

CHALMERS



Issues with Scrum-of-Scrums

Investigating factors of failure compared to Daily Stand-up

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Abstract

To succeed in the development of products, different approaches can be taken. Two examples of such are the plan-driven method or by using an agile methodology. A commonly used framework within Agile development is Scrum. Within the framework of Scrum there are tools such as Daily Stand-up and Scrum-of-Scrums which are both used for communication. Coordination is critical when it comes to projects involving multiple teams and Scrum-of-Scrums is one possible solution to deal with this. This tool is intended to focus on team communication and is used for inter-team coordination. It is used in an up-scaled context, where the Daily Stand-up meeting is not suitable, but does not work nearly as well. As problems with Scrum-of-Scrums are identified there is an interest in finding out what separates Daily Stand-ups from Scrum-of-Scrums and what makes the latter less successful.

First, a pre-study was conducted to define a purpose of the study. When the purpose had been defined, the appropriate methods for the study was decided upon. It was decided to conduct a literature review and to find empirical data by the use of semi-structured interviews. The interviews were held with respondents working with the concepts Daily Stand-up and Scrum-of-Scrums. The literature review and semi-structured interviews were conducted simultaneously, to meet the set purpose.

The result showed a variance when it came to how to implement both Daily Stand-up as well as Scrum-of-Scrums. It was found that the respondents had a broader common understanding on how to implement and use the Daily Stand-up meetings than they had when it came to the implementation of the Scrum-of-Scrums meeting. Among the respondents there was a difference to be found when it came to the length of the meeting as well as which topics being discussed during the meeting. There was also a difference in who is attending the meeting. In some cases the Scrum Master was sent to the meeting and in others the Product Owner or a team member was sent to represent the group. It was found that one of the biggest issues when implementing the Scrum-of-Scrums meeting was the lack of interest which was caused by the meeting not having a clear purpose.

To lastly conclude the findings from the result, it was found that there is no easy way to use the Scrum-of-Scrums meeting. It is not as straight forward as implementing the Daily Stand-up meeting. This does not mean that Scrum-of-Scrums is outdated or that it is a less useful tool, but rather that it does not offer a solution for all cases of coordination.

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1 | Introduction

There are different approaches and techniques to reach goals and succeed when developing products. Two examples of frameworks that can be adopted is the plan-driven method or the method of agile development. The plan-driven process follows a sequential order with several predefined stages and is used to improve efficiency (Cooper, 2004). A challenge when it comes to the plan-driven method is that, during the development process, nothing can easily be changed upon customer request (Mahalakshmi & Sundararajan, 2013; McKenna, 2016). Agile development is different to the plan-driven method. Due to the Agile development processes being divided into smaller iterations, where every iteration is finished off with a delivery to customer, customer requests, changes and feedback can be implemented during the process.

Coordination of tasks is central to product development. Plan-driven development tends to a large extent rely on direct supervision and up-front planning and Agile development relies on face-to-face communication for coordination, known as mutual adjustment (Söderqvist & Pushpanathan, 2019).

Agile processes and development, which are based on the Agile manifesto, written by practitioners in 2001, contains guidelines on how to work in an agile way (Beck et al., 2001). It has been common, mainly within the field of software development, for a long period of time and is as of today considered mainstream (Stavru, 2014). One of the reasons why agile development and especially the Agile framework Scrum is popular, despite its challenges when it comes to coordination (Nyrud & Stray, 2017), is due to the flexibility it creates and the focus it brings to being ready to change at any point in time (Dybå & Dingsøy, 2008; McKenna, 2016).

Scrum is the most popular framework when it comes to Agile development (Maximini, 2015). To ensure that the project flow is maintained there are several events that occur and originates from the Scrum framework. One of them is a daily meeting which is, as Stray, Sjøberg and Dybå (2016) mentions, one of the most used Agile practices named the Daily Stand-up Meeting. The meeting is held within a time box of 15 minutes. The meeting is where the project team creates a platform to plan activities and air present problems (Schwaber & Sutherland, 2017; Stray et al., 2016). By the use of different events and tools within the framework, the projects are driven forward in a structured way, iteration by iteration. But even though the framework is used to gain project success there are some problems when it comes to coordination when using Scrum in large scale projects (Nyrud & Stray, 2017).

A version of the Daily Stand-up meeting, used for inter-team coordination in a large scale (Paasivaara, Lassenius & Heikkilä, 2012), is called Scrum-of-Scrums. Scrum-of-Scrums is used in larger projects where multiple teams or groups are involved. This meeting is attended by one member of each team from the project. The agenda is almost the same for both Scrum-of-Scrums and Daily Stand-up, but the Scrum-of-Scrums meeting focuses on teams instead of team-members (Paasivaara et al., 2012). It has previously been discovered that Scrum-of-Scrums does not work as well as Daily Stand-ups do (Paasivaara et al., 2012). This is due to the fact that the Scrum-of-Scrums meeting comes with challenges such as, the topic of the meeting being too broad and therefore the interest of the audience may be lacking (Paasivaara et al., 2012). Another challenge of the meeting is that, people attending the meeting do not know exactly what to report and because of that they do not report anything throughout the meeting (Paasivaara et al., 2012). As described, there are constraints when it comes to applying this particular event to larger projects or contexts (Paasivaara et al., 2012; Nyrud & Stray, 2017).

As Paasivaara et al. (2012) point out, there are several difficulties when it comes to Scrum-of-Scrums. Great challenges arises when scaling up projects and when several teams are involved (Nyrud & Stray, 2017). Difficulties arise when it comes to the planning of who should be involved in which decisions as well as when it comes to communicating the decisions made to everyone not involved in the meeting where the decisions were made (Dingsøy, Rolland, Moe & Seim, 2017).

1.1 Purpose

Despite the popularity of both Daily Stand-up meetings and Scrum-of-Scrums, the latter of these methods comes with, as described, certain problems.

As these problems are identified there is an interest in finding out what separates Daily Stand-up from Scrum-of-Scrums as a vehicle for coordination and what makes Scrum-of-Scrums less successful.

2 | Method

As the research started there was no clearly stated purpose. Because of this, some sort of pre-study was needed, with an intended outcome of identifying key questions in need of further research (Thomas & Hodges, 2010). When the purpose was defined, appropriate methods was able to be chosen. These methods were composed of a literature review, an empirical data collection and an analysis of the two, visualised in figure 2.1. The literature review and empirical data collection was done simultaneously by going back and forth between the two.

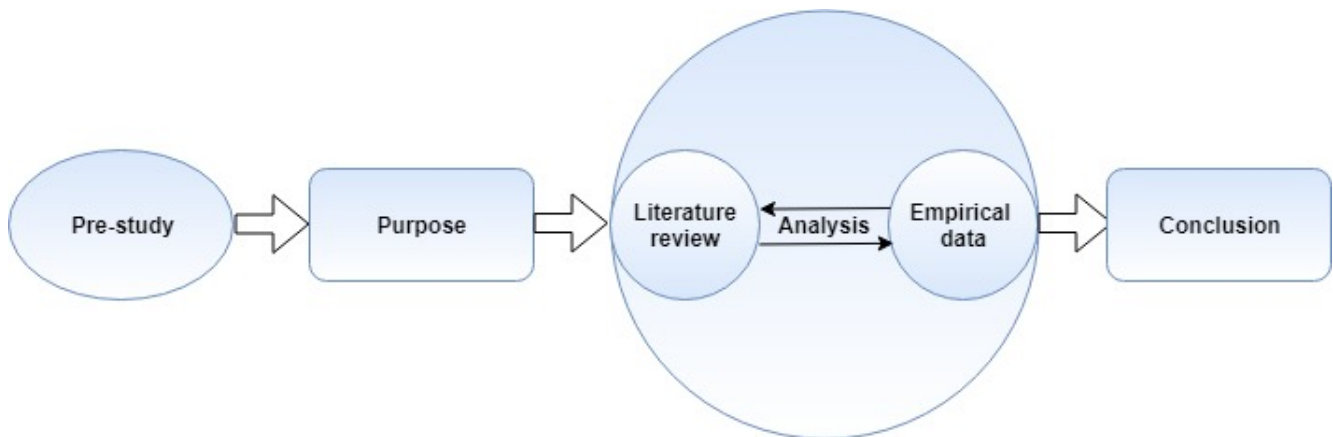


Figure 2.1: The figure illustrates the methodological process of the thesis

Moving on, the purpose was answered through explanations and reasoning assessments based on empirical data collection and literature. Paasivaara et al. (2012) state that studies on how scaled agile work in practice are rare. Therefore an abductive methodology is suitable. The conducted abductive method was based on the method "systematic combining" described by Dubois and Gadde (2002). Once finalised a conclusion could then be drawn upon this analysis.

2.1 Literature review

The pre-study was conducted to identify key questions in need of further research. The pre-study was divided into different parts. These parts were a brief literature review, a planning

process and an informed planning process.

When first starting this project a brief literature review was carried out. The purpose of doing the brief literature review was to locate interesting knowledge gaps as well as to examine and to conduct further research within. The brief review resulted in an overall broadened understanding of the agile principles and allowed the definition of an interesting field of study upon which the purpose of the thesis was based.

To conduct the brief literature review, it was necessary to plan how it was going to be carried out. The goal of the planning process was to brainstorm a number of key topics that was to be reviewed. When a number of topics of interest had been accumulated a browsing of the topics through primarily electronic search engines was conducted. In the early stages of browsing general internet, search engines like Google were used. General internet search engines allows for a quick and easy search of topics but they may result in irrelevant and sometimes untrustworthy grey sources (Thomas & Hodges, 2010). A grey source is an unpublished, not peer reviewed research according to Thomas and Hodges (2010). Supplementary, research focused internet search engines as Google scholar and Chalmers library search engine were also used. Research focused internet search engines provides more trustworthy sources than general search engines, and gives access to a wider range of research literature compared to research literature databases (Thomas & Hodges, 2010).

After the brief review had been concluded, key topics was decided to conduct further studies on. At this point key words and a combination of them were brainstormed and a more orderly searching of sources proceeded. This search was made through general internet search engines, research focused internet search engines as well as research literature databases such as SAGE and Scopus. The goal of this methodical searching was to find a gap or key areas of the topic that needed further research and could lead to a solid purpose.

When a purpose had been solidified a more extensive literature review of was conducted. The reason to have an extensive review was to get a deep understanding of the topic. With the extended review a compilation of existing research can be created to be able to be used in the analytic part of the thesis as well as informing the reader of the topic studied (Thomas & Hodges, 2010; Pierce, 2008). The extensive review was conducted in a similar way as the brief review, through a planning where key topic being studied was split up into different areas in the need of being reviewed.

The extensive literature review was conducted in a more orderly way. But a problem arose, the field of research is currently being developed and studied within both academia and industry and is filled with grey sources. The grey literature was primarily retrieved using general search engines. When having to use grey sources the aim has always been to try and validity those sources with scholarly and peer-to-peer research. Scholarly articles and peer-to-peer research was primarily retrieved through the Research focused internet search engines and research literature databases. Overall, preference was given to scholarly and peer-to-peer reviewed articles, as these sources has been evaluated by independent and qualified experts (Given, 2009).

2.2 Data collection

The goal of the empirical data collection was to get practical understanding of the concept Scrum-of-Scrums. The aim was to retrieve new information, not to reinforce or strengthen existing theory (Esaiasson, Gilljam, Oscarsson, Towns & Wängnerud, 2017). The focus of the empirical data collection relied on peoples perception, experiences and feelings towards Daily Stand-up and Scrum-of-Scrums. Qualitative data collection was recognised as a suitable method. As Flick (2018, p. 4) state , one "can identify some common features of qualitative research", one of those is that "qualitative research is approaching the world(s) 'out there' ". Frey (2018, p. 4) state, that approach to the world are done through analysing "experiences of individuals or groups" as well as analysing "interactions and communication" in the making.

