SCRUM.

In Search of Synergy: Communication and Collaborative Innovation Among Team Members.

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ABSTRACT

Innovation and creativity are essential for organization performance, especially in current highly competitive and rapidly changing environments (Shin et al., 2012). With this increasing competitive edge, the companies have searched for tools that would facilitate innovation, speed and flexibility of work. Agile methods, as a new flexible and responsive tool to enhance team productivity, have become a popular choice within product development companies. Scrum is the most popular method within agile with over 52% of companies implementing it (Chan, 2013). With the lack of empirical research on innovation aspect of Agile methods, this paper aimed to fill in the gap in the literature, focusing on how Scrum enhances the communication essential of collaborative innovation. We conducted a qualitative in-depth analysis of Scrum method of work, focusing on one case study complemented with two expert interviews and an observation. The case focused on the Scrum team of the company Funda, which works in the field of internet based real-estate. The results showed that Scrum could enhance the communication aspect of innovation in the following matters. The team heterogeneity could increase communication and innovation within the teams. The flexibility that Scrum facilitates might increase freedom of work which could further enhance spontaneous communication. The built-in interactivity of teams also seems to increase the creativity flow within the teams with the ultimate goal of innovation. The product owner was found to be the bridge between the team and stakeholders and became the push point of creativity. Being transparent when communicating with the team and stakeholders seems to facilitate the ease of communication and could enhance the clarity of information flow. The freedom over work might increase responsibility which further seems to enhance the motivation and productivity of the team. We found that within the Funda Scrum, responsibility did not need to be communicated, it rather happened naturally during the process. Finally, the flexibility facilitated by Scrum seems to increase spontaneous communication and interaction of team members. The social aspect seemed to be the most significant aspect of the team. The results have shown that transparency, responsibility, problem solving and team spirit are essential components of the social aspect of the Scrum teams. The implications for theory and practice are discussed.

KEYWORDS: *Scrum, Communication, Collaborative Innovation, Team, Creativity*

Preface

This paper is my thesis for the requirements of partial completion of my Master program of Media & Business at Erasmus University in Rotterdam. This thesis would not have been completed without the help, support and patience of many people.

First of all, I would like to thank to my thesis supervisor, Dr. Sarah van der Land for her guidance, insight and patience when writing my thesis. Your feedback and ideas were very valuable and helped me to be on the right track throughout this process. You made me see the joys of being the “female in technology”. Without you, Sarah, this thesis would not be what it is now.

Secondly, I would like to thank my family, my mom and dad for their support throughout my studies and my friends for their valuable insights.

Finally, I would like to thank Funda for allowing me to look into their way of working and all of the respondents for their excitement about Scrum and their valuable insights.

Content

1. Introduction

Innovation and creativity are essential for organization performance especially in current highly competitive and rapidly changing environments (Shin, Kim, Lee, & Bian, 2012). With the current decline in sales of new products, the revenue-generating capacity of any new product innovation that is to be introduced needs to be higher (Sundar, & Anil, 2000). Therefore, understanding what fosters innovation is of a great importance. Existing research suggests several factors that facilitate innovation, for instance organizational orientation, interdepartmental interactions and creativity as an intangible resource of an organization (Sundar, & Anil, 2000). Nonetheless, current research lacks in empirical research on *tools* that foster creativity and innovation. Agile methods and thus Scrum are one of these tools or methods often used in software teams to enhance innovation and creativity (Strode, Huff, Hope, & Link, 2012). However, there has not been much empirical research conducted on this topic (Dybå & Dingsøyr, 2008). For this reason, this paper aims to fill in this gap in the literature.

As the word “agile” already suggests, the method is based on flexibility and responsiveness, the ability to successfully adapt to constantly changing surroundings (Anderson, 2003; Dingsøyr et al., 2012). To give an example of what “agile” is and how it works in a team, imagine a project that is broken up into several iterations of equal duration. At the end of each cycle, a working product is delivered. The team decides which core features of the product are required and which of these can be delivered in the first iteration. The rest of the features that were not handled in the first iteration will be attended in the second one, or subsequent ones. Thus, at the end of each cycle, a working product is presented that is increasingly enhanced after each cycle.

