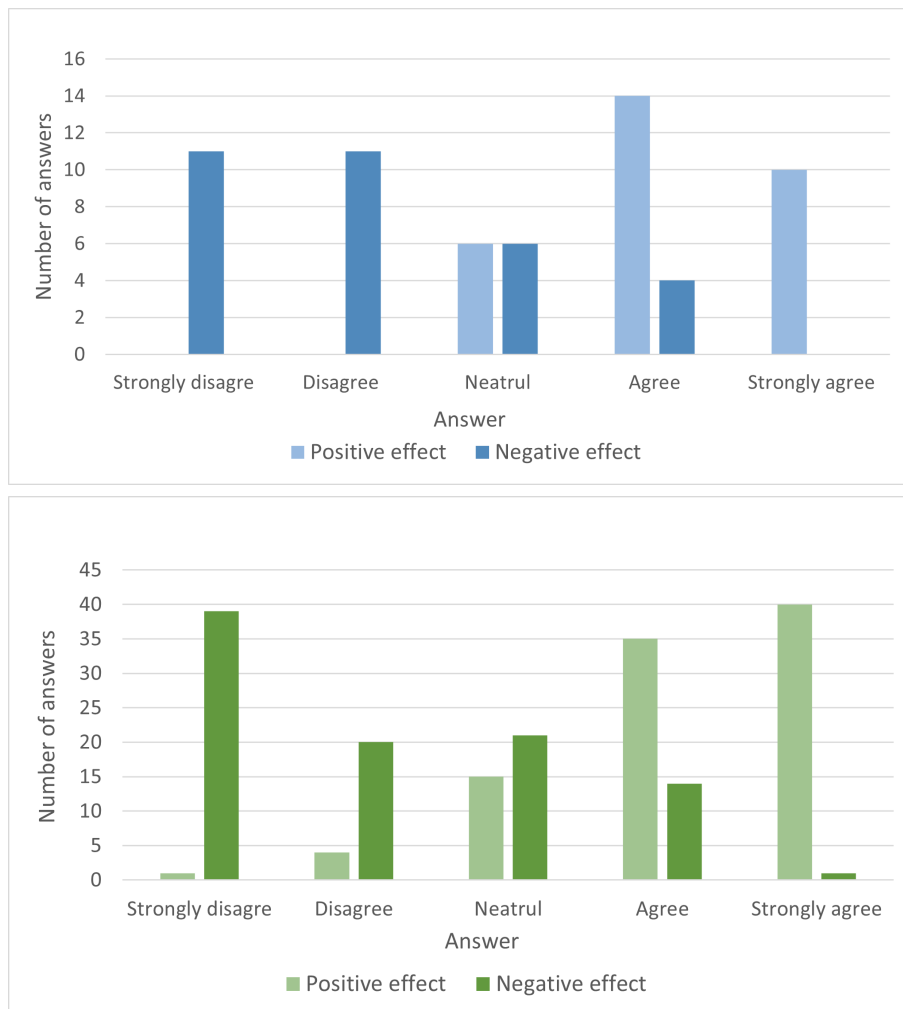
Figure 4.10: The positive and negative impacts of hybrid work on physical and mental health: group A (first) and group B (last)

Work-life balance

Work-life balance is by far the most common reason stated for having a positive experience with hybrid work. Work-life balance can include several different experiences and is unique for every individual. But in its essence, a good work-life balance means your professional work-life and your personal life are in harmony. Some individuals in our survey are less specific about exactly how hybrid work created a better work-life balance and simply stated that it did. Other participants described reasons they experienced a better work-life balance with hybrid work. Examples of this are, less commuting, easier to manage family and kids, more time and flexibility for household tasks, and easier to fit in private appointments.

Less commuting was frequently given as an explanation for improved work-life balance in both groups A and B. When working from home the need to commute to and from the office is eliminated. As one individual explained it thus: *"Less commuting is a big plus, saves time for myself and my loved ones."* The time saved is according to our participants often used for more time for hobbies such as working out or extra time to spend with the family, the ability to pick up kids from school etc. Less commuting also saves the individual money as mentioned by a participant from group B. This can be money for fuel, parking fees, or public transportation.

The flexibility that hybrid work creates was mentioned by several participants as a major factor that leads to an improved work-life balance. The ability to choose which days are spent at home and which are spent in the office seems to help individuals plan their lives to become less stressful. One individual in group B explained it as this: *Everyone on my team has benefited from having the possibility of working remotely. Especially co-workers with young kids and pets for example thanks to the added flexibility.*

Mental health

Positive and negative impacts on mental health were mentioned by both groups as an effect of hybrid work. Most of the participant who talked about this aspect had a positive experience and found that hybrid work improved their mental health, unfortunately, this was not true for everybody. Work-life balance was discussed in the previous section and participants' reasoning as to why they think it improves with hybrid work. It is also important to note that good work-life balance leads to better mental health which was specified by individuals in our survey.