The qualitative data collection was chosen to be conducted through semi-structured interviews. Semi-structured interviews make sure that the same general areas of information are collected from each interview, while maintaining a certain degree of freedom and adaptability (Turner III, 2010). Semi-structured interviews also provide a possibility to get unexpected answers that can lead into deeper conversations (Esaiasson et al., 2017). Respondents have got a chance to ask clarifying questions to the interviewer (Lavrakas, 2008). Hence, semi-structured interviews allows for an exploration of uncharted territory where unknown but potential issues can arise (Adams, 2015). Adams continues by saying that semi-structured interviews have got pre-defined topics in order to cover the same areas in all interviews. However, semi-structured interviews are expected to differ in structure and the result is therefor also expected to differ. Moving on, (Adams, 2015) states that to minimise fatigue of respondent and interviewer the interviews should last for one hour maximum. Moreover, Sturges and Hanrahan (2004) state that it is appropriate to perform face-to-face interviews for longer and more unstructured interviews. The interviews should be conducted in a quiet room with as little outside disturbances as possible - it is important to make the respondent feel comfortable and not disturbed while answering the questions (Esaiasson et al., 2017). If the respondent allows it the interviews should be recorded, something that helps when a need of going back to listen again arises (Barriball & While, 1994). The interviews were all conducted face-to-face, in a quiet room. They were recorded and lasted for about 45 to 60 minutes.

After it was decided to use semi-structured interviews an interview guide was put together in order to cover the same topics and to use the same baseline in all interviews (Adams, 2015). The interview guide can be viewed in appendix A. The guide was a help for the interviewer to keep the conversation flow in a natural way and for the respondent to get help through prompts (Adams, 2015). Prompts are used to move interviews forward and help the respondents to expand and elaborate on their answers (Olson, 2012). The guide shows the semi-structured character in which the interviews were held. Worth noting, is that, the wording of the questions and in what order they were put forth is not what is important (Barriball & While, 1994; Adams, 2015). It is the topics that needs to be covered that are of importance. When the questions were put together they were developed with the intent of leading to open conversations concerning important topics, always with the purpose of the

study in mind. When the guide was finished several different, Agile practising, companies within the Gothenburg region were identified. The reason for wanting to conduct interviews at different companies was to see if similarities occurred independent of variables. According to E. Herriott and Firestone (1983, p. 14) "multisite qualitative research arose primarily in response to pressures". These pressures came from the need to "overcome some of the weaknesses of large quantitative evaluations without being limited by the particularism of the single-site case study (E. Herriott & Firestone, 1983, p. 14). When potential companies had been identified individuals with potential Daily Stand-up and Scrum-of-Scrums experience were found by the use of LinkedIn and Google. These individuals were contacted by the telephone and given a short introduction to the project. They were then asked if they had any interest in partaking. If such an interest existed an informative email was sent to each one of these individuals. The email contained an introduction of the authors of the thesis, information on the interview, such as a basic interview schedule, estimated duration of the interview and the research question. If the individual remained interested in participating, an appointment was booked at a time and place which suited the individual being interviewed. This way of reaching out to possible respondents, by first contacting the individuals by telephone, to find if there is an interest and then get back by mail with supplementary information increases the legitimacy of the research according to Adams (2015). From an ethical standpoint Vetenskapsrådet (2018) recommends that respondents should be informed about confidentiality and final use of respondents answers.

11 interviews were conducted with 11 different respondents at seven different companies. Daniel (2012) states that approximately six to ten interviews is sufficient when conducting a research based on peoples experiences and perceptions towards a subject. All the respondents in this research had to have experience within this specific narrow field, in other words the respondents had to be experts, hence the respondents were defined to be a part of an expert sample. The use of an expert sample means to use members of a population that is picked based on their knowledge within a field (Daniel, 2012). Because the respondents are from an expert sample they are also a part of a non-probability sample. Daniel (2012) states the strengths and weaknesses of non-probability sampling to be, the need to target specific elements of a population, the difficulty to access population, highly scattered population, using a qualitative research, small sample size and more.

Ethical considerations were made, these can be viewed in appendix A. The reason for having these caution of ethics was to provide the respondent with the possibility to consent, to keep confidentiality and usage approval as, recommended by (Vetenskapsrådet, 2018). The reason for implementing anonymity for the respondents was that being anonymous increases the likelihood of giving candid information (Given, 2009).

2.3 Analysis

The method of analysing the results of the literature review and data collection was inspired by 'systematic combining' as described in (Dubois & Gadde, 2002) and discussed in (Dubois & Gadde, 2014, 2017). 'Systematic combining', is essentially combining and comparing,

framework, empirical world, theory and the topic studied (Dubois & Gadde, 2017). This intertwining occurs throughout the research process through a process defined as matching, direction and redirection (Dubois & Gadde, 2002). Matching is defined by Dubois and Gadde (2002, p. 556) as, "going back and forth between framework, data sources, and analysis". This could in some regards be viewed as triangulation (Dubois & Gadde, 2002).

The analysis of the empirical data collection and extensive literature review was conducted in an iterative way in parallel during the better part of the research process. Continuous comparison of the two was made in an attempt to understand both theory and data. Dubois and Gadde (2002) states that theory cannot be understood without data and vice-versa. Systematic combining is a way of linking empirical studies with appropriate theory where the aim is to develop the theory further (Dubois & Gadde, 2014).

The data collected was continuously compared to prior data collected, the comparison was to address needs of diversification and additions of the data. While the questions seen in the Appendix A had a purpose, the purpose changed during the research process, from finding potential topics to be more of a conversation starter. Prompts became a more notable part and were used to cover the same topic mentioned in previous interviews where the aim was to see if any commonalities existed. As Dubois and Gadde (2002) argues the data collected should not fit the preconceived theories.

The analysis of the data collection and literature review was conducted as soon as the interviews had started. The analysis was conducted by looking for discrepancies. When discrepancies were found conclusion were drawn and discussed. Dubois and Gadde (2002, p. 556) argues that this type of abductive matching "requires more, and has the potential to yield more, than an inductive fit."

3 | Theory

Dingsøy, Falessi and Power (2019) state that there are companies implementing large-scale Agile frameworks without considering the problems they might face. They further argue that a framework should never be the goal, but instead that frameworks should help achieve a goal.

The frameworks, or rather the tools, Daily Stand-up and Scrums-of-Scrums, should both serve their purposes and be a part in, and help to reach a project goal. Daily Stand-up and Scrum-of-Scrums are both meetings to improve communication and help manage coordination. Daily Scrum focuses on intra-team coordination whereas Scrum-of-Scrums focuses on inter-coordination. They are both based on Agile methodologies which originates from the Agile manifesto.

3.1 What is Agile?

It has been noted that there is a lack of a common understanding of what Agile exactly means (Hanssen, Šmite & Moe, 2011). A reason for this can be that an absolute definition of the Agile concept does not exist (Abrahamsson, Salo & Ronkainen, 2002). One way of seeing it, is that Agile is a collection of frameworks and methods for product development and management. The purpose of an Agile framework is to provide quick and continuous value to the customer (Measey, 2015). Measey (2015) further states that this is done by focusing on prioritising functionality and working in short iterations, closely with the customer, instead of following a long-term plan. This allows more flexibility for both companies and customers, which is necessary in today's business world. Self-organising teams is another core aspect of Agile development, this means that teams need to have the possibility to decide over themselves to a certain extent (Dikert, Paasivaara & Lassenius, 2016).

The Agile frameworks are set to abide by the core values and principles defined in the Agile manifesto. This manifesto was created in 2001 when a group of 17 software developers came together to discuss solutions to the software development problems they faced at the time. The term is defined by four ideas:

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation

- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

and while the aspects on the right are valuable, the ones to the left should be prioritised (Beck et al., 2001).

The Agile mindset is important when implementing an Agile framework and Maximini (2015) states that corporate culture is one of the main reasons as to why Agile projects fail. In order to reap the benefits it is necessary that the process is fulfilled in a way that takes the agile philosophy into consideration. Having an Agile mindset means that a person or company as a whole, reasons according to the Agile philosophy (Dikert et al., 2016). This is the meaning behind the conception of "being Agile" instead of "doing Agile", and Measey (2015) argues that the Agile mindset can be more important than the implementation of Agile tools when it comes to achieving efficiency.

There are a number of different Agile frameworks and methods that strive to help improve the way work is done and while the methods have similarities they also have clear distinctions. Scrum is the most popular Agile framework and when other Agile frameworks such as Extreme Programming (XP) and Lean Software Development are used, it is often in combination with Scrum (Dikert et al., 2016).

While Agile development has grown popular, the concept is not without its problems and it has been criticised over the years. Some of the described issues with the Agile software development methods, is the lack of architecture focus which has a risk to negatively effect design-decisions, and that the methods are more suitable for small teams while there are other processes that are more suitable for larger projects (Dybå & Dingsøy, 2008).

The tools and methods of Agile frameworks were originally created in a way that easily fits and helps improve the efficiency of small scale projects (Boehm & Turner, 2005). Boehm and Turner (2005) also state that scaling these frameworks to fit with bigger projects or corporations is more difficult than for smaller ones. For companies to implement an Agile framework at large scale, with hundred of developers, and still work in an efficient manner, it is often necessary to adjust and customise the way of working with these frameworks. But how this is done at large scale, in an optimal way, is not always obvious and Dikert et al. (2016) state that many companies find it harder than expected to implement these frameworks. However, even though it can be more difficult to implement Agile frameworks, it has been shown in a study with 196 Norwegian companies, that projects using Agile methods even at large scale outperform non-Agile projects (Jorgensen, 2019).

3.2 Scrum

Scrum is an Agile framework created in the early 1990's (Schwaber & Sutherland, 2017). Scrum was created with the intention to be a method used to solve complex problems and deliver a result of as high value as possible (Schwaber, 2004; Schwaber & Sutherland, 2017). To use the Scrum framework, a Scrum team, consisting of a Product Owner, a Development

Team and a Scrum Master needs to be in place (Larman & Vodde, 2009). Scrum needs to be implemented fully and not mixed with standard project management methodologies in order to reach project success (Schwaber, 2004).

When making use of the Scrum framework there are certain roles required within the project. These roles constitute the *Scrum Team*. The Scrum Team consists of a *Product Owner*, a *Development Team* and finally a *Scrum Master* (Schwaber & Sutherland, 2017). The Product Owner is responsible of representing the interest of the Development Team (Schwaber, 2004). If there is any interest in changing something which is in the Product Backlog this is up to the Product Owner to decide. It is crucial that everyone respects the Product Owner and the decisions this person make for the work to be carried out in the best possible way (Schwaber & Sutherland, 2017). The Development Team is responsible for the completion of the tasks in the Product Backlog as well as the tasks in the Sprint Backlog, which describes which tasks that is set to be carried out during the sprint (Schwaber, 2004), meaning that they should develop functionality (Schwaber, 2004; Schwaber & Sutherland, 2017). The people in the Development Team are the only ones working on the actual product. They are responsible, as a self-organised team, to make sure that the items in the Product Backlog are made into manageable tasks for them to work on in every Sprint (Schwaber & Sutherland, 2017). The last member of the team is the Scrum Master. The Scrum Master is responsible for the team to follow the framework of Scrum and is responsible for the process overall (Schwaber, 2004; Schwaber & Sutherland, 2017). This person is the one accountable for making sure that all of the Scrum events take place and that everyone follows the framework of Scrum. What is important to remember is that the Scrum Master is not a traditional project manager (Schwaber, 2004). The Scrum Master needs to ensure that everyone outside the Scrum Team understands how to interact with the team and how not to. The Scrum Master is also the one answerable for helping the Product Owner with the Product Backlog management as well as for the Developer team understanding the Product Backlog properly (McKenna, 2016). The Scrum Master serves and helps the Developer Team by maximising the value of the product as well as coaching them into being self-organised and provide the Scrum events. Last but not least, the Scrum Master must ensure that the organisation's adoption of Scrum runs smoothly and ensure the success of the Scrum by making sure that the stakeholders and outsider employee's understand the framework (Schwaber & Sutherland, 2017).