Introducing the Agile development ideology, it got its shape in 2001 when a manifesto was introduced to the broad public (Sverrisdottir, Ingason, & Jonasson, 2014; Chow, & Cao, 2012; Dingsøyr, Nerur, Balijepally, & Moe, 2012; Strode et al., 2012). Since the manifesto appeared, researchers and public became interested in this holistic method of software development. The most recent statistics show that Agile grew in popularity since 2009 by 110%, resulted in 76.3% of companies adopting this methodology in their product development (Forrester, 2013). Moreover, 86.9% of the companies that have implemented this method had increased their profit (Forrester, 2013).

Scrum, such as other methods with similar attributes, belong under the umbrella of Agile methodology. Currently, from all different agile methodologies, Scrum has been found to be the most popular method, with 52% of companies adopting it (Chan, 2013). Scrum is based on a constant interaction between the team members from different multidisciplinary backgrounds, who work together from start to finish (Takeuchi, & Nanaka, 1986). The aim of Scrum is to deliver as much of a high quality software as possible within a series of 3-8 short fixed time intervals (short time-boxes) also called *Sprints* (Beedle, Devos, Sharon, Schwaber, & Sutherland, 1999; Sutherland, 2001; Paasivaara, Durasiewicz, & Lassenius, 2009). To give an example of what "scrum" is and how it works in a team, we provide a real-life example for better understanding. Imagine a restaurant on a regular busy night (Johnstone, 2014). The team is compiled of people with different tasks who work together in order to deliver a product. At the end of the shift (sprint) the team discusses what they could improve for the next shift (sprint). The short sprints allow the team to be flexible and adjust to any changes. As Scrum is on its peak of popularity, we believe that focusing our research on Scrum will have the most societal and academic value.

Overall, the existing literature on the topic of Agile and Scrum has mainly focused on defining the methodologies and explaining how they work. There has been a review conducted on the empirical support of Agile methods by Dybå and Dingsøyr (2008). They found that most of the existing research papers focused on Extreme Programming and only some on Scrum and Lean software development. These studies mainly aimed to define these methodologies, their perception and the human factor involved. However, these have found to been mainly a part of conference proceedings. The research papers mainly focused on discussing Agile methods in general; there has been a lack of academic papers found on Scrum. The research that focused on Scrum approached the topic from the team point of view, or researched decision-making process within the team members. Innovation and communication aspect in regards to this method have been neglected; they have only been generally assessed to when researching Agile.

Thus, we identify a research gap; there has been found a lack of research on the communication aspect of Scrum in relation to collaborative innovation (Van Ruler, 2013). Communication, as a central aspect that glues the processes of Scrum together, needs to be researched more in depth. Betteke van Ruler in her book Refectieve Communicatie Scrum

(2013) touched upon the importance of communication within Scrum. Nevertheless, to the best of my knowledge, this was the only academic literature found on this topic. Therefore, this paper focuses on Scrum method in relation to communication and collaborative innovation, with the aim to shed light on the communication aspect that has been so far neglected and to deepen the understanding of it.

In this sense, the academic relevance of this paper lies within the importance of understanding how communication within the Scrum teams can enhance the process of innovation. With the growing interest in Scrum,the reoccurring focus on the team and its functional processes (Dybå & Dingsøyr, 2008) there is remaining lack of literature on the communication aspect of this method. This thesis therefore aims to enrich the existing pool of literature on Scrum and enhance the understanding of this method of work. By looking at the communication aspect of collaborative innovation, we aim to turn the focus of the academia on the possible new ways of approaching this topic. We aim to gather a deeper understanding of this method, laying a ground for further research on the collaborative innovation and its enhancement. Secondly, there has been contradicting literature on the teams, team diversity and individual creativity found (Hazzan, & Dubinsky, 2006; Pirola-Merlo, & Mann, 2004; Taggar, 2002). Pirola-Merlo and Mann (2004) believe that group creativity can be explained as an average or weighted average of individual creativity of team members (p.235) whereas Taggar (2002) argues that group creativity depends on both members of the group and the environment they work in, where interaction plays crucial role (315). In this sense we aim to deepen the pragmatic understanding of how different aspects of Scrum, such as task approach and social side of teams, can foster collaborative innovation in relation to communication, answering current academic discussions**.** Lastly, from a methodological point of view, this thesis is innovative as Scrum offers a new way studying innovation within companies that is based on speed and flexibility (Takeuchi, & Nanaka, 1986).

