Little Stakeholder Communication in Distributed Scrum Projects During the Covid-19 Period

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Abstract. Agile methods have recently been popular by software development teams, with Scrum being the prominent process over the last decade. In Scrum, the Scrum Master serves the developers, the Product Owner, and the organization by coaching, leading, mentoring, planning, removing impediments, etc. Additionally, the Scrum Master is accountable for establishing the developer's effectiveness. The global pandemic of Covid-19 changed the world unexpectedly in March 2020. Work has mostly shifted to a remote setting, and meetings have mostly transferred to being remote. People have had to adapt to these new circumstances worldwide. This research aimed to explore the changes that Scrum Masters and their teams have had to face during the first year of the Covid-19 period by increasing distributed working and the changes in the Scrum Master's responsibilities. The results indicate that the most significant change has been decreasing communication with stakeholders and users after working more distributed. Additionally, not meeting socially, as the teams did before, has been a big challenge for the Scrum Teams.

Keywords: Scrum Master · Stakeholder communication · Distributed work

1 Introduction

The work environment of many professions has undergone many changes since early 2020 worldwide. People have been working from home a lot more under different circumstances. Some have their spouses also working from home and children taking their school lessons through virtual tools. Some people had to do their work from their kitchen or their bedrooms with different equipment and privacy standards which can depend on circumstances, and affect people's focus on work routines.

According to the annual State of Agile Survey, 95% of organizations surveyed practice Agile development. Of all the Agile frameworks and methodologies, Scrum is the most popular method or used by 58% of organizations. The same survey informs that 81% of organizations have Agile teams where all the team members do not work at the same location. Distributed teams may become a "new normal" due to the current worldwide health crisis [23].

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In Scrum methodology, a Scrum Team consists of three different roles: the Scrum Master (SM) role, the Product Owner (PO) role, and the Scrum Team (ST) role, a development team of 10 or fewer developers. The PO is accountable for maximizing the value of the product resulting from the work of the developers. His/her focus is on building the right product. The ST developers have the skills required to deliver the business value requested by the PO as their focus is mainly on building the product right [16, 19].

The Scrum Master role is described by him/her: *being a coach*, coaching the team members in self-management and cross-functionality, *being a servant leader*, leading the Scrum Team to ensure the highest priority needs are met; and *having process authority,* which involves that the Scrum Master should ensure that the team enacts and adheres to the Scrum values, principles, and practices, along with the team's specific approach [6, 16, 19, 20]. Schwaber and Sutherland additionally mention that the Scrum Master's role is to be leading, supporting training, and coaching for the organization, especially while the organization is adapting to using Scrum [19]. Additionally, the role of the Scrum Masters includes planning, ad advising on the implementations of Scrum within the organization [19]. Noll et al. did a systematic review to identify activities performed by Scrum Masters. These activities were process facilitation, ceremony facilitation, and impediment removal [15]. Another study on the Scrum Master's responsibilities by Bass reveals six most common activities: process anchoring, stand-up facilitating, impediment removing, sprint planning, Scrum of Scrum facilitating, and integration anchoring [3]. An online survey from 2019 revealed that 91% of IT professionals with Scrum experience think that the Scrum Master role is important for the success of the Scrum methodology [9].

The scope of this paper is to study how the change that Scrum Masters and their teams have experienced from being entirely or partially co-located to being a fully distributed team during the Covid-19 period. The focus is on the role of the Scrum Master, studying particularly, if and then how, the responsibilities of the Scrum Masters, changed while their work was more distributed during the Covid-19 period. Distributed work entails that all team members are working from different locations. The rationale behind the selection of focus is that the Scrum Master acts as a bridge between the developers and the Product Owner and therefore is aware of the changes that have impacted the Scrum Team since working from home. We ask the following research question:

What changes did distributed work during the Covid-19 period entail for factors included in the responsibilities of the Scrum Master role?