When the team are in place, there are certain events which should be realised to get the most out of the framework. When using Scrum, the work is divided into *Sprint's* which can be described as smaller projects within the large project. The sprint runs for a certain amount of time, no longer than a month, and has a specific goal of creating something which should be fulfilled in the end of the sprint. A sprint is always followed by a new sprint, which starts right after the previous one is finalised (Schwaber & Sutherland, 2017).

During the execution of the sprint and when carrying out the work there are daily meetings, called *Daily Stand-ups*. These Daily Stand-up meetings should last for fifteen minutes at a maximum (Schwaber, 2004; Maximini, 2015; McKenna, 2016; Schwaber & Sutherland, 2017; Stray et al., 2016). The goal of the meeting is to synchronise the team and plan for upcoming activities - the activities should be executed or delivered until the next meeting the next day (Schwaber, 2004).

3.3 Daily Stand-up

The Daily Stand-up meeting, shortened DSM, is an essential part of the Scrum framework, amongst others, and held by the Development Team each day of the sprint, with a length of 15 minutes (Schwaber, 2004; Stray et al., 2016). The Scrum Master is responsible for the meeting being held as well as for the time frame, but other than that the Development Team is in charge of the meeting. This meeting is said to improve the communication within the team and guarantees an opportunity for coordination (Danait, 2005). It is not meant to be used as a meeting for status reporting, but rather as a daily reoccurring forecast meeting where the members of the Development Team can discuss the progress and make plans for the next 24-hours, until the next Daily Stand-up (Maximini, 2015). Communication of this kind, on an individual level, is called mutual adjustment (Dingsøy et al., 2017).

The three basic questions of the Daily Stand-up meeting, suggested by Schwaber and Sutherland (2017) should be responded to by all members of the Development Team. The questions are the following:

- What did I do yesterday that helped the Development Team meet the Sprint Goal?
- What will I do today to help the Development Team meet the Sprint Goal?
- Do I see any impediment that prevents me or the Development Team from meeting the Sprint Goal?

The meeting is to ensure that there is progress within the project (Schwaber & Sutherland, 2017). McKenna (2016) states that the Daily Stand-up meeting main purpose is not problem solving, and if there is a need for problem solving on an individual basis this is usually deferred to take place right after the Daily Stand-up (Maximini, 2015).

The Daily Stand-up meeting is the most used agile tool (Paasivaara, Durasiewicz & Lassenius, 2008) and according to Schwaber and Sutherland (2017) the goal of the meeting is to ensure that the tasks in the Sprint Backlog are approached in time to meet deadlines. By having this daily meeting some of the needs for other meetings throughout the day is eliminated as well as it creating a better structure within the project. Stray, Moe and Sjøberg (2018) argues against that the DSM should have a set agenda, always following the same three questions, and further state that it should be up to each Development Team to create a structure for the meeting which both fits the team as well as the project. It can be shaped quite differently in differing projects and still manage just as well to add value to the team (Stray et al., 2016).

Daily Stand-ups do have many advantages, but also disadvantages when it comes to its implementation. According to Stray et al. (2016) the Daily Stand-up meeting improves communication as well as keeping the team aware of the project process and status. Dorairaj, Noble and Malik (2012) add that Daily Stand-ups also work to build a strong team-bond and that it creates a "one team" mindset. Furthermore, the Daily Stand-up reveals issues and problems early and therefore greatly reduces project risk (Maximini, 2015).

A reported disadvantage with Daily Stand-up meetings, according to Stray, Lindsjorn and

Sjoberg (2013), is that the meeting causes interruption's in the daily work-flow which can result in decreased productivity. Stray et al. (2018) propose for teams to adjust the frequency of the Daily Stand-ups if necessary, and state that having it daily is not always optimal. Duration is another named problem for which Stray et al. (2016) argue for teams to remain standing during the meeting, as this has been shown to decrease the meeting-length dramatically. Larman and Vodde (2010) further state that there is a great need for high relevance in the meeting and making sure that the meeting is not a time frame to report to the manager. Stray et al. (2018) state that it should be held short and scheduled in a convenient time for everyone during the day to cause as little interruption as possible, recommending either in the morning or right before lunch. The interviewee's in the study, Stray et al. (2016), mentioned in regards to the last question of the meeting which focuses on talking about problems, that if problems occurred the team would not wait until the next day to bring it up at the Daily Stand-up meeting, but rather face the problem straight away.

3.4 Scrum-of-Scrums

Coordination is considered the biggest problem when implementing Scrum in a large group of people (Schwaber, 2004). When inter-team coordination is necessary the Scrum-of-Scrums meeting, abbreviated as SoS, can be used. The Scrum-of-Scrums meeting is described as a meeting to handle the coordination between teams when using Scrum in an upscaled context (Paasivaara et al., 2012) and this kind of meeting, where a representative from each team attends the meeting, is called layered mutual adjustment (Dingsøyr et al., 2017).

The SoS meeting has the same purpose as the Daily Stand-up meeting but in a larger context or scale (Schwaber, 2004). SoS can be applied when there are several teams using, for instance, the Scrum framework and all teams contribute to the same project (Cohn, 2007). Schwaber (2004) claims that the SoS structure is needed for every three to five teams. It is recommended that SoS are held daily (Schwaber, 2004) or two to three times a week (Cohn, 2007).

The participants of SoS consists of one representative from each Scrum team. The representative can be any member of the Scrum team and this role can be rotated within each team (Larman & Vodde, 2010). However, Larman and Vodde (2010) note that the rotation should not be done too frequently as this will result in discontinuity which can lead to disorder. Larman and Vodde (2010) further recommend that the representative is a technical contributor. The contributor needs to have technical knowledge in order to make sure that the he or she can understand and actively work to solve problems that are likely to be brought up during the meetings (Cohn, 2007). When Scrum Masters attend the SoS they are likely to take on the role of a project manager (Larman & Vodde, 2010) and deviate from their original purpose in the team. The Daily Stand-up meetings are still held within every Development Team, the SoS is an additional tool for bigger scaled projects, not as a replacement for Daily Stand-up (Cohn, 2007).

The structure for SoS is similar to the structure in the Daily Stand-up meeting. The three

questions are simply adjusted to fit the team instead of the team members. Cohn (2007) also recommends adding a fourth question:

1. What has your team done since we last met?
2. What will your team do before we meet again?
3. Is anything slowing your team down or getting in their way?
4. Are you about to put something in another team's way?

The goal of SoS is to create information flow between teams. It is also to resolve dependencies, and problems due to these, as well as determine how teams need to collaborate to move forward and achieve a successful release (McKenna, 2016). Paasivaara et al. (2012) notes that there are recommendations for SoS meetings to be time boxed to 15 minutes. However, McKenna (2016) discuss the possibility of solving problems during the SoS meeting as the relevant personnel for this should be present. This is something that differentiates the SoS meeting from the Daily Stand-up meeting. When it comes to Daily Stand-up there appears to be a consensus that the purpose is for the team to plan and synchronise, any problem solving or more detailed discussions should be done with the specific parties afterwards (Larman & Vodde, 2009; Schwaber & Sutherland, 2017; Cohn, 2007; Maximini, 2015). Cohn (2007) believes that even if the SoS meetings often are short one should be prepared to spend up to one hour with the meeting if problems do arise. Larman and Vodde (2010) advocates for a specific "Two-part Scrum of Scrums" structure. This consists of the standard time boxed 15 minute status-briefing followed by self-organised follow up meetings where relevant team members work to solve problems that affect multiple teams, attendees that are not related to the problems are free to leave.

Scrum-of-Scrums have different variations were only Product Owners or only Scrum Masters attend. These are usually titled Scrum-of-Scrum-Masters and Scrum-of-Product-Owners (Maximini, 2015). As previously stated, it is considered bad practice for Scrum Masters to be the ones attending and representing the Development Teams in SoS. There can however be some benefits for both Scrum Masters and Product Owners to have structured meetings. Larman and Vodde (2010) emphasises that in the Scrum-of-Scrum-Masters, a *Community of Practice*, inter-team coordination is not the main purpose. The purpose of the meeting is instead shifted towards discussing experience, sharing problems and learning from each other (Larman & Vodde, 2010).

Larman and Vodde (2010) note that it can be difficult to achieve an efficient Scrum-of-Scrums meeting and Paasivaara et al. (2012) state that there is a lack of information on how to implement Scrum-of-Scrums in a larger scale with tens of teams. Paasivaara et al. (2012) found in their study that the main issues were caused by the large number of participants with disjoint interest and concerns, resulting in a too wide of an audience and a lack of subject interest. This led to participants not knowing what to report to other teams and often not reporting anything at all. With a successful feature specific SoS there still remained issues at the project level (Paasivaara et al., 2012).

If the number of teams working on the same project is greater than what one Scrum-of-Scrums meeting can handle, it is possible to again increase the scale and introduce Scrum-

of-Scrum-of-Scrums. That means that one representative from each SoS meeting will come together and discuss the same questions but on an even higher level of the project (Cohn, 2007). This does theoretically allow for an even bigger multi-team solution within the Scrum framework, but Maximini (2015) warns that it should be applied depending on situation as it is not always necessary nor a good idea. Maximini (2015) further suggests that the number of teams working on a project should be as low as possible as the productivity does not always scale with addition of more teams.

3.5 Sustainable development

According to Dahlin (2014) sustainable development is a term which was popularised after the United Nations released 'Our Common Future' (World Commission on Environment and Development, 1987). The meaning of sustainability was then defined as: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). Another way to describe sustainable development is by dividing it into three categories: ecological, economical and social sustainability (Hedenus, Persson & Sprei, 2018). When it comes to software development the largest ecological sustainability impact originates mostly from effectiveness of code and general energy usage (García-Rodríguez De Guzmán, Piattini & Pérez-Castillo, 2015). Daily Stand-up and Scrum-of-Scrums are however more closely related to management than coding practices, and has a bigger possibility to affect the economical and social parts of sustainable development than the ecological part. Social sustainability is defined as continued development, and guarantee, of basic needs, education, quality of life, social capital, social cohesion, integration and diversity, and sense of place (Åhman, 2013). Many of these concepts are heavily affected by work, and especially the employees relations to their work and their colleagues (Egerter, Dekker, An, Grossman-Kahn & Braveman, 2008).

Beck et al. (2001) state in the Agile manifesto, the importance of prioritising individuals and interactions over processes and tools, which is positive from a social development standpoint. The Daily stand-up meeting can be associated with improvements in both communication and coordination (Stray et al., 2016), and the same has been said for Scrum-of-Scrums (Heikkilä et al., 2014). Mulder (2006) talks about the importance of both these aspects when it comes to social sustainability. Agile project management has also been shown to improve health, influence (ability to affect a system one exist in) and ability to acquire new competences, and can overall be considered as a way to promote organisational social sustainability (Albarosa & Valenzuela Musura, 2016). These factors can also be connected to economical sustainability as improved health and competences can increase productivity (Egerter et al., 2008).