All in all, we aim to shed a light on the communication aspect of collaborative innovation. We will do this by conducting a qualitative multiple-case study research including in-depth interviews with team members and Scrum experts in order to answer our research question: "*How does Scrum enhance the communication essential of collaborative innovation?"*

In addition to the academic relevance, the societal relevance of this study is that it aims to deepen the understanding of collaborative innovation within Scrum teams. Based on the deepened understanding of the various aspects of Scrum and the perception of Scrum team members, the method can be further developed or improved to facilitate innovation. In other words, we believe that the results proposed in this study will complement the development of Agile methods, shedding light on how innovation can be enhanced. Not only this, but also in-depth understanding of Scrum can help companies to foresee the pros of this method, and Scrum masters to further enhance the work process in order to get to the desired result.

This thesis will have the following structure in order to answer the above mentioned research question. First, we introduce the Agile methodologies focusing on Scrum and discuss previous literature based on our three-dimensional framework: Task approach, Social aspect and Innovation. The final part of our theoretical framework will present a conceptual model that further explains the relationship between the terms and also enlighten the reader on the line of thought behind this research. The methodology section will focus on the qualitative case study complemented with observation and expert interviews that were used to answer our research question. We will explain the research design, sample, procedure and analysis of the collected data, focusing on in-depth interviews and observations.

2. Theory and previous research

With the aim to answer our research question, we will discuss theory starting from a broader perspective towards a more focused case (Babbie, 1992). In this sense, we will draw from Agile methodology towards Scrum collaborative innovation using a three-dimensional framework: Task approach, Social aspect and Innovation. These dimensions provided us with guidelines when it comes to our understanding of Scrum and its vital components that drive communication aspect of collaborative innovation. First part of the theoretical framework aims to present the concept of Agile principles, familiarizing the reader with Scrum, drawing upon the background of the principles and the methodology behind it. Next, the three-dimensional framework will be presented, where each of the dimensions will be discussed individually, providing an overview of the existing research. This section ends with a conceptual model that integrates and visualizes the obtained theoretical insights per concepts and serves as an outline of this thesis.

2.1. Agile Development and Scrum

The first approach to the **Agile development** appeared in 1990s with the aim to facilitate the speed of delivery of final product (Iivari, Hirschheim, & Klein 2004). Since then, the spark of interest in this topic has grown, translating into the introduction of the Agile Manifesto in 2001 (Strode et al., 2012). The manifesto granted the first definition of the Agile Development method, which was created by 17 software process methodologists in order to create a better way of software development (Chow, & Cao, 2012) by “doing it and helping others do it”, identifying four core values: Individuals and interactions over processes and tools, Working software over comprehensive documentation, Customer collaboration over contract negotiation, and responding to change over flowing plan (Agile manifesto, n.d.).

As the word “agile” already suggests, the method is based on flexibility and responsiveness, thus, the ability to successfully adapt and survive in constantly changing surroundings (Anderson, 2003; Dingsøyr et al., 2012). The core of this method is embedded in an idea of self-organizing teams that foster creativity and productivity keeping the pace of work (Dingsøyr, et al., 2012; Aurum, & Dybå, 2012). There are various development methods that can be called “agile”; Chow and Cao (2008) introduced a general list which includes

Extreme Programming (EX), Scrum, Feature-Driven Development (FDD), Dynamic System Development Method (DSDM), Adaptive Software Development (ASD) Crystal and Lean Software Development (LD) (p.962). Dybå and Dingsøyr (2008) exclude Adaptive Software Development from the list and include solely 6 Agile methods that they believe to be the main ones (p.835).