One individual in group B described their experience, stating: *"People are much happier remote and we are happy when we see each other, there's no burnout."* This quote underscores the significant impact of social interactions with colleagues on one's mental well-being. Participants in both groups expressed contentment and happiness with the social interactions they experience in hybrid work settings. However, they also indicated that they would find 100% remote work too isolating. For instance, one participant from group A shared their perspective: *"I used to work 100% remote. That was bad for mental health. It's good to meet your colleagues a few times per week."*

Nevertheless, there were a few participants in group B who felt that the amount of social interaction in hybrid work was insufficient. Some expressed feelings of loneliness and being unseen. Notably, one individual who missed social interactions lived in the countryside, which amplified their sense of isolation. Another participant from group B highlighted how an individual's private social life influences their contentment or loneliness during working hours. They commented: *"When done in excess, I feel isolated. I wouldn't want to work only remote. I believe there should be a balance. I have a family and a rich social life outside of work, but for single people, I think the negative effects could be greater."*

Focus and productivity

According to several participants in group B of our study, a hybrid working environment positively impacts focus and productivity on an individual level. Many developers explain that they can easily focus at home and is easier to solve complicated problems. One developer explained their experience as *"I can focus more on mentally challenging tasks at home, it's easier to program without distractions."*

A common reason given for why it is easier to focus at home is the working environment. According to many answers we got people experience working from home is a calmer and quieter environment, with less distracting elements. Some participants also preferred their working setup at home and appreciated being able to leave their stuff and continue the next day with everything unmoved from the previous day. This comment encapsulates many of these feelings, *Silent work environment. I don´t have to run around and get stressed over fully booked conference rooms. I can leave my stuff and continue next day, with my notes. Don´t have to bring everything with me all the time. I don´t get interrupted all the time any more."* It is worth noting that the company where group B works uses an open workspace layout at their office.

It is not only focus that is improved according to some participants in group B once productively is also heightened. This fact is according to many because of improved focus, as one participant explained: *"I can concentrate and get so much more done in shorter time."*

Physical movement

Moving the body is important for once physical health and is something impacted by hybrid work according to our survey.

As discussed in the previous Section hybrid work can increase physical activity by freeing up more personal time and making it achievable after working hours. This was true for this individual in group A, *"It's easier for me to do sports, as I can't drag my gear to the office."*

However this was not the case for everybody, participants in both groups A and B explained they got less movement when working from home. The reason for this is less everyday movement such as walking or biking to and from the bus/work but also no walks to a lunch restaurant, no stairs to get to the meeting, for example.

Chapter 5

Discussion

During our case study, we have gained significant insights into hybrid work within an agile team. In this chapter, we will discuss our findings from both the interviews and surveys, and discuss topics of interest to our study. The discussion is organized according to our research questions, aiming to clearly address each one. Additionally, we have included Section 5.5 that discusses the limitations of our study.

5.1 Current hybrid work practices (RQ1)

Hybrid work is a broad term that can be implemented in various ways. We examined its utilization in our case company and among our other companies. A majority of our participants utilize the ability to work remotely to some extent. We explore the reasons individuals choose to work remotely or from the office, highlighting personal preference and company guidelines as major factors. Our main case company and several others enforce guidelines favoring a majority of work in the office. Lastly, we delve into the digital tools used by individuals and teams to facilitate hybrid work, particularly in communication and collaboration.

5.1.1 Extent of hybrid work

We found a great variation in how much our participants worked remotely versus in the office. Individuals ranged across the entire spectrum from 0% remote to 100% remote work. In our surveys, the average amount of remote work was around 67%, while in our interview the average was much lower at 32%. Various factors influenced these decisions, which we have grouped into **company policies**, **company position**, and **personal preference**. We will discuss these in greater detail shortly.

One noteworthy detail we found in our study is that, despite the wide range of remote work arrangements, most participants were happy with their current balance between in-office and remote work. We believe this satisfaction stems from the individual accommodations made possible by the flexibility of hybrid work. Two individuals with completely different preferences for remote work can still be equally happy with their current situations.

Our study also revealed that if employers offer hybrid work, most employees will take advantage of this option to some extent, splitting their working hours between the office and their homes. We think this trend will permanently alter what software developers expect from their employers. After working successfully in a hybrid setting, they will likely consider it an important factor when choosing future employers. This perspective is reflected by Trivedi and Patel [31]. The authors looked at the public perception of hybrid work from social media and found that most people viewed hybrid work positively. They therefore recommended that companies find ways to incorporate hybrid work into their businesses.

Company policies

We found that our main case company and most of our other case companies have guidelines regarding hybrid work. These guidelines can vary between companies, but the most commonly mentioned guideline was: the majority of time spent in the office. This guideline was observed in our main case company as well as in a few other case companies.

Several participants stated that even if there were official guidelines, they and their team did not follow them. The reasons varied, but it mostly boiled down to the guidelines not being practical for their team. For example, in one team, the members were spread out across different locations, so working in the office would not facilitate in-person meetings with their teammates.

Our main case company had the official guideline that *"a majority of work should take place in the office."* However, 33% of the survey participants from the main case company stated that their company had no guidelines, and 18% did not know. This indicates a significant number of employees are unaware of the company guidelines. The reasons for this are not entirely clear. One theory is that management has not effectively communicated the information to everyone within the organization, leading employees to believe that their way of working is an informal agreement within the team or that they can do as they please.

This possibility seems plausible when we examine how much the participants from our case company worked remotely. A majority of participants claimed they worked more than 50% remotely, directly contradicting the guideline. However, there might be an error in our data, making a definitive conclusion difficult to draw. We discuss this further in Section 5.5 on limitations.

Company position

The role or position an individual holds within a company may influence how much time they spend working remotely versus in the office. This distinction is evident when comparing the average work locations of our interviewees and survey participants. On average, the interviewees spent more time working in the office than the survey respondents, including those from the case company. Notably, all interviewees held leadership roles within their teams, while the majority of survey participants were developers.