There exists a number of definitions of economic sustainability. One definition is to manage the financial resources in a way that we can support both today's generation but also the ones to come after (Hedenus et al., 2018). Another definition describes it as the aim to maintain assets which includes capital but also added value (García-Rodríguez De Guzmán

et al., 2015). Adaptability is a big part of Agile development and is a way for companies to keep up with today's evolving market (Maximini, 2015) and as previously stated, it has been shown in a study by Jorgensen (2019) that projects using Agile development outperforms projects using the plan-driven approach. Economical sustainability, according to the second definition, is one reason to why Agile development has gained popularity. Furthermore, a business that neglects the sustainable development aspect as one of its priorities risks public criticism that can result in the loss of market legitimacy (García-Rodríguez De Guzmán et al., 2015), which can have negative effects on a company's assets.

4 | Results

The results of the data collection consist of material from 11 separate interviews. All the respondents and companies are kept anonymous but have been given pseudonyms.

Figure 4.1 shows a compilation of the duration and occurrence of the Daily Stand-up in companies where it is implemented and the duration, occurrence and attendants of the Scrum-of-Scrums in the companies where it is implemented. The results are presented interview by interview where the respondents explain how they work with the concepts Daily Stand-up and Scrum-of-Scrums. An analysis of these interviews with respect to the purpose of this research will follow in the next chapter.

Respondent pseudonym	Title of respondent	Number of teams	Approximant minutes of Daily Stand-up	Occurrence of Daily Stand-up	Approximant minutes of Scrum-of-Scrums	Occurrence of Scrum-of-Scrums	Attendants in the Scrum-of-Scrums meeting
Kalle	Agile coach	N/A	N/A	N/A	N/A	N/A	N/A
Lena	Scrum Master and Agile coach	2	30 min	Every day	15 min	Every other day	Product Owners
Pelle	Agile coach	N/A	15 min	Every day	N/A	Once a week	N/A
Nils	Scrum Master	3	15 min	Every day	30 min	Once a week	Scrum Masters and sometimes others
Mikael	Scrum Master and developer in other team	1	10 min	Every day	Does not apply SoS	Does not apply SoS	Does not apply SoS
Jan	Scrum Master	N/A	Differs within the company	Differs within the company	30 min	Once a week	Scrum Masters, RTEs and Agile Coaches
Anna	Scrum Master	3	15 min	Every day	90 min	Once a week	Scrum Masters and RTE
John	Scrum Master	N/A	15 min	Every day	N/A	Once a week	Scrum Masters
Ulf	Scrum Master	2	15 min	Every day	15 min	Every other day	Team member
Niklas	RTE	N/A	15 min	Every day	90 min	Once a week	Scrum Masters
Stina	Scrum master and Member of team	N/A	15-30 min	3 times per week	60 min	Twice a week	Scrum Masters

Figure 4.1: Table of respondents.

4.1 Interviews

Kalle - Agile coach

Kalle is a technical consultant who works as an Agile coach.

Kalle considers Daily Stand-up to be a good concept, with the exception where companies already work close together. However, he claims that, companies that have not had help from Agile coaches, have been forced into having meetings they do not want or understand the underlying reason for. He says that these companies and/or teams often miss the purpose of the meeting and do not grasp the meaning of the meeting. The meeting is intended to develop the team and to help the team with their planning within the sprint. Moreover, Kalle says that standing during the meeting is not an important part, the focus should be on the teamwork. Kalle also states that it is important that the meeting is held frequently and kept efficient.

The benefits of the Daily Stand-up are that the members of the team have an opportunity to quickly and efficiently update each other on what is going on. Also, the team members can discuss and try to find out how to reach their collective goals effectively.

The disadvantages that can be identified are that the meeting is hard to facilitate if the team does not sit down together, and that if the meeting not implemented correctly it can take up more time than required and affect the team negatively. Kalle does not find Scrum-of-Scrums to be of much use, there are other tools to solve coordination problems.

Regarding the Scrum-of-Scrums meeting, Kalle claims that Scrum-of-Scrums is a simplification of a complex problem. However, Kalle states that the occurrence of the Scrum-of-Scrums meeting should depend on the dependencies within the teams. Kalle says that if there are many dependencies to discuss there might be a need to have the Scrum-of-Scrum meetings more frequently. If there are not any dependencies to discuss, the Scrum-of-Scrums meetings can be held less often. According to Kalle, solving dependencies across teams and allowing teams to work autonomously would be most efficient. Kalle has heard of different opinions on Scrum-of-Scrums, both that it should be held more often and that it should be scrapped completely. Even though, Kalle says the biggest advantage with the Scrum-of-Scrums meeting is that knowledge is shared across the organisation. The biggest disadvantage is that not everyone has the knowledge about everything and therefore all problems cannot be identified and solved.

Finally, Kalle says that Daily Stand-up and Scrum-of-Scrums has different purposes. Daily Stand-up aims to create a plan for the upcoming 24 hours, basically how to reach the set goal within the Development Team. The Scrum-of-Scrums meeting is a meeting to synchronise and inform the attendants. Kalle finds the Scrum-of-Scrums meeting to be a bad version of Daily Stand-up. To create a Scrum-of-Scrums meeting which is just as the Daily Stand-up tends to fall into more of a big room planning meeting, which can be beneficial even if it is not called Scrum-of-Scrums. Kalle says that the Scrum-of-Scrums meeting can be improved if the structure of the meeting would not be as set.

Lena - Scrum Master

Lena is employed as a full time Scrum Master at a software development company. Along with her duties as a Scrum Masters she also works as an Agile coach at the company. Furthermore, she facilitates meetings with fellow Scrum Master colleagues. At those meetings the Scrum Masters discuss improvements that can be made along with the Scrum framework.

At the company where Lena works the Daily Stand-up occur every working day at 8:30 and lasts for 30 min. Lena explained that the meeting last for 30 minutes due to office culture and that teams need time to distribute information. According to Lena, team members seems to be content with the meeting structure. The starting time is set to 8:30 because many team members start their day early. Some of the team members have stated that they need the meeting to get a sort of status update so that they can plan their day according to what has been said during the meeting. If a team member is unable to attend the Daily Stand-up they call in via Skype - a meeting communication tool. According to Lena, the fact that they sometimes need to use Skype can cause the meeting to run less smoothly. Moving on, Lena explains that the meeting is divided into two parts. During the first part the team goes through current features. During the second part, they cover further questions raised during the first part of the meeting. The reason for covering the features, feature by feature instead of going person by person, is to create greater relevance for the meeting. Lena informs that they changed focus on the meeting because team members tended to repeat the same information previously stated.

The benefits which Lena identify is that the Daily Stand-up is a good way to start the day, as well as it being a good way to coordinate the team and to understand what has happened previously and what is going to happen onwards. Also, it is an excellent method for team building.

Lena starts by claiming, as an disadvantage, that there is an overall negative feeling about there being too many meetings within the company. She says that employees/team members feel that meetings interrupts workflow, chain of thoughts and that nothing gets done during the meetings. However, Lena says that it does not feel like this is a remark made with the Daily Stand-up meeting in mind. Furthermore, Lena says that the Daily Stand-up is being held for 30 min instead of the recommended 15 creates more room for discussions about technicalities but Lena is unsure if this is an advantage or a disadvantage. Moving on, Lena says, with previous work experience in mind, that employees believe that the three questions used for the Daily Stand-up meeting only was answered because everyone had to and that the meeting was a waste of time.

Regarding the Scrum-of-Scrums meeting, Lena informs that the Scrum-of-Scrums meetings are held every other day and lasts for 15 minutes. The reason for the meetings being held every other day is that every day is too often, and would it be held more rarely there might be a possibility that it could lead to difficulties and problems not being addressed in time. Lena thinks that Scrum-of-Scrums meetings are a good tool when working with several teams. Lena informs that it is the Product Owners who attend the meetings, it used to be the Scrum Masters. There is an overall positive feeling about sending the Product Owners to

the Scrum-of-Scrums meeting. The meeting is used to discuss the status as well as to find any constraints or dependencies across the teams. However, the meeting tends to become more of a technical meeting rather than a meeting to address any issues and prioritise what is of importance at the moment. Lena finds that problems are identified in a sufficient and satisfying way. That said, Lena is aware, and stated, that they do not use Scrum-of-Scrums by the book.

The benefits are the synchronising between teams. It is a big advantage that the Products Owner attend the meeting instead of the Scrum Master. Lena says that the Product Owners are more informed about technicalities than Scrum Masters. It is also good that the Scrum-of-Scrums creates a platform for the Product Owners to meet.

The disadvantages is that the Product Owners are quite busy and not everyone can always attend, which can cause inconsistency. It is also hard to engage the attendees due to there being too many meetings within the company overall.

Finally, Lena mentions that Daily Stand-up works better than Scrum-of-Scrums. In the Daily Stand-up meeting everyone who is attending knows what to do and what is expected of them. Scrum-of-Scrums is new to the teams and has got room for improvement, like deciding who should facilitate the meeting. Difficulties occur when the facilitator does not attend the Scrum-of-Scrums meetings.

Pelle - Agile Coach

Pelle defines himself as an Agile coach. Pelle will soon work as a Scrum Master again and has experience from educating Scrum Masters at a company where the aim was to work in a more Agile way.

Pelle explains that at the company where he works, they have changed to work in a more Agile way. The Daily Stand-up is time boxed to 15 minutes and occur every working day. The Daily Stand-up is a meeting where the team plan for the upcoming 24 hours. He emphasise that it is a meeting for the team. Pelle states that if the team follow the standard questions for the Daily Stand-up meeting, the meetings tend to be more of a meeting to report rather than a time for planning. Pelle suggest that, instead of using the questions, teams can presuppose from a board and see what activities is on there and then identify what is needed for them to meet the set goal. Pelle explains that this can create a possibility to see if there is enough work being carried out or if any member of the team can take on more tasks.

Benefits of the Daily Stand-up is the possibility to synchronise the team as well as it being an opportunity to embrace the team spirit which is created by holding these meeting.

Disadvantages, Pelle says, could be when the meeting becomes a time to report and where focus lies on individuals instead of the team. If this were to happen there is a risk of the team members putting too much focus on what they are supposed to say rather than focusing on what their team members are saying.

Regarding the Scrum-of-Scrums meeting, Pelle informs that the company should facilitate the meeting once a week and that it should be hosted by a Scrum Master. The Scrum-of-

Scrums meeting is explained to the teams as being a meeting where progress is reported or updated, hence, it is not in place to solve problems. The role of Scrum Master can be rotated at times, but the intention is that a Scrum Master shall be consistent throughout the project. By rotating the Scrum Master role, Pelle says that there is a risk of inconsistency. A positive outcome of the rotation is that it creates a possibility of educating team members who want to try the role as the Scrum Master.

For final thoughts, Pelle mentions that when team members are busy and has got a lot of work the attitude towards meetings in general is not that positive. The feeling is that there is a resistance towards the agile way of working as it is perceived to take up too much time. Pelle says that these meetings are important and, as mentioned, find that they increase team spirit. The rules of the meetings and how they are executed are not the important parts. Learning by doing, adjusting the meetings to fit the organisation, adjusting to the needs of the teams, making sure that the meeting goal is met as well as the team spirit being worked on are the important parts. Lastly, Pelle does not see that the advantages of the Daily Stand-up meeting can be applied to the Scrum-of-Scrums meeting.

Nils - Scrum Master

Nils is a Business Analyst consultant, has previously worked as a coach for Scrum Masters and is currently working as a Scrum Master - responsible for three teams.