Focusing on **Scrum**, it was first defined in 1986 when Takeuchi and Nanaka (1986) studied methods on product development emphasizing the speed and flexibility (p.137). This new method was based on a constant interaction between the team members from different multidisciplinary backgrounds, who worked together from start to finish (Takeuchi, & Nanaka, 1986). In contrast with the traditional linear approach, it focused on the interplay of members in an integrated manner, where the team is passing a "ball" back and forth (Takeuchi, & Nanaka, 1986). The Scrum method as we know it now was introduced by Schwaber in 1995 who claimed that Scrum method starts with a broad deliverable context or definition, which, during the project, evolves based on the environment (Schwaber, 1995).

The aim of Scrum is to deliver a as much of a high quality software as possible within a series of 3-8 short fixed time intervals (short time-boxes) also called *Sprints*, which usually last for about 1 month (Beedle, Devos, Sharon, Schwaber, & Sutherland, 1999; Sutherland, 2001; Paasivaara, Durasiewicz, & Lassenius, 2009).

Each stage in the product development cycle is redefined into a Sprint or series of Sprints, depending on the stage in the cycle (Beedle, et al., 1999). Before the sprint starts, *Sprint planning meetings* take place in order to plan the work. During this meeting, a *Burndown chart* is created, which helps to calculate the velocity of "burndown" of work, thus, controlling the velocity of the project to meet the deadlines (Sutherland, 2001). The Burndown chart consists of tasks that need to be fulfilled for the respective sprint; these tasks are also called *Backlog*. It can be defined as a prioritized list where the backlog with highest priority is worked on first (Beedle, et al., 1999). Just as the process evolves, Backlog evolves with the changing environment. One of the most important practices during a Sprint is *Daily Scrums*, where members meet for approximately 15 minutes a day and talk about the achievements since the last meeting (Beedle, et al., 1999; Paasivaara et al., 2009). At the end of a Sprint a *Retrospective meeting* is held, where team discusses the positives and negatives of the Sprint and what could be improved for next time (Paasivaara et al., 2009).

Lastly, *Sprint Demos (Sprint review meetings)* are held when the Sprint is finished, where the developed functionality is showed to all the parties involved.

To give an example of what "scrum" is and how it works in a team, we provide a real-life example for better understanding. Imagine a restaurant on a regular busy night (Johnstone, 2014). The shift manager (Project owner) starts up the shift (Sprint), discussing the tasks that need to be undertaken in the upcoming hours (standup). The team leader (Scrum master) is there to help the team. At the end of the shift, they would get back together to discuss what has happened (Sprint review) and what could be improved for the next time (Sprint retrospective).

2.2. Task Approach

In this paper, we refer to the task approach as the different aspects of team that contribute to the task fulfillment. Based on the literature, we focused on individual creativity and team diversity as the aspects that can facilitate successful task fulfillment (Maznevski & Chudoba, 2000).

2.2.1. Team Diversity

It has been found that organizations are more efficient in solving complex problems when their teams are more diverse (Dahlin, Weingart, & Hinds, 2005). Thus, fostering team diversity is becoming increasingly important within organizations in order to develop innovative products or make important decisions (Dahlin et al., 2005). There are numerous ways team diversity can be expressed, such as through gender, nationality, culture, lifestyle, beliefs, etc. (Hazzan, & Dubinsky, 2006). In this line of thought, there have been many different team diversity dimensions and theories introduced by researchers. One of the most known dimensions are bio-demographic markers and cognitive resources (Horowitz, & Horowitz, 2007; Horowitz, 2005). Here, bio-demographic markers represent immediately observable categories such as age, gender, ethnicity, whereas cognitive diversity, or task related diversity, refers to the difference between team members in regards to experience, expertise and knowledge (Miller, Burke, & Glick, 1998). The research has found that the team performance was positively affected when there was a task-related diversity within a team (Horowitz, & Horowitz, 2007). Similarly, heterogeneous teams were more creative in coming up with new ideas than homogeneous teams (Nemeth, 1986; Kanter, 1983). Also,

teams that were diverse based on education were using information in a more diverse way and more in depth (Dahlin et al., 2005).

Relating the team diversity to communication, the literature proposes different points of view on this matter. The research has shown that functional diversity, thus the diversity in skills and background, increases communication outside of the team (Ancona, & Caldwell, 1992). On a similar note, Dahlin, Weingart and Hinds (2005) claim that educational diversity of team members facilitates communication within the team and team action (p.1111). Connecting this back to innovation, academics believe that communication promotes innovation within the teams (Jackson, 1996). Looking at the demographic diversity, the research suggests that it can influence the processes within the group especially when it comes to communication (Knight et al., 1999). The authors found that diversity can have negative effects on the frequency or quantity of communication and can lead to increased conflict within the group (Knight et al., 1999).