We believe it is important for leaders to be actively involved with their teams, and this is often more effectively achieved through in-person interactions. Physical presence fosters better engagement and collaboration within the group. One interviewee also highlighted the importance of leading by example: if a leader expects their team to follow the company guidelines, it is important that they do the same.

In contrast, developers' tasks may be better suited to remote work. Software development is inherently problem-solving, and as will be discussed shortly many developers prefer working from home, where they can focus and maintain a productive flow. This preference for solitude while solving complex problems highlights the difference in how various roles within a company approach remote work.

Personal preference

Within the company guidelines, individuals can choose where they work and to what extent, based on their personal preferences. We identified three main aspects that many people take into consideration when choosing their work environment: **focus**, **learning**, and **work-life balance**.

Focus was mentioned as a reason for working both from home and from the office. When working from home a good home office was mentioned as a factor for better focus. Some participants explained they had a better setup at home and could work undisturbed to a greater

extent compared to the office. Individuals who reported better focus in the office often explained that having small children at home made it hard to concentrate. We observed that a greater number of participants stated they focus better at home than in the office. These findings highlights the variation in personal preferences regarding work environments. This variation is supported by Gratton, who claimed that a person's ability to focus in a given environment is a highly personal experience and that people's "Our capacity to operate at peak productivity and performance varies dramatically according to our personal preferences"[12]. For one individual, the home might be the space where they feel most focused, perhaps due to a well-equipped home office where they can work undisturbed and with confidence in their tasks. For another person, the office might be the best place for focused work for opposite reasons—they might be new to their position and require support, or their home environment might not be suitable for focused work.

Learning new things may be more of a challenge when working remotely. This was indicated by our participants who mentioned that it is easier to ask spontaneous questions in an office setting. Just hearing people talk about their work can provide a better understanding of the bigger picture, which can be especially helpful for those new to a team.

Given these findings, we believe it is beneficial for new team members to work more from the office. The ability to easily interact with colleagues and absorb information through casual conversations can significantly enhance the learning experience for new employees.

Work-life Balance improving was by far the most common reason stated for choosing to work remotely. The flexibility to be able to work from home when needed was a great help for many, especially individuals with pets and children. In a later section, we will discuss in detail why many of our participants found that having the ability to work remotely improved their work-life balance.

5.1.2   Digital tools

Digital tools are vital for the successful implementation of hybrid work. Employees need easy and effective ways to communicate with their teammates and colleagues, access information such as tasks and boards from home, and use development tools and code repositories, among other needs.

In our study, we found several different tools used for making hybrid work possible. These tools serve various purposes, including configuration management, communication (both written and video formats), task management, whiteboard functionality, and more. The specific tools and functionalities needed can vary from team to team; for example, not every team may need the ability to virtually draw their ideas on a whiteboard. Some tools may serve similar or identical purposes, raising the question of which tools are necessary and beneficial for the team. For instance, at the company where our interview study took place, there were three options for communication that didn't involve face-to-face interaction: MS Teams, Slack, and email. Additionally, some employees had used a fourth program, Discord, but it was banned for security reasons.

Many of our participants expressed satisfaction with the digital tools used in their team. However, two issues were raised: an overabundance of tools and communication channels, and concerns about information security. Despite these critiques, it is fair to say that without the many tools and technologies we have today, hybrid work would be impossible.

Amidst the multitude of options available, it's essential to recognize potential downsides. Our study identified two critical pitfalls to consider when selecting and utilizing tools to support hybrid work within teams

- Over-reliance on multiple tools for the same or similar tasks.

- Security concerns regarding the protection of information and ensuring proper handling.

When many tools offer similar functions, it's crucial to evaluate their necessity within the team. An excess of tools can lead to confusion, clutter, and information loss. This observation was corroborated by an interview study conducted with developers from GitHub. The researchers found that an abundance of communication channels doesn't necessarily translate to better outcomes. It can lead to misunderstandings and misinterpretations, such as failing to disseminate information uniformly across all channels or providing incomplete information to interested parties.[9]

When there are many communication tools and channels, information can be spread out over a large number of locations. This can potentially lead to security risks. It is harder to keep track of where information is stored and who has access to said information. In many companies, not all information is meant to be shared with everyone in the organization. When there are many different places where information can be shared, including private messages, it becomes difficult for those responsible to ensure that only authorized individuals can access sensitive information. There can also be risks involved with certain tools and sensitive information. In some programs, the company that owns the tool also owns the information shared within the program. This can be problematic if company-sensitive information is stored in those programs. It was for this reason that our main case company banned the program Discord.

5.1.3 Tracking Work Locations

As we will discuss in further detail in Section 5.2, communication and collaboration are important parts of different agile methods. How a team communicates and collaborates differs depending on the team members' working locations. We, therefore, asked our participants if their team had any system or digital tool in place for keeping track of where everyone was working on any given day. A significant number reported that no such system existed. Many of the affirmative responses indicated that their system was something very simple, like updating their status in MS Teams. This shows a high level of trust within teams and between employers and employees.

While we believe this level of trust and faith is positive, we also think a simple reporting

system would be beneficial. Knowing whether an individual is working remotely or in the office can help others determine the best way to contact them. This way, there is no need to search for someone in the office when a quick check could reveal their location for the day.