Nils starts of by stating that the implementation of the Daily Stand-up meeting was done by the book and is held at the same place and at the same time every day, all to evade variations. Nils explained that the Daily Stand-up meeting occurs every working morning and is time boxed to 15 minutes. Nils further states that it is important that the Daily Scrum meeting does not exceed the 15 minutes, but it is fine if the meeting is made shorter. Furthermore, Nils says that face-to-face communication is important and therefore it is important that all team members attend the meeting in person. The purpose of the Daily Stand-up is to plan the day and to decide how and what the team should do to reach their goals within the sprint. Nils says that the structure of the meeting can, and should, be modified if there is a need for it - working in an agile way means being agile and adjusting to the situation. Nils says that sometimes there might be a need to motivate certain team members to attend the Daily Stand-up, the reason why differ from person to person. When persons tend to become unmotivated Nils tries to motivate them by reminding them why the meetings are held and eventually even the most sceptical team member finds the meetings useful. Furthermore, Nils find it important to focus on the team and not on the individuals attending.

The benefits Nils mentions is the planning of the upcoming 24 hours and that the focus lies on how the team can reach their goals within the sprint.

Nils cannot come up with any drawbacks when it comes to the Daily Stand-up meeting. The only downside, or problem, Nils could identify is when the team is distributed to different buildings or countries. Furthermore, Nils stresses once again that face-to-face communication is important and that this is something that can be limited when teams are distributed. He also states that there is not the same need for Daily Stand-ups if the team is positioned in the same room and work close together.

Regarding the Scrum-of-Scrums meeting, Nils claims to have implemented it by the book. The Scrum-of-Scrums meetings are time boxed to 30 minutes and occur once a week. The Scrum-of-Scrums meeting is attended by the Scrum Masters. Nils again stress the importance of face-to-face communication, something he says is important to avoid misunderstandings and to save time. Nils is a firm believer in that if you cannot attend the meeting, someone else should be sent in your place. If and when someone else is sent, this someone should be a team member with the appropriate knowledge. The advantages of the same person attending every meeting is the consistency as well as it being easier to follow up older meetings with the same attendants as in the previous meeting. The main purpose of the meeting is to know if any team is creating a blocker that will affect other teams. After the meeting, the arisen topics should be shared within the teams. Nils describes the structure of the Scrum-of-Scrums meeting to be similar to the structure of the Daily Stand-up meeting. The Scrum-of-Scrums involves the same sort of questions and is consistent in time and place.

The benefit identified is that the Scrum-of-Scrums it is a meeting where that blockers are discussed.

Nils cannot see any big disadvantages regarding Scrum-of-Scrums as of now. However, the structure is not set in stone and it might evolve when then teams and Scrum Masters get more used to it.

The final thoughts which Nils brings up is that he only see Daily Stand-up and Scrum-of-Scrums of a part of the whole in a larger context, these two meetings are nothing more than just tools. It is not enough just to attend as they are implemented to solve problems. Nils emphasises that the tools should only be used if it brings any value, if not, then do not use these specific tools. Nils (2019, April 5, Personal interview) says that "Doing Agile instead of being Agile, Agile is an adjective not a product or schedule, it is a way of thinking". Nils states that by applying agile frameworks does not mean that the company works in an agile way.

Mikael - Scrum Master/Developer

Mikael is a Scrum Master of one team and works as a developer in another team within the company where he works. Mikael informs that he is a certified Scrum Master, something, which he says, gives him support internationally.

Mikael starts by stating that the company has expanded. During the expansion phase it was decided to implement some sort of framework and Scrum was chosen to be the one. Mikael informs that the Daily Stand-up occur every morning at 9:00 and lasts for about 10 minutes. After the ten standard minutes of the Daily Stand-up there is an opening for further team discussions. Mikael states that, sometimes, the meeting gets too long, mostly due to lack of focus, something that could probably be avoided by repeating the purpose of the meeting. He states that the Daily Stand-up is a good way to start of the day. Moving on, two teams within the company facilitates the Daily Stand-up meetings at the same time. Mikael claims that the Daily Stand-up meeting adds value as a daily gathering of the team. But the meeting is more to report rather than a meeting to plan the next 24 hours. The meeting follows the three classic questions but there is not a pre-decided person who starts the meeting, anyone who wants to start the discussion can start. Mikael cannot think of

any different opinions concerning the Daily Stand-up meetings, everyone seems to like them. That said, Mikael has thought about the need of the Daily Stand-up. He mentions that all team members communicate throughout the day, something that causes the advantage of the meeting to be somewhat unclear.

Benefits of the meeting is that everyone in the team is aware of what the others are doing and that the teams aim to avoid dependencies between each other.

Regarding the Scrum-of-Scrums meeting, Mikael says that the company do not apply Scrum-of-Scrums. However, Mikael says that if a Scrum-of-Scrums meeting should be applied he states that it would deepen the understanding and spread awareness to other teams. Mikael also says that one from each team should attend in such a case and that the person attending should be rotated every week. The purpose of such a meeting would be to distribute information across the teams and identify any dependencies.

Jan - Scrum Master

Jan is a Business Analyst and is currently working as a Scrum Master.

Jan starts by saying that neither the implementation or the use of Daily Stand-up or Scrum-of-Scrums is done by the book. Therefore, the occurrence and the time set for Daily Stand-up differs within the company. Jan says that this is common in companies that the implementation of Daily Stand-up, or any other arbitrary Agile methodologies, is not done by the book. Jan claims that everyone tweaks the process to fit their organisation. Moving on, Jan informs that Daily Stand-up is implemented in slightly different ways within the company. One team facilitates the meeting at the same place but only three times a week, this is due to the team spending much time together outside the meetings. Another team holds the Daily Stand-up every day, with all people either being in the same place or calling in to the meeting. When all team members are not in the same place, Jan says that it takes more coordination and that it creates some hassles. Jan says it is crucial that everyone in the team knows each other. It is important for team spirit to know somethings about coworker's personal life. Jan also states that Daily Stand-ups works better in the smaller of the two teams where the other members of the team are more senior and take more responsibility for their work as well as them having a good understanding of how to work with the Scrum framework and Agile methodologies. In the other team, where it does not work as well, Jan claims it to be because people are not in the same place, there are different cultures among members of the team as well as peoples difference in experience. Moving on, the purpose and focus of the meeting is on what will happen going onwards, what tasks the teams are going to take on and the aim is to identify blockers and or dependencies. Jan states that there is a challenge within the teams to finish tasks. Furthermore, Jan explains that, during the meeting, he likes to work through the Scrum boards from right to left. The aim is to finish off as many tasks as possible, but he does not expect to cover all of them within one meeting. Jan is unsure if everyone gets to speak during the meetings. They sum up the meeting by opening up for questions or any topics worth discussing. After this, there is a short time to report and therefore the meetings usually end up being 25 minutes long. Jan says that it is more efficient to go through everything in need of getting addressed than having an additional meeting after the Daily Stand-up. This is something that was decided unanimously in the

group. Jan states that it is important that the team is measured on what the team produces and not on what single individuals produce.

The benefits Jan identifies for the Daily Stand-up meeting is that issues should be solved during the day to avoid interruptions of the workflow. Another benefit is that lead times are generally shortened down by working in an agile way.

Regarding the Scrum-of-Scrums meeting, Jan says that the meetings are held once a week and lasts for about 30 minutes. Scrum Masters as well as Agile coaches and RTE (Release Train Engineers) attend the meeting. In the beginning the meeting was supposed to be a meeting to discuss dependencies. But Jan says that eventual problems or dependencies are discussed throughout the day and that most teams lack dependencies between each other. Therefore, the meeting has evolved into being a status update meeting - an opportunity to check that the goals will be reached and to check up on progress. Team members do not think that it brings any value, mostly due to topics being irrelevant for some of the attendants. The meetings are executed in the same way as the Daily Stand-up meetings but features rather than stories are discussed during the Scrum-of-Scrums meeting. In this context Scrum-of-Scrum is basically scaled up from the Daily Stand-up. The Agile coach is responsible for commenting on the progress and Jan presses that this meeting is a great resource and a big advantage. But there is a somewhat negative mindset when it comes to the Scrum-of-Scrums meeting and Jan does not want to attend the Scrum-of-Scrums meetings either. Jan does not find that it brings enough value, and everyone does not always attend, then why should he? Jan blames the lack of attendance for being the reason for not taking the Scrum-of-Scrums seriously. If Jan cannot attend the Scrum-of-Scrums meeting someone else from the team will be sent. Preferably the Product Owner, or any other person from the development team.

Finally, Jan says that, it is so much easier to do things right and deliver the correct result to the customer when applying an Agile methodology rather than working by the waterfall process. Jan says that it would be good to learn from other teams when it comes to the process, and inspect how they work to get even better, but he sees time as a limit.

Anna - Scrum Master

Anna is a Scrum Master at a hardware company. She is Scrum Master of three teams and applies the Scrum methodology in all teams.

Anna starts by describing that the implementation has differed in all teams depending on the size of the team, but that Daily Stand-up occurs every day at set time chosen by teams and lasts for 15 minutes. Anna mentions that it is hard to find a time slot for everyone where the Daily Stand-up works best. According to Anna there is a greater risk to exceed the time limit in the larger of the three teams. The purpose of the meeting is to discuss the matters that have occurred, what is in the pipe going onwards and if anyone in the team needs any help. Anna says that the meeting should create value for the team and therefore the meeting should be adjusted along with what the team wants, it is the team's meeting. Moreover, the meeting does not cover the three standard questions used by the book as this was found to create too much repetition and did not bring as much value. Instead the Daily Stand-up covers all tasks in the pipe. Anna further stresses that the meeting is for the team

and it should be meaningful to attend and not feel like something you must do. Moving on, in the smaller teams the structure described above is used. In larger teams, in the beginning of the week, the focus lies on the the sprint. In the same teams, in the end of the week, anyone who wants to share something can. The late week meetings tend to be shorter.

The benefits of the meeting is that information is spread through the team in an efficient way as well as the meeting being a good platform for the team to help each other. The biggest advantage is that the team plans together and everyone help each other out.

Regarding the Scrum-of-Scrums meeting, Anna says that the meeting is held once a week. The meetings last for one and a half hour as the previous time boxed hour was not enough. Anna does not think that the length is a problem as this is the only Scrum-of-Scrums meeting during the week. All Scrum Masters and RTE's attend. Anna says that attendance is quite high but the energy and the engagement at the meeting is not as high as it should be. She says that this might be due to people not being passionate about the Scrum Master role or passionate on how to develop the way of working further. During the meeting there is usually some practical information which needs to be covered and information on how to execute certain things. There are also discussions on how the distributed work within the teams can be made easier and how their daily work life can be improved. Considering dependencies across the teams there are not many dependencies within one unit as there are between other units in the company. Otherwise, the attendants have a list of subjects which they find interesting and sometimes they choose a subject from this list and discuss it, anyone is free to bring up subjects. Anna says that the meeting has the possibility to bring more value to the attendants than it does as of now but, but she is not sure how to do this. Anna, once again, emphasise that value-creating topics are the topics that should be discussed during the meeting.

Anna says, as a final mark in the interview, that all meetings can always be improved. Anna says that it is important that the structure and purpose of the meeting are fulfilled. When it comes to the process in general Anna says that discussing the process and improving everything you do is crucial. Anna once again stresses that the meeting should not just be done by the book but rather create value, if the meeting is boring, why should it exist?

John - Scrum Master

John is both a Scrum Master and an IT consultant.