In relation to Agile methods, team diversity is becoming an integral characteristic in organizations (Hazzan, & Dubinsky, 2006). There have been three types of diversity identified in agile teams: gender, management and opinion diversity (Hazzan, & Dubinsky, 2006). Looking at gender, the research has shown that in Agile teams, collaboration and communication is supported focusing on gender equal participation (Hazzan, & Dubinsky, 2006). When it comes to management diversity, the concept of the whole team being together but having a role scheme is essential, as it enhances project management as well as it facilitates various approaches towards the project management (Hazzan, & Dubinsky, 2006). Lastly, opinion diversity embedded in short cycles of Agile methodology facilitates the flow of opinions as both team members and customers have the opportunity to share their perspectives (Hazzan, & Dubinsky, 2006). This goes in line with the method as it emphasizes the aspect of accommodation to a change that can occur at any stage of the development process, or in other words, the ability to rapidly respond to a change on both business and technical levels (Dingsøyr et al., 2012).

2.2.2. Individual Creativity

Creativity is defined as “actions, processes, and programs that are meaningfully novel relative to existing practices” (Hirst, van Knippenberg, Chen, & Sacramento, 2011;

Bharadwaj, & Menon, 2000). Individual creativity, on the other hand, refers to actions individuals undertake within a company in order to develop something novel within their field (Hirst et al., 2011; Perry-Smith, 2006; Bharadwaj, & Menon, 2000). When looking at the individual creativity, we cannot look only at the individual but more on the individual in their context (Hirst, van Knippenberg, & Zhou, 2009). There are many ways to foster individual creativity in employees. Previous research identified three building blocks of individual creativity: domain-relevant skills, creativity-relevant skills, and intrinsic task motivation (Hirst et al., 2009; Taggar, 2002). From these, the emphasis is on learning which can stimulate ones creativity further (Hirst et al., 2009). Interactivity has to do with one's motivation; individual goal orientation relates to motivation to tackle problems which influences one´s creativity (Hirst et al., 2011; Hirst et al., 2009). Theory also suggests that work environment affects individual creativity especially when it comes to the motivation (Taggar, 2002). Further research focused on individual creativity in relation to team/group creativity.

Individual creativity is highly valued in organizations even when working in teams (Shalley, Zhou, & Oldham, 2004). This might be due to the fact that if both organizational and individual creativity are present, higher level of performance could be seen (Bharadwaj, & Menon, 2000). Researchers believe that the interaction within teams might influence ones creativity (Hirst et al., 2011; Pirola-Merlo, & Mann, 2004). Looking at group creativity in relation to individual creativity, researchers have divided views. Pirola-Merlo and Mann (2004) believe that group creativity can be explained as an average or weighted average of individual creativity of team members (p.235). Taggar (2002) on the other hand argues that group creativity depends on both members of the group and the environment they work in, where interaction plays crucial role (p.315). In both cases individual creativity is an important building block of a team; however, both authors propose different perspectives on this. Focusing on bureaucracy within a team in relation to individual creativity, it has been found out that it can suppress ones creativity (Hirst et al., 2011). This is due to the fact that bureaucracy within a team can suppress individuality among team members as different motivations produce different ideas (Hirst et al., 2011). Thus, when looking at individual creativity and task approach, team diversity is essential (Shin et al., 2012).

According to the literature, the communication was found to be the driving force behind the process of collaborative creativity (Binnewies, Ohly & Sonnentag, 2007; Pirola, &

Merlo, 2004; Sonnenburg, 2004). The theory suggests that for a team to be able to communicate creative ideas, the climate for creativity needs to be present (Roffe, 1999). There were six features of a climate that fosters creativity identified in literature: encouraging flexibility and group involvement, perceptive, respectful for team diversity, stimulating the expression of ideas, encouraging, and being objective and specific with feedback (Roffe, 1999). The climate however also needs to be responsive to the processes of the team, which is one of the most difficult areas to maintain by the company (Roffe, 1999).