In this paper, we first give a short overview of the background literature, including summarizing the responsibilities of the Scrum Masters listed in core literature on the subject and the effects already described by the Covid-19 period on distributed work. We describe the data gathering conducted with interviews, the participants, and the data analysis method. We describe the results in six themes: the responsibilities of the Scrum Masters, the work environment and procedures, meeting and Scrum events, communication and social interaction, productivity, and the future. We conclude by discussing our results.

2 Background

This section gives a short overview of the literature on Scrum, the Scrum Master's responsibilities, and related work in the field of Scrum in a distributed work environment.

2.1 Scrum Methodology

Scrum is an agile approach for developing innovative products and services [16]. It was defined in 1986 by Takeuchi and Nanaka while studying methods to create new products [21]. Ken Schwaber and Jeff Sutherland developed Scrum as it is known today in the early 1990s [19]. They presented it first at the OOPSLA conference in 1995.

At the beginning of a project, the Product Owner creates a product backlog in collaboration with the other Scrum Team members and stakeholders. The backlog is a prioritized list of features and other capabilities needed to develop a successful product. It is a constantly evolving artifact [16].

The work within Scrum is in iterations that are called sprints, which are fixed lengths of events of one month or less. A new sprint starts immediately following the conclusion of the previous sprint. Within each sprint, there is Sprint Planning, Daily Scrums, Sprint Review, and Sprint Retrospective. Sprint Planning is for laying out the work in the upcoming sprint and can take about four to eight hours, depending on the length of the sprint. Daily Scrum is a 15-min event for the Developers of the Scrum Team. The primary purpose is to inspect progress within the sprint and adapt the sprint backlog, as necessary. Sprint Review is to examine the outcome of the sprint and determine future adaptations. The Scrum Team presents the work and progress to the stakeholders. The last event of each sprint, the Sprint Retrospective, is to plan ways to increase quality and effectiveness. The focus is on continuous process improvement to help Scrum Teams become great [16, 19].

2.2 The Scrum Master's Responsibilities

The overall responsibility of the Scrum Master has been defined by many researchers. Schwaber and Sutherland state that the Scrum Master is responsible for the Team's effectiveness while serving the Scrum Team and the larger organization [19]. Schwaber states that the Scrum Master makes sure that all the pieces of the Scrum process come together and work as a whole [17]. Schwaber and Beedle state that the Scrum Master conducts daily coordination meetings and removes any impediments that the team encounters [18].

Rubin states that the Scrum Master does this by helping everyone to understand and embrace the Scrum values, principles, and practices and is thereby responsible for supporting the team to gain that understanding [16].

Cohn describes the Scrum Master as both a Servant Leader and someone with no authority over the other Scrum Team members. However, he/she has authority over the process. That gives him/her the control to make decisions when the team does not decide independently. The Scrum Master is there to help the team in its use of Scrum. The attributes of a good Scrum Master are being responsible, humble, collaborative, committed, influential, and knowledgeable [6].

Sochova states that the Scrum Master has the responsibility to seek to build self-organized teams, make all people more active, and make the organization independent at every level [20].

We analyzed in more detail the Scrum Master's responsibilities described in four core publications on the responsibilities of the Scrum Master from Cohn [6]; Rubin [16]; Schwaber & Sutherland [19] and Sochova [20].

The responsibilities of Scrum Masters described in these four papers can be summarized as:

1. *Being a Coach:* Involves coaching the team members in self-management and cross-functionality.
2. *Being a Servant Leader:* Involves being a leader for the Scrum Team who ensures the highest priority needs are met.
3. *Having Process Authority:* involves the Scrum Master ensuring that the team enacts and adheres to the Scrum values, principles, and practices, along with the team's specific approach.
4. *Acting as an Interference Shield:* Involves protecting the Scrum Team from outside interference to remain focused on delivering business value at every sprint
5. *Acting as an Impediment Remover:* Involves removing all impediments that inhibit the team's productivity.
6. *Being a Change Agent:* Involves helping others understand the need for change.
7. *Taking Care of Scrum Events:* Involves ensuring all Scrum Events occur and are positive, productive, and kept within the timeline.

There is some variation in the responsibilities that are described in these four papers. We list which responsibilities are listed in each paper in Table 1.