John states that there are eight teams in the company and not all teams apply Daily Stand-up. The teams that apply Daily Stand-up meetings have got a time box of 15 minutes and a set place for the meeting. John mentioned a concept called "the parking lot". The parking lot is held after the meeting, it is not mandatory, and it is an unofficial meeting where any unfinished discussions can continue and where anyone interested or affected is attending. The parking lot is to make sure that the 15-minute time box for the Daily Stand-up is not exceeded. Moreover, John explains the reason for hosting the Daily Stand-up to be that in the agile process applied at the company the teams cannot make decisions all the way through. The teams cannot take a feature from start to end they are dependent on other teams to make decisions along the way. And that is for planning the daily work. They follow the structure by using the three standard Daily Stand-up questions.

Communication is strengthened due to Daily Stand-up, which is a benefit, communication between teams strengthen the company product and is of great importance. Another benefit is that the meeting provides a platform to help each other to be as efficient as possible in terms of team work. It is a meeting to plan the daily work and it helps to ensure that everyone works on the high prioritised tasks.

The disadvantages which are mentioned are the meeting being energy consuming when it covers subjects which does not interest everyone in the team. Also, it does not always work perfectly, some team members are too talkative and forget the purpose of the meeting and discusses their own interests too much. Everyone cannot always be present during the meeting, John finds body language to be an important part and purpose of the meeting. The last disadvantages which Jan can find is that content is sometimes irrelevant and people get bored and therefore do not find the meetings relevant as of that.

Regarding the Scrum-of-Scrums meeting, John says that it does not work at the company. People do not attend and do not find a big enough interest in the meeting. When it was implemented it was all Scrum Masters attending the meeting and the meetings were held every week. The intention of the meeting was to find a synergy between the teams but ended up with people being late and discussions being off topic. The meetings are described by John to be informal and he says that if the purpose was made clearer it could have been easier to get people interested. John says that the meeting should cover what value the teams has covered through the sprints. However, John describes an e-mail being distributed every week. This e-mail describes what that specific team has done during the week and John says that e-mail works better than the actual Scrum-of-Scrums meeting.

Ulf - Scrum Master

Ulf is a Scrum Master of two teams.

Ulf says that he has tried to implement Scrum by the book. Daily Stand-up occurs every day at a set time and is time boxed to 15 minutes. Ulf does not think that the time of the day is an important part of the meeting but rather that the plan for the upcoming 24 hours is made. According to Ulf, it is only the Development Team that must attend, but the Product Owner and the Scrum Master often attend also. Ulf states that the purpose of the Daily Stand-up is for the team to discuss what to do during the day and coordinate between each other. When the team is done with their discussion the Product Owner or the Scrum Master might give their inputs and direct the team towards the goal. Ulf says that this is a good format for the team. If this had not been done and by having the meeting where only the Development Team could attend, Ulf says that it would be hard to reach the goals and is unsure if misunderstandings could be evaded. Furthermore, Ulf states that efficiency and speed would be jeopardised. When it comes to structure the two teams have adapted Daily Stand-up to their way of working and what suits them best. Ulf cannot see any problems in that there is a difference in this. Ulf tries to make sure that the Daily Stand-up meeting is somewhat conducted by the book as this is believed to provide efficiency. The team stand up during the meeting and Ulf finds that this provides efficiency and that the meeting gets more interactive.

The Daily Stand-up has made the teams work more closely together and the Daily Stand-up

works in an efficient way and creates value which both are beneficial aspects. According to Ulf, no one else have any contradictory opinions.

The disadvantages Ulf finds is tardiness or absentness, as the meeting started, within designated time, the team did not wait for absent persons to arrive - something that created a lot of problems. After the meeting the late or absent person had to get filled in on what had happened during the meeting, and the person being late or absent had to inform the other team members in on what he or she had done and planned to do – to make sure that this did not collide with the new plan for the day. This problem was solved by moving the meeting time.

Regarding the Scrum-of-Scrums meeting, Ulf informs that there is a meeting which is somewhat like a Scrum-of-Scrums. This meeting is held at the same time every other day. The meeting is scheduled for 15 minutes but the time box is often exceeded. When the meeting time is extended Ulf finds that the discussions of topic are brought up and that the meeting could be developed with a stricter deadline. Moving on, Ulf says that one participant from each of the teams as well as some other people, like the Product Owner attends this meeting. The participants going to the meeting are decided before the meeting, but often it is the person who thinks it creates value for himself/herself that attends. Ulf says that the main purpose of the meeting is to discuss problems that are common among the teams. An extra aspect of this meeting is that other people attending the meeting, people that are not members of the Development Team, want a report from the meeting. Ulf says that the meeting could be of use of the team and create value for the attendants but is unsure if everyone has the same picture of the purpose. There is not a strict agenda for the meeting which sometimes create issues on how the discussions should start and how to go about the discussions.

Lastly, Ulf claims that discipline such as, having relevant discussions which are applied at the Daily Stand-up meetings should be applied at the Scrum-of-Scrums meeting too. The team spirit in the Scrum-of-Scrums meeting is not as high as in the Daily Stand-up meetings. Ulf says that this is because the individuals attending the Scrum-of-Scrums are not working as closely together as the individuals in the team attending the Daily Stand-up. Ulf is unsure if it is important that the same people attend the Scrum-of-Scrums meeting over and over again, and says that he believes that rotation of people is good.

Niklas - Release Train Engineer

Niklas works as a Release Train Engineer, which means that he is responsible for handling any obstacles preventing the teams from doing their job and reaching their goal. He works at a hardware company.

According to Niklas the Agile principles are used as guidelines in their process of working with Daily Stand-ups. The company tries to use the Agile frameworks in a way, where they set a goal for what they want to achieve and then implement the frameworks by tweaking them to fit the organisation in the way they want. The Daily Stand-up is time boxed to 15 minutes and held every morning. The meeting is held in the morning because the purpose of the meeting is to discuss what is going to happen during the day and the day following. Furthermore, the Daily Stand-up also functions as a platform to discuss problems and how

the teams work should be executed together. Moving on, in the beginning the meeting did not have any positive outcomes, the teams already worked closely together and could not see the purpose of the meeting and the team members were often late. Niklas explains that after the Daily Stand-up had been implemented they used the three standard questions but in some way it evolved into the team only covering the backlog during the meeting. He further explains that as for now there is no clear agenda for the meeting, instead, discussions are started based on what the team needs that specific day. Niklas ends this by stating that now everyone finds value in the meeting, even the individuals who works most closely together. Moreover, Niklas says that the best Daily Stand-up meetings are the ones when the Scrum Master does not have to interfere with the discussions. Niklas states that it is important that no individual host the meeting as this means that the meeting gets too structured.

The benefits of the Daily Stand-up meeting, Niklas says, is decreased email correspondence as well as decreased worrying among the team members. There are less misunderstandings due to the face to face communication. Also, the team is tighter than before, everyone knows each others skills and what the other team members can help out with. The disadvantage found there is to much focus on the team and not enough on the individual.

Some other disadvantages which Niklas mentions is that there is too much focus on the team and not as much on the individual. Niklas says that they have meetings every week with all Scrum Masters, something which is considered to be less than optimal. Niklas says that the best solution would be to talk with the people actually doing the job. In this meeting, the structure is basically the same as for the Daily Stand-up to enable the Scrum Masters to discuss any problems or issues which occur as well as discuss how the work is proceeding. It is basically a status meeting with the aim to disturb the teams as little as possible.

Regarding the Scrum-of-Scrums meeting Niklas says that the meeting is held every week for one hour and 30 minutes. The agenda is not set but there is a document where everyone can add topics of interest and at the actual meeting the topics are gone through and a decision on what to talk about is made. It is supposed to be an overall meeting instead of a meeting to discuss technicalities.

The identified benefits of the SoS meeting is that the leaders have been more aware of how they manage the teams. Niklas says that there are no problems because of the lack of technical knowledge within the meeting. It would limit the teams on a long term basis If the Scrum Masters would have technical responsibilities, as they would ask the Scrum Master or the Product Owner for answers.

A disadvantage of the meeting is that the engagement of the meeting varies due to renewal of team members.

Lastly, Niklas says that the structure at the company makes the possibility for the teams to make all own decisions impossible. Furthermore, Niklas do not find that it is problematic to use Agile development even though they produce hardware, the only problem is that lead times cannot be taken into consideration. Niklas says that is not a good idea to be both a Scrum Master and a part of the Development Team, there is a conflict of interest. That said, when a team is senior and well established within the Agile methodology, there can be a rotation of the Scrum Master, if the mode of operation is well established and

the responsibility within the team members is high. Niklas says that the Scrum framework has enlarged the teams understanding of that they are a part of something bigger. Lastly, a disadvantage of Scrum, is that it might be chosen due to it being easily understandable.

Stina - Scrum Master / Team member

Stina is working half-time as a Scrum Master and half-time team member in a hardware team.

Stina starts by saying that Daily Stand-up is applied at the company where she works. The meeting is held three times a week and last for 15 to 30 minutes. Stina says that the occurrence of the meeting might not be sufficient but at the same time it is what works best for the team. She further states that they have previously had the meetings five times a week and the feeling within the team was that it was too often. Moving on, the purpose of the meeting is to understand why the different tasks are not getting finished in time and how the team can help each other out. According to Stina the agenda is sometimes structured by the three standard questions and at other times whoever feels like they have a topic to discuss is free to bring it up. Moreover, when discussions sometimes wander off Stina explains that she sometimes let these discussions be. Stina stresses that the meeting should focus on what the team finds effective and that the Scrum Master should not interfere too much, with suggestions and such. Stina however, says that she would prefer if these discussions were kept outside the Daily Stand-up meeting.

The benefits are that problems are solved faster after having implemented the Daily Stand-up meetings.

Although advantages are found, so are disadvantages. Engagement is low and Stina says that it might be because the team is new to the Scrum framework, or it might be because some individuals are more comfortable to work by them self rather than in teams.

Regarding the Scrum-of-Scrums meeting, Stina says that all Scrum Masters attend and that it is held twice a week for one hour each time. The meeting starts off with 20 minutes of information, information that the Scrum Masters need to inform their teams about, after this there is 20 minutes of reporting on projects and lastly there are 20 minutes to lift any issues the Scrum Masters find relevant for the day. The occurrence or time box of the meeting has not been evaluated or discussed within the company. The meetings purpose is fitted to what the attendants of the meeting find relevant. Stina says that the purpose of the meeting should be to lift problems, stoppers or dependencies that prevent the teams from moving forward. According to her there is no structure on how to handle these problems, stoppers or dependencies within the company. Dependencies arise due to different priorities within the organisation and lack of synchronising between the teams. Stina states that there is a vision for the meeting, but the vision is not fulfilled.

There comes benefits with Scrum-of-Scrums. The meeting synchronise the teams and it is a time to identify and lift problems. Stina moves on and says that the meeting would be good if the basic purpose was fulfilled.

The disadvantages are that the Scrum Master need to attend the meeting, Stina does not find this necessary. If other team members would attend, the team members would gain more

perspective and there would be an overall bigger engagement. Sometimes it is hard to understand what problems are relevant to lift during the meeting. Lastly, the person facilitating the meeting needs to create an environment where it is comfortable to lift problems.

Finally, Stina says that the advantages of Scrum is that changes can be made. There are not countless hours put into planning with the thought that everything is going to change anyways. It is also good to reflect upon what works well and what does not work as well. Furthermore, Stina says that it is a bit tricky to implement Scrum in hardware companies as the lead times are a bit longer than for software - the sprints are longer. For a final comment, Stina emphasise that the implementation of the agile framework lessens the need of emails and phone calls, something that creates more time to producing value for the customer.