5.2 Collaboration & communication(RQ2a/3a)

Collaboration and communication are fundamental pillars of agile work, critical for success, especially in a hybrid mode. Our investigations reveal that many team members express satisfaction with the communication and collaboration within their hybrid teams. According to de Souza Santos and Ralph, successful communication is particularly important when working remotely. Good communication, according to these authors, has a positive impact on group cohesion [11]. Different teams and companies use various approaches to enable effective communication and collaboration. A common approach we observed was using chat tools such as Slack for communication both within the team and beyond, and MS Teams for both chat messages and video meetings. Many teams and companies tried to enable smooth communication and collaboration by ensuring that team members meet each other at least a few days a week. We found two primary factors that contribute to this satisfaction with their teams' communication and collaboration: **effective tools** and the **nature of hybrid work.**

5.2.1 Factors contributing to effective communication and collaboration

As previously discussed, tools play a significant role in enabling seamless communication. If the tool is easy to use and fulfills its purpose effectively, more people are likely to use it. We received many responses highlighting the kinds of tools used for communication, with team members expressing satisfaction with them.

Hybrid work offers distinct advantages compared to fully remote or entirely in-office setups. While remote work can present challenges such as fostering team spirit, encouraging natural collaboration, and maintaining a sense of connection to broader goals, these issues can be mitigated through a hybrid approach. Meeting in person a few days a week enhances team spirit, facilitates face-to-face communication, and provides visibility into collective efforts beyond individual contributions.

In contrast to fully in-office work, a hybrid approach enables individual choice. It may foster a healthier work-life balance, along with other benefits discussed in Section 5.3 on employee well-being. However, it's important to recognize that the effectiveness of hybrid work depends on various factors beyond the hybrid model itself, such as team dynamics and leadership.

There is, however, one major difficulty with a hybrid approach brought up again and again, this being hybrid meetings.

5.2.2 Meetings in hybrid work

Meetings are a significant part of the workday for many professions. This is true for team members in agile teams as well. Regular meetings are a core aspect promoted by several agile methods. This raises the question of how these meetings can be achieved when the team is working in hybrid mode. We identified three ways a meeting can be held in a hybrid setting: **in-person meeting**, **fully remote meeting**, or a **hybrid meeting**. In our study, we found that many participants considered hybrid meetings to be a challenge, as well as deciding which meeting type worked best for different types of meetings.

Hybrid meetings are necessary for hybrid work to be effective, but not all meetings are suitable for this format. In our study, we found that many participants preferred in-person meetings for discussions involving complicated or divisive subjects. They found that discussions run more smoothly in person and it is easier to read people and their intentions when in the same room. However, not everyone had negative feedback about hybrid meetings. Some participants appreciated the flexibility they offer. Simpler meetings with less difficult discussions were often mentioned as suitable for a hybrid setting. An example of this type of meeting might be a stand-up meeting within the team.

The ratio of individuals meeting in person versus those joining remotely also impacts the success of hybrid meetings. One interviewee explained that when the majority of participants are in the same room, it is easy to forget those joining remotely, resulting in their reduced involvement in the discussion. Conversely, another interviewee noted that when most participants are online, the need for the in-office attendees to sit together diminishes. The optimal division between in-office and remote participants appears to be a 50-50 split to achieve the most effective hybrid meetings. While this might not always be possible, it is something to keep in mind when planning meetings.

Technology was mentioned in conjunction with hybrid meetings. A wide range of equipment is available to facilitate these meetings, such as big screens, video cameras, microphones, and speakers in the meeting room. In our study, we found that while this technology can help conduct successful meetings, a few difficulties might arise. Setting up and ensuring all the equipment works correctly can be challenging. One interviewee explained that it was initially a struggle to get everything to function properly. This troubleshooting can take time away from the meeting and discourage people from using the equipment.

Fully remote meetings are an alternative to hybrid meetings. Some participants found this preferable to hybrid meetings. Since everyone can join online from their desks, there's no need to find and book a meeting room, which can be a significant advantage in offices with limited meeting spaces. Additionally, no extra equipment is required as everyone uses their computers, ensuring that all participants join the meeting under the same conditions. However, this approach has its own challenges. The ease of face-to-face discussion is lost, and meetings might feel less personal. Some believe this can be mitigated by turning on cameras and microphones, creating a greater sense of everyone being in the same room. However, not everyone may have a suitable home environment for this, and in larger meetings, it might become distracting.

Considering all these insights, we have categorized several key points that we believe are important for the team to consider in order to have the best possible meetings:

- Deciding which meetings work best remote, hybrid, and in-person.

- Decide if and when the camera and microphone should be on.

- Find meeting tools and equipment that work for the team.

- Respect the agreement decided by the team.

5.3 Well-being (RQ2b,RQ3b)

Well-being was a recurring theme in our interviews and surveys. Many participants had strong opinions on this topic, as their well-being was significantly impacted by working in a hybrid setting. The majority of participants reported that hybrid work positively affected their well-being, commonly citing improved work-life balance and mental health. However, it's important to note that not everyone had a positive experience. A few participants mentioned feelings of increased loneliness and isolation. Some also expressed a desire to work more or less remotely than their current arrangement allowed.

5.3.1 Work-life balance

Work-life balance was a common theme in our study. It was a significant reason participants chose to work more remotely and why they had a positive experience with hybrid work. But what contributed to this increased work-life balance? We identified two main factors that participants found to enhance their work-life balance: **less commuting** and **flexibility**.

Less commuting

Many employees face long commutes to work, as reflected in our results, with extreme cases such as one interviewee enduring a 2-hour commute each way. Remote work eliminates this travel time entirely, providing individuals with more time outside of work. Our participants used this extra time in various ways, such as dedicating more time to hobbies and spending quality time with their families. For instance, one survey participant mentioned being able to pick up their child from daycare while working from home, which was impossible when they were fully office-based.