2.3. Social Aspect

When it comes to Agile methodology, team component is essential as it adds complexity to the overall methodology, where each individual is purposeful within the social system (Whitworth & Biddle, 2007). Teams can be understood as a set of individuals that work together towards a certain goal (Acuña, Gómez, & Juristo, 2009). For the team to be successful and have good performance, it needs to be cohesive (Acuña et al., 2009). Research highlighted that in cohesive team individuals need to have regular feedback from the team, team members need to have knowledge of team activity and they need to be committed to team goals (Whitworth & Biddle, 2007). The awareness within the team facilitates the trust between team members and enhances the togetherness (Whitworth & Biddle, 2007). Regular meetings have also shown to be important when motivating team members (Whitworth & Biddle, 2007). All these facilitate high level of social support and accountability within a team (Whitworth & Biddle, 2007). This leads us to the fact that the more cohesive the team is the less conflict between team members occurs (Acuña et al., 2009). Similarly, the more conflict is present within the team, the satisfaction of team members with their job decreases (Acuña et al., 2009). Conflict-based relationships within a team can occur when there is need-only communication between team members (Whitworth & Biddle, 2007). In Agile teams this is reduced; the possible conflict present in the interaction is “constructive conflict” that is often used as a motivation for improvement and change and can foster flexibility (Ruhnow, 2007; Yauch, 2007). When looking at a team, idea generation and problem solving is another essential part of teamwork; as a method Brainstorming is one of them. It can be defined as “an important process step when generating solutions to an organizational problem” (Kavadias, & Sommer, 2007). In

organizations, it is one of the most used creative techniques (Faure, 2004). Looking at Brainstorming from a social point of view, Faure (2004) proposed two opposing ideas on the effects of the type of group and ideas (p.23). When it comes the process of brainstorming, research suggests that familiarity with the group and proposed ideas can lead to higher quality of ideas selected (Faure, 2004). This is so, because the team members would objectively judge selected ideas and, thus, be minimally self-centered which would enable for the team to create a group identity (Faure, 2004). The opposing explanation says that team interaction in brainstorming sessions can lead to social pressure within the team (Faure, 2004). The team members could tend to conform to ideas that are in line with the team ideal and thus negatively affect originality (Faure, 2004). Also, the team members are more satisfied within the group if the ideas they proposed were selected (Faure, 2004).

The literature also suggests that the team spirit is an important part of a successful team. The team spirit is defined as "the presence of peer effects between teams leads to a social multiplier towards better outcomes" (Sausgruber, 2005). It has been found that when the team loyalty or team spirit is enhanced, the team becomes more efficient (Thamhain, 2004; Alchian, & Demsetz, 1972). However, to my best knowledge, the academic research did not offer more insight on this phenomenon.

Looking into the ones identification with the team, the literature offers a Social Identity Theory (SIT). According to SIT people often classify themselves and other into social categories, such as being a member of an organization or a religious group, age, gender and more (Tajfel, & Turner, 1985). In this regard, the social identification can be understood as a feeling of oneness with a group of people which is based on categorization, distinctiveness and class of the group and leads to activities that are in line with the identity of the group (Ashfort, & Mael, 1999). Nonetheless, the SIT theory contradicts conventional views on group relations. The conventional theories claim in-group favoritism occurs even when the leadership, communication and independence is missing (Ashfort, & Mael, 1999). According to the SIT theory in-group favoritism simply happens when an individual is assigned to the group (Ashfort, & Mael, 1999). The theory states that even when individuals are randomly assigned to the group leads to discrimination of out-groups and brings the in-group relations closer (Ashfort, & Mael, 1999). This view slightly contradicts the insights on team spirit, as according to this just being a part of the team is enough.