5 | Analysis

This chapter contains the analysis of the findings from the research by combining theory and results. To conduct a proper discussion on how Scrum-of-Scrums have issues compared to Daily Stand-up meetings, a baseline analysis of Daily Stand-up's strengths and weaknesses is presented in section 5.1 below. As the observed implementations and their effects are pretty homogeneous, this analysis is mainly focused around pinpointing deviations while expressing how and why the Daily Stand-up meeting has found success. With this baseline in mind, the authors discuss what parts and to what degree of this the Scrum-of-Scrums tool may obtain in section 5.2. Finally the two methods are compared directly in 5.3 and it is assessed what differences that generate issues for Scrum-of-Scrums meetings.

5.1 Findings about Daily Stand-ups

Judging from the conducted interviews, there seems to exist an overall consensus between theory and practice, what the purpose and procedure of the Daily Stand-up meetings are. Majority of the respondents claim to conduct the meetings in a similar fashion as to the recommendations of Stray et al. (2016). These respondents also recognise that they have made minor adjustments to their implementation of the Daily Stand-ups to fit their teams. The most significant adaptations of Daily Stand-ups are discussed in the following subsections. The reason for this, being that these might provide indications of how Daily Stand-ups are adapted locally to serve its purpose, which in turn can help shed light on why similar adjustments are more difficult to make in order to improve Scrum-of-Scrums.

5.1.1 Meeting frequency

Most teams have chosen to conduct the Daily Stand-up meeting every day. Stina's teams have specifically chosen a different meeting-frequency. Jan on the other hand, mentions that there exists a difference on meeting frequency within the company. This is a change that goes against the original guidelines of the Daily Stand-up, introduced by Schwaber and Sutherland (2017). However, a recent study by Stray et al. (2016), supports that Daily Stand-up meetings do not necessarily have to be held on a daily basis to be effective. The companies' decision to reduce the frequency of the Daily Stand-up meetings seem to be based on one of the two following reasons.

Firstly, there might simply not be a need to have the meeting everyday. As Stina mentioned, the reason for their decrease in frequency of the meetings is due to a feeling within the team of having a meeting too often. There could be many reasons for this feeling. One reason might derive from a low effectiveness of the meeting and where a better solution is to instead change the way the meeting is conducted. It could also derive from the fact that a project has longer periods between significant changes in which it would be correct to reduce the meeting frequency.

Secondly, that the teams have a difficulties scheduling the meeting so that enough members, for the meeting to be worthwhile, can attend. Jan said that his reason for the decrease in frequency is that team members are not on site every day. Nils agrees with Jan by claiming that face-to-face communication is important and therefore its important that members attend meeting in person. Others have mentioned that when communication-tools, such as Skype, are used with the aim to have the team members present at the meeting, it often leads to other problems. Lena specifically mentions that the meeting, as a whole, will run less smoothly if people do not attend in-person.

5.1.2 Meeting duration

A majority of the studied teams responded that 15 minutes was allocated for the Daily Stand-up meetings in accordance with (Schwaber, 2004; Stray et al., 2016). In the case of the longer 30 minute meeting, respondent Lena has perceived that there is a general fatigue of meetings even though it is not directed to the Daily Stand-up itself. The reason for the meeting being 30 minutes long is, according to her, due to technical discussions often taking place. Stray et al. (2016) has however noted that too long meetings was one of the most common reasons for negative opinions of the Daily Stand-up meeting. Larman and Vodde (2010) agree with Stray et al. (2016), emphasising the importance of keeping the meeting brief as to not feel like a waste of time for the participants. Even if Lena's team does not feel that the Daily Stand-up is overbearing it is possibly contributing to the meeting fatigue which could be lessened if these technical discussions are held separately after the meetings with the relevant participants, according to the advice of (Maximini, 2015).

5.1.3 Abandoning the three standard questions

A majority of the interviewees mention that they implemented the standard questions in their team , as defined in (Schwaber, 2004; Maximini, 2015). Some of these teams as they became more experienced working with Daily Stand-ups, gradually adapted the structure of the meeting to a structure that fit the team. A wide variety of different adaptations are used by the different teams. For example Lena has gone from the traditional person to person to a feature to feature structure where the focus is directed towards how the team should approach the tasks at hand instead of what each person will do. As Anna noted, the meeting should create value for the team and therefor the meeting should be adjusted for what the team wants. Stray et al. (2018) agrees with the notion above, saying that one

should adapt what is discussed during the Daily Stand-up meetings. The benefit of adapting the topics would be to eliminate unnecessary information as one does not go into certain details just for the sake of it. This leads to the meetings not getting to repetitive and creating more value. Respondents within the teams using an adapted structure do agree that the standard questions are a good start and useful until the team is mature enough to identify what information is valuable to bring up at the meeting.

5.1.4 Daily Stand-up in general

The Daily Stand-up meetings seem to be conceived as a good tool to facilitate team coordination, albeit most respondents, state that the process is a work in progress. Apart from being a good way to plan and brief, many respondents claim to see that the meeting breeds better teamwork and team spirit, this reinforces the previous findings by (Dorairaj et al., 2012). Factors in common to garner these benefits are keeping them brief, regularly and concise to facilitate good planning, while having them more open-ended and informal but still concise seem to further the teamwork better in a mature team that understand the Agile mindset. In a immature team there is value in using the standard structure of the meeting defined by (Schwaber, 2004; Maximini, 2015).

While the standard structure does have some value, there seems to be a consensus that one should adapt the Daily Stand-up to fit the needs of the team. Many of the participants structure their Daily Stand-up meetings in accordance with (Stray et al., 2016; Stray et al., 2018) and adjust both how they structure the discussions in the meetings, as well as the frequency of them. This also relates to the Agile manifesto, in which it is stated that one should focus on "Individuals and interactions over processes and tools". It is easy to get stuck on the traditional process of the meetings but Dingsøyr et al. (2019) state that the framework should be used to achieve a goal, not the other way around.

There seems to be a consensus about what the purpose of the Daily stand-up meeting. Several interviewees talk about dependencies being a common topic and reason to have the meeting as well as synchronising the team and plan the day ahead. Interviewees also discuss having the meeting for reporting and status update of the goals and progress.

5.2 Findings about Scrum-of-Scrums

Judging from the conducted interviews, there doesn't seem to exist an overall consensus between practitioner literature (Schwaber, 2004) and practice. The nature of Scrum-of-Scrums seems to be more complex due to a larger variance of both purpose and shape across our population than its single-team counterpart Daily Stand-up. The variance in purpose exist is in stark contrast to what Schwaber (2004) discusses. A common theme throughout the interviews have been the variance in who attends the Scrum-of-Scrums meetings. Paasivaara et al. (2012, p. 237) states, that the result of her paper is that the Scrum-of-Scrums meeting works poorly when the meeting has "too many participants with disjoint interests

and concerns". Same type of inconsistencies are discussed by the interviewees topics as frequency, duration and adaptations are brought up. Scrum-of-Scrums related issues and topics for these along with proposed solutions are discussed in the following subsections.

5.2.1 Purpose of Scrum-of-Scrums

The purpose of the Scrum-of-Scrums meeting is the same as for the Daily Stand-up meeting but intended to be used when multiple teams are involved. The meeting is intended for synchronisation and information to flow between teams (Larman & Vodde, 2010). Despite this clear purpose, which among others Schwaber (2004) states, there is a difference when it comes to what the purpose of the Scrum-of-Scrums meetings is, at the companies of the respondents. The mere variation of purposes presented in chapter four suggest disparities in types of benefits and levels of success.

The majority of the interviewed respondents describe their Scrum-of-Scrums meetings as containing inter-team planning in some way. It is the basis for the other possible benefits such as treating dependencies between teams and enables a coherent vision of the future product.

Handling inter-team dependencies seems to be a popular purpose among the respondents. Kalle, Lena and Nils are some of the respondents who use the Scrum-of-Scrums meeting to clear out dependencies. This is pretty closely related to the train of thought used in the Daily Stand-up where a goal is to help each other work in a more efficient manner. A Scrum-of-Scrums style meeting is a good forum to address such problems if there in fact are such dependencies but its efficiency may vary greatly depending on factors such as attendants, products or organisational structure.

One purpose that would not be considered common practice, nor the most valuable, according to previous research is to let the Scrum-of-Scrums meeting be a pure status update meeting (Paasivaara et al., 2012; Larman & Vodde, 2010). Whether an organisation actually gains from a status meeting or the standard SoS depends on the degree on which the teams are dependent on one another. Low dependency between teams implies little actual use of SoS and can possibly be replaced by shorter status briefings. Respondent John has found good use for a weekly status e-mail when dealing with fewer technical dependencies. This saves time as the sole purpose of the meeting is to spread information.

Having a meeting with the purpose of improving their way of working in the organisation as several respondents describe, is not either the intended application for Scrum-of-Scrums but might be a valuable process regardless. It is then called a *Community of Practice* and has a main purpose of being a place for sharing general knowledge and tips within a profession (Larman & Vodde, 2010). It does however not solve any of the other issues that Scrum-of-Scrums intend to address such as planning or solving dependencies which need to be taken care of in one fashion or another. That these meetings might be 90 minutes weekly as observed with one respondent, Anna, might contribute to low energy levels among participants as it is a lot of time to discuss problems that some may find trivial.

5.2.2 Attendants

Sending the team's Scrum Master to the Scrum-of-Scrums meeting is considered bad practice as this often leads to the Scrum Master entering a role which tends to slip towards being like a traditional project manager (Larman & Vodde, 2010). This however seems to be quite common as 6 out of 11 have the Scrum Master as the main attendee.

John was one who had conducted SoS with exclusively Scrum Masters, this had not worked out well due to a mix of lack of interest and off topic discussion. Their intended purpose with the SoS was to increase synergy between the teams, this purpose not being specific enough might have been a reason to why the SoS did not result in anything of value. Sending someone with technical understanding of the project might have yielded better results as it allows for dependency-related discussions, which is what Larman and Vodde (2010) state adds the most value. This is something the Scrum Masters might not be able to do as they don't have a full grasp of the project's technical implementation.

In Ulf's company they did rotate the SoS participants based on who they believed could add valuable insight to the discussion, and managed to achieve positive results. The fact that they rotated members the way they did, shows that they knew what they wanted to discuss during the meeting. This could be a reason to why the participants do not lack subject interest, which noted as a common issue with SoS (Paasivaara et al., 2012).

Pelle and Ulf described that the representative from the team attending the meeting was rotated and changed from meeting to meeting. This was considered good for the team as it created value for the meeting as well as the meeting being taken seriously. This also gave more team members the opportunity to gain a better general insight on how other parts of the organisation operates. On the downside, this made the Scrum-of-Scrums meeting inconsistent as reoccurring topics was hard to cover due to the change of attendants. Some of the SoS meetings described seem to better match the description of Scrum of Scrum Masters or Scrum of Product owners as described by (Larman & Vodde, 2010), although the original intention seem to have been to implement a standard SoS. The purpose is however shifted towards discussion of general problems faced in the teams. Niklas, participating in one of these meetings, also states that their meeting is not meant to solve technical dependencies, which further adds to the resemblance of a Scrum-of-Scrum Masters meeting.

It can be concluded that there is a correlation when it comes to the number of teams attending the Scrum-of-Scrums meetings and the meeting efficiency as described by Paasivaara et al. (2012). Some of the respondents in the different interviews have stated that it sometimes is a problem with many attendants, and state that it may lead to exhaustive meeting duration's and increased frequency of irrelevant topics being discussed. The fact that the teams have to select one representative, to aid in solving possible problems as well as act as an information-bridge between different levels in the project, will increase the complexity compared to the Daily Stand-up meeting. This makes it even more important that the purpose of the meeting is clear, as to make sure that the right person is sent and will be able to aid in the discussions. This is one way to combat the issue with attendees lacking subject interest, which is known problem in both DSM (Stray et al., 2016) and SoS (Paasivaara et al., 2012). Rotating

participants is not a popular solution, judging by the interviews, but the times it is done correctly, it appears to yield decent results. A possible reason can be that more thought have been put into the method when it is conducted in this manner.