Table 1. Responsibilities of Scrum Masters listed in the literature

Category	Rubin	Schwaber & Sutherland	Cohn	Sochova
Coach	X	X	X	X
Servant Leader	X	X	X	X
Process authority	X	X	X	X
Inference shield	X			X
Impediment remover	X	X	X	X
Change agent	X			
Scrum events		X		X

The authors all agree that the Scrum Master's responsibilities include being a coach, being a servant leader, having process authority, and being an impediment remover. Rubin and Sochova describe additionally that the Scrum Master should act as an inference shield, and Rubin also includes that the SM should be a change agent. Sochova, Schwaber, and Sutherland state that the SM should be responsible for Scrum events.

2.3 The Effect of the Covid-19 Pandemic

At the time of this data gathering, in April 2021, the Covid-19 pandemic has been active for over a year. People in software development (among others) have had to work a lot more from home. There have only been a few studies about the effect of the pandemic on working according to Scrum methods, but there has been a lot of research done on using Scrum in distributed teams.

The most common challenges found while using Scrum in distributed teams have been issues with synchronous communication. Other issues have been collaboration difficulties, communication bandwidth, tool support, large teams, and office space [12]. In more recent years, the most common issue encountered by distributed Scrum Teams has been communication, especially among stakeholders [24]. Recent studies have shown that Scrum Teams can adopt to distributed software development projects [10]. The new circumstances caused by Covid-19 do not significantly impact the projects [14].

Work Environment and Procedures. Before the pandemic, distributed teams usually consisted of people from different countries or regions, whereas now, former co-located teams have had to work more hours from home than in the office. For teams that were co-located before the pandemic, it was easier to plan meetings when everyone was at the office. Some people stopped working 9–5 since they started working from home [8]. People tend to work more flexible hours, while some team members prefer to work from home because of those flexible hours, fewer interruptions, and having all the tools needed [2].

The reduction of social time during working hours is often passively factored into project and release plans. Therefore, the workday is closer to contracted hours while working from home, magnifying the intensity of the workday that workers have not experienced before. This increases the risk of fatigue and burnout, impacting the overall team, and the product may suffer [11].

The whiteboard is used by Scrum Team members while working co-located, for example during Sprint Retrospective meetings, solving issues, or planning a sprint. However, it has not effectively been transferred into a remote work setting [8].

Meetings and Scrum Events. A recent study revealed that since the pandemic started, more meetings are within teams, and they last longer than before [8]. The most common issues in meetings encountered by distributed Scrum Teams in the past were people going off-topic, together with lack of involvement or low enthusiasm for participation for some team members [24]. The solutions suggested by Wu & Wang are designed to control the rhythm to ensure that meetings do not deviate from the subject and, for participation issues, to consult colleagues or discuss in informal meetings.

There have been increased distractions from instant messaging since the pandemic, which leads to more challenging context switching [8]. The same also applies to emails that can be distracting when everybody is on their computer during meetings, resulting in a lack of focus within teams [11].

Some challenges can occur with Daily Scrums while working in a remote setting. When co-located, problem-solving after the meeting could contain a quick chat after the daily stand-up while remotely, everyone logs out after the meeting [8]. Extending the meeting from 15 min to 30 min with the second half blocked for problem-solving

could solve such a problem [7]. Another suggestion for Daily Scrum to go smoothly in a remote setting is encouraging teams to use video to keep them engaged and focused [7]. Daily Scrum can also be performed through an instant messaging application for consumption by the team at their own pace to reduce waste [11].

Since Sprint Planning can go on for four to eight hours, it is easier to achieve engagement for a more prolonged period when held in person than when working from home. Griffin suggests breaking Sprint Planning down into smaller, consumable pieces (Griffin, 2021). Other suggestions are to encourage prep work ahead of time and agree on what to achieve offline [7].

For Sprint Review, there are suggestions to keep presentation content crisp and concise and to integrate content in one place with one person [7]. Griffin also suggested having pre-recorded demos so the team can consume their own time [11].