Flexibility

The flexibility to choose when to work from home significantly enhanced the work-life balance of many participants. The flexibility offered by hybrid work made it easier for individuals to manage everyday challenges more effectively. For instance, they could be home with their kids or pets as needed, be present when a carpenter or other service provider visited, avoid the hassle of transporting fitness equipment to the office when planning to exercise afterward, and take care of household chores such as laundry during breaks.

5.3.2   Mental health

Work plays a significant role in people's lives, occupying much of their waking hours and inevitably influencing their mental health. Our investigations revealed that the majority of participants felt that hybrid work has a positive impact on their mental well-being. We have identified several reasons from our study that can affect an individual's mental health. Interestingly, these same categories can also be used to categorize both positive and negative experiences. This underscores the variability of experiences within hybrid work arrangements, highlighting that what may be positive for one individual may not be the case for another.

Work-life balance

A healthy work-life balance can significantly benefit a person's mental health. Feeling a sense of equilibrium between work and personal life is crucial, as it allows individuals to allocate time to prioritize what matters most in their lives. This was evident in our survey results, where participants reported improved mental health simply due to a better work-life balance.

Social interactions

Social interactions are an essential part of the human experience and crucial for a healthy lifestyle. When working from home, the amount of social interaction often decreases. This was mentioned as both a positive and negative aspect by different participants in our survey. One interviewee, who identified as an introvert, explained that the ability to be alone and recharge on some days was a positive aspect. Several others mirrored this sentiment in our survey. However, this was not the case for everyone. Some participants expressed a desire to spend more time in the office to interact with colleagues and felt lonely and unseen when working from home. Another participant living in the countryside mentioned that working from home could be isolating due to their remote location.

Physical movement

Physical movement is beneficial for people's mental health. When working from home, some of our participants reported getting less everyday movement, such as walking or biking, because they had no need to leave their homes and missed the natural movement associated with commuting. However, we also received responses indicating that some participants experienced more physical activity while working from home. One interviewee mentioned having time to take a walk before starting work. Several survey participants explained they had more time for workouts and sports after work, leading to more physical movement than simply commuting, such as walking to and from the bus station.

Impact on individual mental health

As shown in this section, several factors can impact an individual's mental health when working in a hybrid setting. We believe that for the majority of individuals, working in a hybrid setting is beneficial for their mental health. The key factor is the ability to choose how much or how little to work from home. For example, the need for social interactions varies from

person to person, and family situations differ—some might need to be at home more than others to manage their responsibilities. Hybrid work allows for a degree of personalization to accommodate these needs.

However, this flexibility comes with a certain amount of individual responsibility to make hybrid work a positive experience. Physical movement might not come as naturally when working from home, so it is up to the individual to ensure they incorporate daily exercise. Additionally, individuals might choose the most convenient option rather than the one that is most beneficial for them. For instance, someone who thrives on social interactions might stay home more often due to a long commute, which could negatively impact their mental health.

We believe that having company guidelines for the amount of remote work might mitigate this issue. Requiring individuals to come to the office on certain days can ensure they interact with their team and colleagues, thereby supporting their mental health.

5.4 Productivity (RQ2b,RQ3b)

Productivity among team members is a crucial factor in the success of an agile team. The conditions that foster productivity can vary significantly from person to person. As discussed earlier in Section 5.1 about personal preferences, individuals have different preferences for their working environments, and their focus is better in certain environments. We believe that focused work often leads to productive work, as individuals concentrating on a task are more likely to make substantial progress.

However, we argue that factors beyond focused work contribute to a productive environment. Effective communication and collaboration are also essential for creating a productive team. One of our interviewees highlighted that certain tasks were better suited to focused work at home, while another emphasized how much more efficiently some problems could be solved through collaboration at the office. Mentally challenging programming tasks was given as an example from one survey participant for a task that is easier to do from home, due to fewer distractions. This ability to choose the right location for different tasks is facilitated by hybrid work models, which provide the flexibility to select the most suitable working environment. We believe this flexibility can lead to more efficient teams and boost both individual and team productivity.

The positive impact of agile and hybrid teams on productivity is supported by a study conducted by Krzywdzinski [16]. According to Krzywdzinski, agile and hybrid teams demonstrated slightly higher productivity levels at both the individual and team levels than non-agile hybrid teams.

5.5   Limitations

No study can encapsulate every aspect of a topic there are limitations present and, this is the case for our study as well. In this section, we will discuss the limitations of our study.

External validity concerns the extent to which our results might be generalized across different companies and organizations, and to what extent they might find a use for our findings in their context [26]. The majority of data gathered in this study was from our main case company. All of the interviews were conducted there, and the majority of survey responses were from this company. This may cause our results to be disproportionately influenced by the specific characteristics and culture of the main case company. To mitigate this risk, we included participants from other case companies in our survey. However, the number of participants from these other companies was only about a third of the size of the survey participants from the main case company. Specifically, we had 95 responses from our main case company but only 30 from our other case companies. This disparity in sample sizes suggests that our findings might not be fully representative of a broader range of companies. Future research is needed to generalize these findings over a larger and more diverse group of companies

Internal validity refers to the extent to which a study accurately identifies a causal relationship between factors without interference from other variables. When additional factors are overlooked or not properly accounted for, they pose a threat to internal validity [26]. In our study, we identified a specific potential risk to our internal validity. Our main case company has hired a significant number of consultants. Although it was confirmed that the same rules applied to both company employees and consultants, it is possible that the consultants answered the survey from the perspective of their consultant company's guidelines. This threatens the validity of our results, particularly regarding participants' awareness of the main case company's guidelines on hybrid work. This effect could have been mitigated if we had specified in the survey that participants should answer from the perspective of the main case company. In future research, consultants and regular employees could be examined separately to determine if there are differences between these groups. Another risk to internal validity is the misinterpretation of respondents' answers by the researchers. To lessen this risk in our interviews, we sent a summarized version of their answers to the participants, allowing them to verify if our interpretations were correct.