5.2.3 Frequency and duration

The time-box set for the Scrum-of-Scrums meeting ranges from 15 minutes (Larman & Vodde, 2010), up to a maximum of one hour (Cohn, 2007), depending on the structure of the meeting. The longer meeting is proposed as a way to allow problem solving on a more technical basis, while the shorter version follows closely to the Daily Stand-up structure; with self-organised meetings afterwards with the relevant parties. It is important that the length of the Scrum-of-Scrums is adjusted to what is needed in the project to increase efficiency and minimise frustration, which is also described by (Paasivaara et al., 2012). With stronger dependencies between project teams, the longer meeting might be favourable as it allows for solutions to be found on the spot, while still being relevant for the participants. If there only exists loose dependencies it might be better to allow for brief synchronisation during 15 minutes and then have smaller meetings between the parties that find it necessary.

As seen from the interviews the duration of the Scrum-of-Scrums meetings varies between 15 and 90 minutes. The weekly 90-minute meeting that Anna participates in is a Scrum-of-Scrum Master meeting by definition (Larman & Vodde, 2010). The meeting's purpose is broad and the reason for it being 90 minutes is that the previously held 60-minute meeting was too short for their discussions. The meeting does however work quite poorly, as there is a lack of both energy and engagement from participants. Even if it is a Scrum-of-Scrum Masters meeting, it seem that 90 minutes is too long to keep the focus of the participants and that some discussion might lack relevance. Niklas' company also has 90 minutes long Scrum-of-Scrum Master meetings with varying engagement, he however, believes that this depends on the renewal of team members.

Jan participates in a weekly 30 minute Scrum-of-Scrums meeting. However, even in these shorter meetings, he describes a lack of engagement and that he does not consider the meetings effective. According to Jan the main reason is a lack of a clear purpose. Lena on the other hand, who has Product Owners attend in 15 minute Scrum-of-Scrums meetings every other day, is satisfied with the results. As the purpose of the meeting is to find constraints and solve technical dependencies it can be described as Scrum-of-Scrums, although Maximini (2015) argues against Product Owners attending the Scrum-of-Scrums. Lena's main complain about the Scrum-of-Scrums are that they focus too much on the technical problems.

How clear the purpose of the meeting is seems to be an aspect that has a great effect on the success of the Scrum-of-Scrums. The more relevant the discussions are to the described purpose, the easier it is for the participant stay focused during the entirety of the meeting. It is also easier for the Scrum-of-Scrums-participants to relay the relevant information to their team as they don't have to filter between relevant and irrelevant information. There is a fine line between the meeting being too long; which results in lost interest of the attendants,

and the meeting being too short; which prevents the participants from discussing topics that are considered essential. The duration and frequency has to be decided in accordance with the purpose of the Scrum-of-Scrums meeting, for it to even have a chance to yield positive results.

5.3 Issues with Scrum-of-Scrums compared to Daily Stand-up

A discovered problem when scaling the Daily Stand-up meeting into a Scrum-of-Scrums meeting is that the same benefits are not granted as the delegates are not part of the same team. A subject which arises in the majority of the interviews conducted, is that it is difficult to maintain a relevant and useful structure for inter-team coordination due to a lack of affinity. This makes much of the meeting irrelevant for many participants and may result in loss of interest and absence from the meetings. This phenomenon is something that does not seem to occur with Daily Stand-ups as team members routinely communicate and have a more relatable connection to one another. Presence and dedication is considered key factors among most respondents for having a successful meeting and this is likely one of the reasons that the teams try to find common ground by having Scrum Masters or Product Owners attend the meetings. To dispose of this problem it may be useful to create a team-like fellowship between the affected teams.

Self-organising teams is a core aspect of Agile development (Dikert et al., 2016). This can work well within teams but might generate issues in the context of Scrum-of-Scrums as there is no obvious way to facilitate a self-organising Scrum-of-Scrums meeting. This is due to all the participants' teams having a much more explicit area of operations than individuals within a team and are thus unable to adapt together in a flexible way. Another problem regarding this way of planning is that the representatives are put in a position where they make decisions for their whole team which to some degree renders the team unable to be fully self-organising. This is one reason to why Larman and Vodde (2010) suggest for teams to rotate which team member attends the Scrum-of-Scrums meeting. It does otherwise push for some individuals to take more responsibility and shape leaders. The notion to have different people attend Scrum-of-Scrums at each occasion is quite interesting since it cannot be applied at Daily Stand-up. The users of this concept have acknowledged both benefits and drawbacks and have made it a valid point to consider when implementing a structural solution for inter-team coordination.

Just like all types of meetings, both Daily Stand-up and Scrum-of-Scrums are affected by the number of participants. This is evident from the conducted interviews. The Scrum-of-Scrums meeting seems to be a little more susceptible to having issues with longer meetings and irrelevant topics since the attendants do not necessarily meet every day as team members do as well at it being harder to answer the questions in within the set time box (Paasivaara et al., 2012). As long as meetings have been met with resistance regarding both Daily Stand-up and Scrum-of-Scrums it is advisable to keep these meetings short. One issue

unique with Scrum-of-Scrums is that since the attendants are from different teams there is less opportunity to further discuss unsolved topics as the attendants might have planned to return to their work space. It is suggested by John, among others of the respondents, to allocate additional time after the shorter meeting itself to handle these issues without occupying all attendants time.

Since it has been established both through the interview with Pelle, as other respondents, that in the present study and by Stray et al. (2018) that it might be favourable to adjust the standard questions used in Daily Stand-up, it is not a far reach to assume that this is also viable for Scrum-of-Scrums meetings as Cohn (2007), Paasivaara et al. (2012) explain that these questions are basically the same.

The Daily Stand-up meetings have been found to work well when their purpose have been clear and relevant to all attendants and the same might be true with Scrum-of-Scrums. Though have the observed implementations of the Scrum-of-Scrums meetings generally not captured the essence of this. This may be due to the misconception about its purpose or that the teams represented are not sufficiently related as Paasivaara et al. (2012) suggests. Without this technical proximity it would be irrelevant to either try to plan, share status or solve dependencies which would render the meeting effectively useless.

An important take-away from all interviews is that when it comes to Agile development it is much more important to understand the Agile mindset and be able to adapt to the task at hand than it is to implement a set of Agile methods simply because they are Agile. The agile mindset is mentioned to be important in several interviews as well as in several sources such as Maximini (2015), Dikert et al. (2016), Measey (2015). This concerns both Daily Stand-up and Scrum-of-Scrums where the latter is particularly sensitive because of all the above mentioned reasons.

6 | Conclusion

To use the Daily Stand-up meeting in this up-scaled context, by implementing Scrum-of-Scrums, is not as straight forward as with the Daily Stand-up meetings and comes with an entirely new set of additional challenges. The fact that Scrum-of-Scrums is trying to bridge the gap between teams makes it difficult to cooperate in the same way as a team using Daily Stand-ups. It has been found that these issues might be eased if a closer relationship between the concerned teams are encouraged.

The Scrum-of-Scrums meetings is described in the research in general to be longer than the Daily Stand-up meetings. Long meetings have side-effects such as reduction of productivity and an increase of off-topic discussions that might lead to fatigue. As attendants of Scrum-of-Scrums generally do not share working space it is more common that extensive details are discussed at these meetings. This renders the meeting not as effective as Daily Stand-ups unless a time slot is allocated to solve the discussed issues after the meeting as suggested by Larman and Vodde (2010).

Another aspect of the meeting, which affect the success of it, is the number of participants. The more teams there are, the more participants there will be at the Scrum-of-Scrums meeting. Paasivaara et al. (2012) state that the more participants there are at the meeting, the harder it will be to answer all the questions intended for the meeting within the time frame.

A final aspect, which also affects meeting success is the purpose of the meeting. If the purpose is not clear to all participants and if all participants are not sure on what to discuss during the meeting there is a chance of the meeting being unsuccessful as well as unnecessary.

All of the mentioned aspects above make it hard to implement the tool Scrum-of-Scrums which is commonly used in large-scale Agile projects. Scrum-of-Scrums is not bad, nor is it outdated. It is simply not a one-size-fits-all kind of solution for layered mutual adjustment and further studies are needed to determine more fully what makes a good environment for Scrum-of-Scrums.

"We see evidence of people embracing frameworks for large-scale Agile, without consideration of what problem they are trying to solve, and if the framework is really an aid. Like with agile itself, frameworks should never be the goal; frameworks should help achieve a goal." (Dingsøyr et al., 2019)

7 | Future work

In the future there is a possibility to further research on how the Scrum-of-Scrums meetings can be implemented in the most efficient way. There is an interest in finding out how the purpose can be clarified for all participants in order to make the meeting meaningful. There is also a need for finding out how to, in the most efficient way, report back to the rest of the team. This depends on different aspects such as who attends the meeting, and again the purpose of the meeting.

A | Appendix - Interview template

This appendix provide the outline of the conducted semi-structured interviews. The questions are all divided into different categories to make the structure of the interview easy to follow. Every interview did have a set of standards questions which was answered. If the answer which the interviewee did provide was unclear or if the interviewers found that the answer needed further evaluation, follow-up questions were asked. Please find the standard questions below, started of with and introduction.

Introduction

Thank you for agreeing to participate in this interview.
Are we allowed to record this interview with you?

Ethics

We are going to start of with walking you through some decisions that have been made due to ethical reasons.

- You and your company will remain anonymous in the report
- If you feel that you do not want to answer a specific question being asked, please tell us and we will move on to the next question
- The recording of this interview will only be shared among the thesis authors and will be deleted as the thesis have been handed in
- If you like, we will provide you with a copy of the interview recording and a copy of the thesis after it being finalised
- Do you have any particular questions you would like us to answer before we start the interview?

Establishing subject and experience

- What position do you have at your company?
- Is Scrum implemented at your company today?
- Is Daily Stand-up used by the team/teams today?
- Do you have any sort of Scrum-of-Scrums meeting implemented?

Daily Stand-up

- Could you walk us through a Daily Stand-up meeting in one of your teams, please?
- Why are you using Daily Stand-up?
- What kind of effects have you seen as the result of Daily Stand-up?
- Have you heard of any opinions that do not align with yours?

Scrum-of-Scrums

- Could you walk us through a Scrum-of-Scrums meeting in one of your teams, please?
- Why are you using Scrum-of-Scrums?
- What kind of effects have you seen as the result of Scrum-of-Scrums?
- Have you heard of any opinions that do not align with yours?

Conclusion

- Do you have any additional problems that you have come across while using Scrum-of-Scrums?
- Do you have any other thoughts about the subject we have brought up today?

During the interview a tool which is named prompts were used. This was used to help the conversation flowing and assist the interviewee to elaborate their answers even further.

Prompts

- Repeating a words from the last sentences (e.g., "Team?" "Not working well?")
- Open-ended questions (e.g., "How did you measure that?" "Did it improve?")
- Use silent prompts (e.g., "Uh hum")
- Questioning why in response to a word (e.g., "How come you did it like that?" , "What was your thought behind this" "Why did that result happen")
- Questioning how to a word (e.g., "How does A work", "How are you working in the team")
- Asking counter questions (i.e, Questions to make the interviewee reflect on their answer)

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