Communication and Social Interaction. Good communication in Scrum Teams is essential. The team members exchange valuable information that needs to be transparent to provide a clear understanding which avoids surprises and helps build trust among the team members [16]. In the literature review of challenges of distributed Scrum Teams by Wu & Wang [24], one of the most significant issues was a lack or difficulty of synchronous communication. Synchronous communication is necessary to improve mutual understanding. Other issues were inefficient or ineffective communication due to a lack of suitable communication tools and insufficient network bandwidth. However, the most common issue encountered by distributed Scrum Teams is communication with stakeholders [24].

When it comes to communication, body language can tell us a lot about people's feelings and behavior. Understanding body language and behavior changes during distributed working can be a challenge [8]. This challenge increases for those who do not have a web camera or have it turned off. The human aspect is absent, such as facial expression, body language, and tone of voice, which produces a loss of communication [2].

A recent study of distributed software development teams conducted that the Covid-19 pandemic influenced communication to some extent since the office interactions are not present [2]. For hybrid teams before the pandemic, the fully remote work improved communication since all communication was transferred online [14].

While working remotely, there is a reduction of social time with team members and other co-workers. There are no common coffee breaks, corridor chats, and watercooler conversations, resulting in issues not being revealed as quickly as before. There could be regular social meetings for Scrum Teams [8]. For instance, online virtual coffee breaks increase online communication and interactions [2]. Social meetings can also be hosted, such as virtual parties or games for distributed team members [12].

Productivity. There have been different results from studies on whether co-located teams or distributed teams are more productive. For example, Teasley et al. performed a study that resulted in co-located teams being more productive than distributed teams, even when distributed in the same building [22]. In contrast, Stanford professor Nicholas Bloom performed a study that showed that working in a remote setting can lead to around 14% performance increase [4].

A recent study since the pandemic has indicated that there has been increased response time between Scrum Teams which causes delays [8]. And some team members in a recent case study felt that the situation with the pandemic is affecting their availability and productivity to work [2].

3 Method

With this research, the aim was to explore the changes that distributed work entails for the Scrum Master's responsibility compared to working at the office. Especially we focused on changes in the themes analyzed from the literature: the working methods, Scrum Events, communication and meetings, and productivity in the first 12 months of the Covid-19 period (April 2020–March 2021) compared to the preceding 12 months (April 2019–March 2020).

A qualitative method was conducted in the research using semi-structured interviews with the opportunity to ask supplementary questions. The qualitative method was more suitable than the quantitative for data collection in this study to gain an in-depth and contextual understanding of the impact of working primarily from home during the pandemic in the Scrum environment.

We describe the background of the participants, the conduction of the interviews, and the data analysis.

3.1 Participants

The participants were selected from seven different types of companies to gather different views. The companies were selected according to if they worked according to the Scrum methodology. We chose companies focused on software development or had a relatively big software department.

Eight interviews took place with nine participants from eight companies, five of whom were men and four women. One interview was conducted with two interviewees at the same time from the same company since the participants preferred that. This resulted in two different views, since their teams are separate, and they work on different projects. They answered the questions in turn with different results.

The participants were all either active in the Scrum Master role or comparable roles with Scrum Master responsibilities. Seven of them had completed a Certified Scrum Master course. Six of them had other additional responsibilities: two were project managers, two were quality assurance testers, one was a director, and one was a CTO.

All the participants had years of experience working in the software industry, the average being 17 years. They also had years of experience working in Scrum before and during the pandemic, which was essential to get their views and expertise in shift changing to a distributed working environment. Each of them is responsible for one to three teams.

3.2 Interviews

The interviews were semi-structured and conducted according to guidance from Lazar et al. [13]. All the interviews took place online using Microsoft Teams since all the participants did work from home or in an empty office because of the Covid-19 pandemic. The interviews were all recorded and documented, and the scheduled timing of the interviews was based on the participant's available hours. Each interview lasted approximately 20–30 min. One exception was the interview with two participants together which took 55 min. The conduction of the interviews took place in early April 2021 (April 6th–14th). Before the interviews started, the participants were informed about confidentiality and anonymity in the information process.