Response bias occurs when participants do not provide truthful or accurate answers to questions. This can happen because they might feel uncomfortable answering certain questions or may fear that their answers could be traced back to the [24]. These factors can affect the reliability of the data collected in a study. To mitigate this risk we assured our interviewees before their interview that their participation was completely voluntary, they could skip any questions and no identifiable data would be shared. In the case of our survey, we did not ask for names or any other traceable information

Sampling bias occurs when the group selected for a study does not represent the larger population, making it difficult to generalize the results [27]. In our study, the qualitative data was gathered from five interviews. All the participants had similar roles within their teams, no-

tably, they all had leadership responsibilities. This limits our qualitative results to only a small subset of individuals and roles within agile teams, thereby risking sampling bias. To mitigate this limitation, we conducted a survey that included participants from all roles working in agile teams.

Chapter 6
Conclusions and future work

Hybrid work has rapidly become a popular trend in software development, raising questions about its application, optimal usage, and impact on individuals and companies. This is particularly interesting in the context of agile development, which relies heavily on collaboration and close proximity among team members. In this chapter, we will summarize our findings and draw conclusions based on our research questions regarding hybrid work in agile teams. Additionally, we will explore potential areas for future research that build on our findings and may provide further valuable insights.

6.1   Insights about hybrid work

We found that hybrid work practices varied significantly between organizations and teams. Many companies established guidelines and policies regarding hybrid work **(RQ1a)**, primarily concerning the amount of remote work permitted. Our main company, along with a few others, had a guideline that the majority of work each week should be done at the office. Interestingly, many employees at our main company were unaware of this guideline. In some cases, employees knew of the guideline but their teams had chosen to forgo it. However, it is important to note that some of the other companies in our survey had no guidelines regarding hybrid.

There was a large number of digital tools being used by our main case company as well as the other case companies from our survey **(RQ1b)**. These digital tools serve a wide range of functions. Some were planning-related, such as keeping track of tickets with JIRA or using whiteboard functionality remotely with Miro. However, the most common digital tools used by agile teams working remotely were communication tools. These communication tools had varying approaches to communication: some focused on chat, others on video communication, some on more classical written communication such as email, and some offered a mix of all. We found it important for teams and companies to evaluate which digital tools were being used and how they worked. An abundance of tools, especially multiple tools for similar tasks such as communication, could lead to information and communication being spread out over many sources. This opens up the possibility of missed information and diminished information security.

As hybrid work has increased in popularity in just a few years this way of working is relatively new for many individuals and companies. This of course has led to some issues emerging when hybrid work has been implemented in agile teams. Interestingly, however, most criticisms emerging from our participants have to do with remote work and not hybrid work. Several participants explained that problems and difficulties they had had when working only remotely were improved or gone when switching to hybrid. For example one of our interviewees explained when their team had worked remotely they had often forgotten to collaborate on tasks. Now when they meet a few times a week at the office their collaboration has improved again. This phenomenon can be seen in factors relating to communication and collaboration **(RQ2a, RQ3a)**. Remote work can make it harder for a team to develop a good team spirit, collaboration does not come as naturally and the larger team goals might be easier to miss. We found that just meeting a few days a week when working in hybrid mode mitigates a lot of these issues and creates a tighter team. Meetings are a big part of everyday communication and collaboration within and between agile teams. We found that meetings are a challenge for many teams, especially hybrid meetings. Not all types of meetings fit well within a hybrid meeting approach. Meetings with a lot of discussions or on sensitive or decisive topics work best as in-office meetings. We found it helpful for the team to decide which meetings work best remotely, in the office, or hybrid for the team and plan accordingly.

Well-being in a hybrid work environment was a topic on which many of our participants had strong opinions **(RQ2b, RQ3b)**. A majority of our participants felt that hybrid work had a positive impact on their well-being. Several factors contributed to this perception. Im-

proved work-life balance was a major factor for many individuals, achieved in part by reduced commuting and the added flexibility of hybrid work. Improved mental health was another significant factor, with many participants reporting better mental health when working in a hybrid setting for various reasons. The ability to choose when and how much to work from home was crucial for many, as it allowed individuals to tailor their work environment to their personal needs. For example, one individual might experience improved mental health with a lot of social interactions and therefore choose to work more from the office, while another might thrive on fewer interactions and therefore spend more time at home. However, it is important to note that not all participants experienced improved well-being in a hybrid setting. Some reported increased feelings of loneliness, isolation, or frustration over not being able to work their preferred amount of time remotely or in the office. We found that productivity in a hybrid setting was largely influenced by where individuals had the best focus. Some participants found they could focus better at home, where they had their own setup and could work undisturbed, while others performed best in the office due to their home environment not being suited for focused work. Individuals new to their positions often had improved productivity in the office due to the challenges of learning new tasks and asking questions remotely.