Connecting the social aspect to communication, the theory suggests that communication leads to higher problem solving and productivity (Lott, & Lott, 1961). Transparency within the team was found to be essential as it enhances communication by making the information sharing clear and accessible (Moenaert, Caeldries, Lievens, & Wauters, 2000). If there is a limited transparency present in a team, it is to be noted that a member of the team doesn't know who to transfer the information to or who to obtain the information from (Moenaert et al., 2000). It was also found that the transparency decreased when the complexity of communication increases (Moenaert et al., 2000). Focusing on the problem solving, the literature suggests that it is enhanced by communicating ideas within the group (Smith et al., 1994). The research showed that communication leads to higher problem solving and productivity (Lott, & Lott, 1961). Finally, looking at the team spirit, the literature suggests that less formal communication leads to team cohesion (Smith et al., 1994). Thus, the spontaneous communication within the team was found to facilitate tea collaboration (Bassett-Jones, 2005), which can be connected to the innovation process of the team (Drach-Zahavy & Somech, 2001).

2.4. Innovation

In this highly competitive environment, innovation is essential when it comes to organizational performance (Shin et al., 2012). Innovation can be defined as "a process of developing and implementing a new idea" (Van de Ven & Angle, 1989). In other words we can understand it as bringing a new idea into use (Van de Ven & Angle, 1989). Innovation is considered to be the life blood when it comes to organizational survival (Baregheh, Rowley, & Sambrook, 2009). The theory proposes that "innovation within organizations is a function of individual efforts and institutionalized mechanisms to facilitate creativity" (Bharadwaj, & Menon, 2000). In relation to the team, we cannot look at team members separately when it comes to innovation, but more in context of the whole team. When looking at individual efforts within a team; there have been several factors identified, such as intelligence, motivation to innovate, and creativity skills when fostering innovation (Pirola-Mero, & Mann, 2004; Bharadwaj, & Menon, 2000). Focusing at the team, Horowitz and Horowitz (2007) believe that cognitive diversity of team members within heterogeneous teams promote innovation (p.989). Yauch (2004) opposes by saying that even though diversity in

team can generate more ideas, it can also enhance the difficulty of problem solving within the team (p.22). He also claims that too strong interpersonal ties within the team can negatively affect team innovation (Yauch, 2004). Moe, Dingsøyr and Dybå (2010) proposed that vision, participative safety, task orientation, and support for innovation are key factors for team innovation (p.481). As innovation involves the sense of newness, creativity can be seen as a part of it (Pirola-Merlo, & Mann, 2004).

It is important, however, to understand the distinction between innovation and creativity. The two terms are clearly related, but refer to different parts of the process when it comes to delivering an idea. As explained before, innovation is the process that aims to develop and implement an idea (Baregheh et al., 2009; Van de Ven & Angle, 1989). This process can be translated into different fields, such as technical, organizational and social but the concept of having an idea and bringing it to fruition is the key (Van de Ven & Angle, 1989). The innovation part within this process is when the idea is brought to the market, including overcoming obstacles, competitive pressure, etc. (Van de Ven & Angle, 1989). And this process of bringing the idea to life is referred to as innovation. In this context, the creativity is viewed as novel and appropriate work (Sternberg, & Lubart, 1999).