The question list had 22 open questions that were asked during each interview for the answers to be comparable. The questions were divided into three categories, as seen in Table 2. The interview questions were designed to answer the research question on the changes that distributed work entails for the responsibilities of the Scrum Master role. Therefore, the focus of the questions was on the changes the Scrum Masters and their teams had experienced in the last 12 months since working in a distributed work environment (April 2020 to March 2021) compared to the situations during the 12 months before the Covid-19 period (April 2019 to March 2020).

Table 2. Overview of the questions in the interview guide for the interviews.

Category	Theme of the question	Number of questions
General	Job, experience, responsibilities, projects, teams	8
Changes in the last 12 months	Work environment, work procedures, Scrum events, communication, sprints, productivity	8
Scrum experience in distributed working	Challenges/obstacles, went well/badly, communication importance, learning outcome	6

3.3 Data Analysis

The data analysis was conducted with thematical analysis according to Clarke et al. [5] after all interviews had been taken. The first author did the theme analysis, which was reviewed by the second and third authors. After each interview, the researcher listened to each of the recordings and documented the answers quite thoroughly to ensure consistency. Then the researcher compared the responses to each question from all the participants to analyze the similarity between the answers.

The results were categorized into five themes: 1) Work environment and procedures, 2) meetings and Scrum events, 3) communication and social interaction, 4) productivity

and 5) future. The themes contain the results from the corresponding interview questions as seen in Table 3.

Table 3. The themes of the results with corresponding question categories

Category	Changes in the last 12 months	Scrum experience in distributed working
Work environment and procedures	X	
Meetings and scrum events	X	
Communication and social interaction	X	X
Productivity	X	
Future		X

4 Results

In this section, we describe the results of the responsibilities described by our participants in the study and the effect of the Covid-19 period they describe on the work environment and procedures, meeting and Scrum events, communication and social interaction, and productivity. We conclude by describing briefly their visions for the future.

4.1 Responsibilities of Scrum Masters

All the participants that were in the Scrum Master role or in comparable roles marked which of the Scrum Master responsibilities were analyzed from the theory, they perceived as their responsibilities. An overview of the responsibilities reported is shown in Table 4. Five of the participants perceived that they had all the responsibilities listed to be included in the Scrum Master role. On the contrary, four interviewees had perceived their responsibilities differently. Participants C and E, who both regarded themselves as project managers, shared the same responsibilities. Neither of them is responsible for the Process Authority aspect nor the Scrum Events. Participants B and D are both in the Scrum Master role as well as being Quality Assurance Testers. Still, their responsibilities vary, except neither of them has the responsibility of being a Change Agent. Participant B declared that the Product Owner is responsible for what was lacking in her Scrum Master role responsibilities in her work. All the participants agreed that being an Impediment Remover was a part of their responsibilities. Eight of the informants also had the responsibilities of being a Coach, a Servant Leader, and an Interference Shield. Seven of the informants had the responsibilities of called: Process Authority, Change Agent, and Scrum Events.

Table 4. The Scrum Master's responsibilities in the study

Category	A	B	C	D	E	F	G	H	I
Coach	X		X	X	X	X	X	X	X
Servant Leader	X	X	X		X	X	X	X	X
Process authority	X	X		X		X	X	X	X
Inference shield	X		X	X	X	X	X	X	X
Impediment remover	X	X	X	X	X	X	X	X	X
Change agent	X		X		X	X	X	X	X
Scrum events	X	X		X		X	X	X	X

4.2 Work Environment and Procedures

All participants and their teams have had to work from home most of the time during the last 12 months (April 2020 to March 2021) or since the Covid-19 pandemic started. In some cases, a few of them have been able to work in the office with strict rules and few employees at a time for a short period. The effect is different between companies and even departments since there were hybrid teams before the pandemic started for four of the nine participants.

The experience of working from home can be different for different people, but four participants felt it had been successful with few challenges. Two participants said that distributed work suits people in different ways. The people in their teams have different circumstances at home that they must consider.