6.2 Future work

While we have gained some insights into hybrid work practices and challenges in agile software development teams, we have also identified a number of areas for further research. These include strengthening the validity of our findings, as well as, exploring additional questions within this broad and ever-evolving subject.

An area for potential enhancement in our thesis involves studying the generalizability across different companies. While our qualitative data primarily focused on one main case company, we supplemented this with quantitative data from several other case companies to validate our findings. However, further research could explore whether our conclusions extend to a broader range of companies, particularly through more extensive qualitative data collection. For example, investigating smaller companies, those operating exclusively within Sweden, or firms predominantly engaged in IT development could help generalize our findings and uncover industry-specific insights.

An area for further research involves examining participants' prior work arrangements, specifically whether they transitioned from fully remote to hybrid work or from in-office to hybrid work. Gaining this added insight would provide a deeper understanding of each participant's background and offer a more detailed view of how hybrid work may have improved or worsened aspects of their previous work style. This could help identify whether the benefits and challenges of hybrid work are influenced by participants' prior work experiences.

Another improvement to our study generalization is widening the selection of interview participants. We conducted our interviews with individuals holding leadership responsibilities within their agile teams. Future research could explore whether the results differ when focusing solely on developers within agile teams. Additionally, we included consultants working

for our main case company in our survey and interviews, as the company had the same guidelines for both employees and consultants. It would be interesting to examine whether there is a difference between consultants and directly employed team members in a hybrid setting. Consultants might prefer remote work due to frequently switching teams and companies, resulting in less attachment to their team, or they might need more support due to being new to teams frequently.

Future studies could benefit from incorporating other types of data collection methods than self-reporting. For example, examining performance reviews and sprint documentation might provide a different perspective on the team's productivity during hybrid work. Combining self-reported data with objective performance metrics could offer a more comprehensive understanding of the interplay between agile development and hybrid work.

Future research could explore the optimal ratio between remote and office work in a hybrid setting. Our study concluded that a blend of remote and office work offers the best arrangement for most individuals and teams, providing flexibility for employees to structure their workweek while fostering team spirit and collaboration. However, we did not examine which specific split between remote and in-office work is the most beneficial. It would be interesting to study and compare different ratios to determine the optimal balance for most teams or if this balance is highly individual-dependent. Future research could employ experimental designs to test different ratios and their impact on productivity, job satisfaction, and team cohesion

Future research could investigate popular commercial communication tools to determine which are best suited for hybrid work environments. We concluded that it is optimal to focus on a few tools that work well for both the teams and the company. However, we did not specifically examine these communication tools to evaluate their strengths and weaknesses. It might be that a combination of tools, as was common in our findings, is optimal, or it might depend on the size of the team and company. This research would provide valuable insights into the role of communication tools in hybrid work and offer guidance for companies seeking effective solutions.

An intriguing area for future research is assessing whether advanced meeting room technologies enhance the quality and effectiveness of hybrid meetings. Many of our study participants found hybrid meetings challenging, with some opting for fully remote or in-office alternatives. Our interviews revealed that our main case companies typically equipped their meeting rooms with screens and microphones for hybrid meetings. However, there exist more sophisticated tools, such as cameras and digitally connected whiteboards, that could potentially improve the hybrid meeting experience. Investigating this could assist companies in determining whether investing in advanced meeting room technology is beneficial, or if the additional functionality might be underutilized or even counterproductive.

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Chapter 7
Appendix

Appendix A: Interview guide

Interview Guide

Intro

- Thanks for having me! And volunteering to take part in my recherche.

- The point of this interview is to give a deeper insight into an individual's thoughts and feelings regarding hybrid work and the impact it has on a person, team, and company.

  - Hybrid work is defined as a work environment where employees can choose to work from home or in the office with warring restrictions depending on the company. This results in teams where not everyone is guaranteed to be in the office simultaneously.

- Participation in this study is of course voluntary and you can choose not to answer questions or be removed from the study whenever you want. The answers are anonymous and will not directly be shared with the company. The result and analyze of the answers will be published but without traceability to the participants.

- The data from this interview will be collected by sound recording. Only me and my supervisor will have excess to this recording and it will be stored safely locally and not on any cloud service. Are you okay with this arrangement?

1 Opening questions

1. Tell me a bit about yourself, your education and how long have you been working in the software development industry.

2. Which position do you have at the company and how many years have you worked here?

3. How do your team's work practices relate to agile methodology? For example, regarding roles (Scrum master, product owner), work planning (backlog, user stories, iterations/sprints), and meeting structure (stand-up, sprint planning, end-of-sprint demos, etc).

2 Degree of hybrid work (RQ1)

1. Describe the company's and your team's current practices related to hybrid work. (How much can each team member work from home etc)

   (a) How was this arrangement decided, did the team decide, or is it company policy?

   (b) Are there any specific tools or programs the company offers that help with hybrid work?

2. To what extent do you work remotely (number of days per week/month)? Describe why you choose to work remotely to this extent. (Ex less commuting time, better work-life, more productive, etc)

3. To what extent do you work in the office (number of days per week/month)? Describe why you choose to work in the office to this extent. (Ex contact with colleges, better focus, etc)

3 Impact on mental and physical health (RQ2b, RQ3b)

Studies have shown that working remotely can negatively impact a person well being. This can be mental health such as increased loneliness or physical health for example back problems from a bad working environment. But there were also positive effects noticed such as a better work-life balance. The following questions will relate to mental and physical health in this regard, as mentioned in the beginning you only need to answer what you are comfortable with.