Most participants did not think that the work procedure had changed since they started working from home, or that there were only minor changes. Four participants noticed that the increasing number of remote meetings and meetings moved to a remote setting. The infrastructure for working in a distributed environment had already been implemented for participant F and his teams before the pandemic started, so there was no big adjustment. For participants B and C, they and their teams needed to make the working procedure better. For example, participant C and his team found a solution to deliver all their projects remotely.

Five participants moved their tablet drawings and post-its to a virtual tool like Miro. One participant made these remarks: "It went well to move things to Miro, and there can be a lot implemented online that is harder to perform in person. The overview is straightforward in tools like Miro."

4.3 Meetings and Scrum Events

Five participants had a team member or members from other regions in Iceland or other countries before the pandemic, so their meetings were already remote. Still, the change was that everybody started being online at the meetings, not just the team members from other locations. Before the pandemic, these participants all had their meetings in meeting rooms at the office with co-located members attending while members from

different areas connected remotely. Two of the participants said that now that everybody is online during virtual meetings, it makes all team members more equal than before. One participant was happy that it was a lot easier to reschedule meetings since the necessity of finding a meeting room is not relevant while working distributed.

Two participants mentioned the importance of having the video camera turned on during meetings. They talked about wanting to see people's faces and know they are monitoring the discussion. The discussion about recording meetings also came up with two participants, which they felt was essential as absent team members could then view the meetings later.

The modifications of the Scrum Events in the last 12 months compared to the preceding 12 months were different between participants. For two of them, the Daily Scrums have lengthened since they started working from home, as they added extra time to get the opportunity to discuss things that they usually addressed in the office after the daily meetings before the pandemic. The opposite occurred for another participant: The Daily Scrum became shorter than before due to fewer social discussions. Two participants thought that the Daily Scrums were more efficient done remotely, both because the team members attend simultaneously and because attendance has increased when everyone is working from home.

As for the other Scrum Events, two participants felt that the meetings go on longer without being decided beforehand while being held online. Other participants did not mention the Sprint Review being any different, except for one who informed that the Review is more valuable than being presented online versus in a hall filled with people. The Sprint Retrospective has been valuable to three participants since they started to work from home as it highlights problems when working distributed that they can deal with, for example, when there are challenges with working from home or with communication.

According to all the interviewed participants, working from home has not affected sprints, their framework, or their length. One participant felt that she and her team had an easier time planning each sprint while working from home because of their improved work procedure. One participant described how the Scrum layout is helpful in distributed work, while others felt it was impressive how well Scrum fitted distributed working environments.

4.4 Communication and Social Interaction

The communication since working from home has changed so that the Scrum Teams do not have the same opportunity to discuss issues that come up as effortlessly as sitting near each other in the office. According to four participants, the information is not flowing between team members as much as before. If they get stuck, they try for a longer time than when co-located before asking another team member.

A few participants described their solutions to this problem:

- "There is a bigger need now to ask the team if there is something that stops their work."
- "Everybody can communicate through chat and video calls, but there was much more silence through those channels at the beginning."

- "When a problem occurs that multiple team members need to solve together, they have an open virtual meeting where they can ask or give information if they need to. In the meantime, they work at their computer in silence."

On the other hand, three participants said that their teams were as active in communication as before. Participant H even stated that the communication was better while working from home. However, like participant E, that participant was in a hybrid team before the pandemic. Both experienced that team members showed more understanding of the original distributed team members since they all had to work distributed.

Communication with the stakeholders seems to be more challenging than within the teams during distributed working. Three of the participants even felt that this was the most significant effect of the pandemic. All the participants except one reported less contact with stakeholders in the last 12 months than in the preceding 12 months. But even one participant declared that communication was less when first starting to work from home. He stated that now they are using more online tools, so the stakeholders have become more active. According to seven participants, the decreased communication was primarily due to not meeting face-to-face as they could before.

Two of them could even walk to their stakeholder's desk to discuss matters while working at the office. Some participants had resourceful solutions. One participant mentioned: "The communication has improved after holding workshops." Another one said: "When the need for changes appeared, we held workshops for one to two days with the stakeholders."

One of the most discussed challenges for the participants and their teams while working from home is the lack of social interaction. Seven of them talked about how they missed meeting each other and other co-workers in person, either at the workplace or during social events outside the workplace. One participant said: "People want to get together. It's a challenge not being able to meet and do something fun." Another participant said: "The hardest thing in the last 12 months is not being able to celebrate anything. It's sad not to go out to dinner together or reward the team with a cake when they do a good job."

Participant G informed that a survey in his company showed that loneliness has increased among his co-workers since the pandemic started. That seems to be recurring in other companies too. Participant, I felt like it is harder to maintain the team's morale, and participant C felt there appears to be a momentum that needs rebuilding within his company.

The participants discussed various solutions that they or their company had done to minimize the social distance while working from home. Almost half have had successful social meetings (coffee breaks) once a week up to once a day with their team. These meetings contain either chatting or playing online games. The solution for one team was to have a social chat channel. Four participants also talked about attending virtual parties held by the company or the department.

4.5 Productivity

The participants' opinions varied when asked whether there were any productivity changes while working more distributed. Two participants felt the productivity had

decreased, three thought it had increased, three thought it was similar to before, and one participant could not make a judgment. One participant discussed a survey done by his company that showed that people felt they were accomplishing more work while working from home. Three participants felt like they get more privacy at home to focus better on their work. And three others said their teams had a longer workday from home than in the office, especially at the beginning of the pandemic.

4.6 Future

Four participants felt like work should be in a more hybrid environment in the future, with people having the freedom to choose their work location. Two participants hoped to work less in a remote setting in the future. The participants had a few comments about their take on how they hoped meetings will evolve after the pandemic. One participant said: "I would like to keep on having remote meetings even if part of the team is in a meeting room. Then those people can have the video camera turned on and only one microphone." Another one said: "I would like to keep the meeting culture in a remote setting, so everybody is equal." The third participant stated: "I hope that after the pandemic, we can bring back face-to-face meetings with the customers."

5 Discussion

Since the Covid-19 pandemic began reaching people worldwide (around March 2020), many have had to work from home for the last year or even longer. The effect that working distributed could have on the Scrum Master's responsibilities was the aim of this research. The changes that affect working distributed according to Scrum the most are that all Scrum Events and meetings were moved to a remote setting.

The results in this study are based on interviews with nine participants who either have the role of Scrum Master or have similar responsibilities. It is not easy to generalize results based on interviews. Still, the results give reasonable indications for the changes for Scrum Masters and their teams when moving to a distributed environment from co-located.

The participants' responsibilities seem to be similar to what the literature suggests as the responsibilities for Scrum Masters, where authors agree that responsibilities consist of coaching, being a Servant Leader, Process Authority, and removing impediments. All participants are responsible for removing impediments, eight of the nine are Coaches and Servant Leaders, while seven are Process Authority.

Previous research on working with Scrum in a distributed setting claims that the most common issue is communication with stakeholders [24]. This is in line with the results from this study that indicate that the main issue for Scrum Teams since the participants started working from home is less communication with stakeholders. The reason behind that was that they could not meet their customers face-to-face as they did before the pandemic. Few participants felt it was more formal to email the stakeholders than walk to their desks as they could while working at the office. The possible effect for Scrum Masters and their teams of less contact with stakeholders could be a decrease in the quality of their product or an increase in waiting time, leading to less productivity. However,

that needs to be researched further. According to Ahmad et al., customer communication and close collaboration are crucial for the development team and project success, but this becomes more complex in distributed teams [1].

The results show that the communication within the Scrum Teams has decreased for half of the participants. So, the effect of less communication is not as crucial as with the stakeholders. However, those participants informed that their team members were not as quick to ask for assistance or discuss issues as they did while sitting near each other in the office. As a result, they tend to try solving issues by themselves before asking other team members. Thus, the possible effect on the Scrum team can halter the project's success, which could be researched further. A recent study done a few months into the pandemic showed that communication was influenced by working from home since office interactions are not present [2]. As for teams that were hybrid before the pandemic, the communication improved [14]. This corresponds with the view of the participants in this study who were in hybrid teams before the whole team became distributed.