1. How does remote work impact your mental and/or physical health, positive or negative?

2. How does office work impacts your mental and/or physical health, positive or negative?

3. Do you feel mixing the two options negates some of each approach's positive or negative effects?

4 Communication and Collaboration (RQ2a, RQ2b)

1. How does hybrid work impact collaboration and communication in your team and the company?

2. Which difficulties have your team encountered working agile in a hybrid work setting?

   (a) How have you adapted your agile work practices to work in a hybrid mode?

5   Challenges and best practices (RQ2)

1. What is the most challenging part about working in a hybrid work setting?

   (a) Do you have any tips or tricks for improving team performance in a hybrid work environment?

Thank you!

- Thank you for your time!

- I will summarize your answers, and if you have time I would like to email this short summary to you, so you can double check I got all the information correct.

- Is anyone else interested?

Appendix B: Survey

Q1

1. Is it possible to work in hybrid mode at your company? Can you work both from home and from the office?

(If the answer is "No" you can submit the survey without answering the rest of the questions.)

○ Yes
○ No

Q2

2. What is your role in your team?

☐ Developer / team member
☐ Team leader
☐ Product owner
☐ Scrum master
☐ Tester
☐ Other

[ ]

Q3

3. How many years have you been a part of your current team?

[ ]

Q4

4. Does your employer have any guidelines for the extent of remote vs office work?

○ Yes
○ No
○ Don't know

If yes what are they?

[ ]

Q5

5. Please, estimate the average extent (in %) to which you work from outside the office (remote).

◄► ————————————————————

Procent

Q12

6. I am currently happy with the amount of remote vs in office work that I perform.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

Example

[   ]

Q6

7. Does your team have a way to keep track of which team members are in the office or not?

- ○ Yes
- ○ No
- ○ Don't know

If yes then how?

[   ]

Q7

8. My team have faced challenges implementing a hybrid work environment.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

Exampels

[   ]

Q8

9. My team's approach to working agile has changed due to hybrid work.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Neutral
- [ ] Agree
- [ ] Strongly agree

Example

```
```

Q9

10. Hybrid work has negatively impacted my team's communication.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Neutral
- [ ] Agree
- [ ] Strongly agree

Example

```
```

Q10

11. Hybrid work has had a positive effect on my mental and/or physical well-being.

- [ ] Strongly disagree
- [ ] Disagree
- [ ] Neutral
- [ ] Agree
- [ ] Strongly agree

Example

```
```

Q11

12. Hybrid work has had a negative effect on my mental and/or physical well-being.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

Example

[ ]

Hybridarbete: Arvet från Covid-19

POPULÄRVETENSKAPLIG SAMMANFATTNING **Marie Ask Uggla**

Hybridarbete har blivit betydligt vanligare i en post Covid-19 värld. För många som arbetar på kontor, specifikt inom IT, så ser vardagen väldigt annorlunda ut idag än för 5 år sen innan pandemin startade. Vi har undersökt hur detta påverkar IT-team, vars framgång beror på bra och nära samarbete i gruppen.

När IT industrin fortfarande var ung var IT-system och program ofta mycket mindre och kunde utvecklas av enskilda individer eller små grupper. Till exempel utvecklades det kända spelet Tetris 1985 av en enda person, Alexey Pajitnov. Detta är inte fallet idag, att utveckla IT-system är stora projekt som ofta innefattar hundratals om inte tusentals människor. För att hantera samarbetet mellan alla dessa människor finns olika teorier och metoder. En vanlig och övergripande metod inom IT-utveckling kallas agil utveckling. Det finns flera olika teorier om hur man jobbar agilt men sammanfattningsvis innebär det att jobba i mindre team, vara redo för förändring, jobba nära kund och ofta publicera sitt arbete. Många agila metoder skapades med förutsättningen att alla i teamet skulle jobba på samma ställe. Detta ställs på sin ända med hemarbete.

År 2020 blev många företag tvungna att skicka hem sina anställda för att minska smittspridningen av viruset Covid-19. Detta innefattade många agila utvecklingsteam. Helt plötsligt behövde man anpassa sitt arbetssätt och börja samarbeta endast online. Med tiden började samhället öppnas upp igen vilket innebar att hybridarbete började bli vanligt. Hybridarbete betyder att vissa var kvar hemma medan några kunde jobba från kontoret. Detta blev mångas nya normala och är en självklarhet i många företag.

I vårt examensarbete undersöker vi hur just de agila teamen påverkas av hybridarbete. För att ta reda på det intervjuade vi flera personer som arbetade i agila team på samma företag. Vi skickade även ut enkäter till personer som jobbade i agila team.

Vi kom fram till att de flesta anställda väljer att till viss mån jobba hemma om detta erbjuds av arbetsgivaren. Hur mycket det innefattar är väldigt varierande, både mellan individer och företag. Många företag har skapat riktlinjer för hur mycket anställda får jobba hemma. En vanlig riktlinje är att majoriteten av tiden ska spenderas på kontoret. Bland dem som väljer att utnyttja möjligheten att jobba hemma är den ökade flexibiliteten ett stort argument för deras val. För många är livspusslet enklare att få ihop om man kan vid behov jobba hemma. Denna ökade flexibilitet och valmöjlighet ledde till ett ökat välmående hos många personer.

Vi hoppas att vårt arbete ska ge en insikt i hur hybridarbete utnyttjas i dagsläget av agila team. Vi hoppas även att detta arbete kan vara vägledande för team och företag för att lyckas med sin hybrida resa.