In their study, Connor et al. pointed out that one of the challenges while working in a distributed Scrum Team is the failure to incorporate co-located social constructions of time into Covid-19 distributed working [8]. In this study, most participants felt social interaction was a big challenge. They had various solutions, for example, taking virtual coffee breaks, playing online games, and having virtual parties.

Since distributed working began in earnest, all meetings that were at the office before the pandemic are now virtual. Hybrid teams usually had virtual meetings even though co-located team members attended meeting rooms. Connor et al. said that since the pandemic started, there have been more meetings, and they lasted longer than before (Connor et al., 2021). Only one participant in this study had that experience, but he was unsure if it had to do with working from home or the changes in his company.

Since this shift in the working environment, Scrum Team members tend to work more flexible hours and even have a longer workday than before [2, 8]. Few of the participants in this study mentioned that this was the case, especially early on. Connor et al. also discussed that the whiteboard had not been effectively transferred to a remote work setting [8]. That issue seems to be resolved by using a tool like Miro, which is done by just over half of the participants in this study.

The results indicate that working from home does not seem to affect the Scrum Events for most of the participants. The Daily Scrum is now longer for two of the participants for the team to discuss issues that they previously addressed in the office. Comella-Dorda et al. suggested extending the Daily Scrum from 15 min to 30 min, with the second half blocked for problem-solving [7]. The sprints tended to stay the same for all the participants in this study while working from the office.

There seems to be a difference in the productivity changes for Scrum Teams since they started to work from home, but participants had different opinions on that. However, Badiale and Connor et al. indicate that there has been a decrease in productivity for Scrum Teams since the pandemic started [2, 8].

This situation has revealed that some people like working from home and would like to continue to do so, especially for one or a few days a week. And the meeting culture might be here to stay since so many are happy with the setting.

The results in this study are based on interviews with nine participants in the Scrum Master role or having Scrum Master responsibilities even though the informants did not all have that title. One of the limitations of the study is that not all participants worked entirely as Scrum Masters. Future studies might include more Scrum Masters or include looking at perspectives of other Scrum Team members, like the Product Owner role or the Developers. Future research studies could also include studying the effect of less communication on the project and productivity, especially with stakeholders while working distributed after the Scrum methodology. It would also be useful to study the long-term effect of following the Scrum process in a distributed work environment since this research took place only a year into the Covid-19 pandemic.

6 Lessons Learned

In this project, we have studied what changes are reported on the responsibilities included in the Scrum Master role in distributed work in the last year (April 2020 to March 2021). The results show that the main changes are that all the Scrum Events are now (April 2021) virtual along with all communication and meetings. Some of them have been demanding for the Scrum Masters while others became easier.

Previous studies on working on Scrum projects since the Covid-19 pandemic started (March 2020) have shown that there is an indication of a decrease in productivity, longer workdays, and more and longer meetings. These studies were conducted only a few months into the pandemic. In contrast to previous studies, this research was conducted after the participants had been working from home for over a year.

The results from this study do not show that productivity has decreased. Only a few participants tended to have longer workdays but only in the first months of the pandemic. In addition, there was no change reported in the number and duration of meetings during the period of the study except for one participant.

Additionally, the results indicate that the main issue for Scrum Masters and their teams when moving from co-located to a distributed work environment is less communication with stakeholders. The lack of communication within the teams did not seem to be as much of a problem, though half the participants said the flow of information between team members was not as much as before. Another issue that most of the participants discussed were the lack of social interaction within the teams. Some of them felt that the most challenging thing about working from home was not meeting each other.

Moreover, the results show that working from home does not seem to affect the Scrum Events for most of the participants. It would mainly be the Daily Scrum that was in a changed format for some of the informants. But the sprints stayed the same in length for everyone. Most of the participants felt that following the Scrum process while working from home was easy.

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