2.5. Conceptual Model

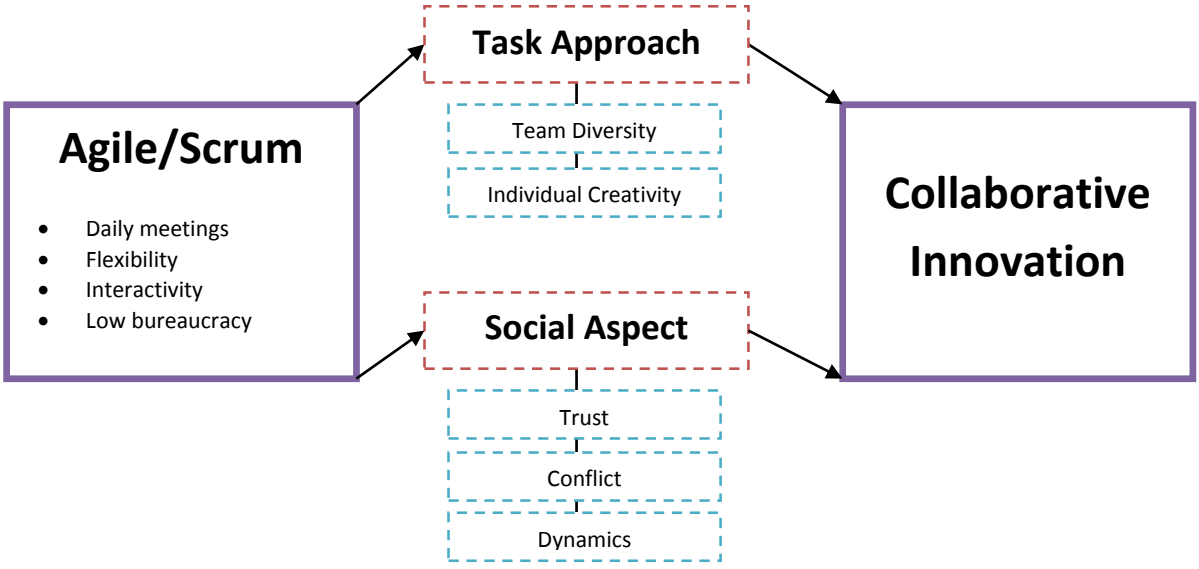

Figure 1. Conceptual model

With the aim to rationally structure this thesis, we will use a conceptual model to help us to do so (see Figure 1). It can be seen as an outline of this thesis that visualizes the different aspects of Scrum in relation to our research focus. Integrating the obtained theoretical insights, the model shows how the theory is organized and the connections between the different concepts used in this framework with the aim of answering our research question.

The conceptual model shows how the different concepts/dimensions are positioned in relation to Scrum communication and innovation, giving our theoretical background more perspective in relation to the researched topic. The structure of the model is deductive, thus going from a broader concept and gradually narrowing down the focus. By no means this model provides evidence on relations between the concepts, but rather aims to facilitate an understanding of the line of thought.

Each dimension is based on theoretical background presented in the framework. The model is structured in a certain way. The left side presents the starting point of the broader concept, working its way to the right side of the model that has a more narrow focus on a specific topic, following the deductive approach.

3. Methodology

In order to find an empirical answer to our research question, we focused on one key case study within the field of Scrum, and two independent expert interviews which were thoroughly researched by conducting in-depth interviews and observations. The following section argues the reasons behind choosing the case study approach, in-depth interviews and observation as a method of data collection. In order to understand the considerations of this paper, we must first understand the focal point of this research, which is the case study,expert interviews and observation that have been analyzed. Secondly, we discuss the research design, including the sample, procedures, interview protocol and data analysis more in depth.

3.1. Research Design

In order to obtain more in depth information in regards to the research question: *"How does Scrum enhance the communication essential of collaborative innovation?",* a case study design was used, where qualitative method of in-depth interviews was applied in order to thoroughly analyze the phenomenon of collaborative innovation (Flick, 2004). The research was based on one case study of the Scrum team of Funda including an observation of the team, and complemented with interviews with two independent experts working in the Scrum industry. The experts can include, according to the literature, anyone with extensive knowledge and experience in the relevant field (Baxter, & Jack 2008).

The case study facilitated a better overview of how Scrum can facilitate innovation within the teams. The case study approach allowed us to look into this topic from different points of view. Having a Scrum team helped us to understand how collaborative innovation works on a team level and what aspects of a Scrum team are influencing it; the two experts gave us more insight and understanding of the Scrum from a professional perspective. Complementing the case study with an ethnographic approach in form of an observation deepened our understanding of how the Scrum team operates and gave us a holistic perspective on the cultural phenomenon within the team (Wang, Hawk, & Tenopir, 2000). Thus, the case study with various data sources was chosen as it can increase the research validity. Complementing the case study approach with expert interviews, according to the

literature, exposes knowledge that is not usually accessible to the researcher (Baxter, & Jack, 2008).

We chose to apply a qualitative approach to find out in-depth information on this topic, in form of in-depth interviews. As this research is taking an interest in understanding the communication essential of Scrum teams, qualitative method was an appropriate approach as it aims to uncover the experiences, emotions and details about phenomena as perceived by people (Strauss, & Corbin, 1999). This allowed us to research the areas of social reality which are not measurable by quantitative statistical approach (Silverman, 2011) and helped us study this complex phenomenon within its contexts (Creswell, Hanson, Clark Plano, & Morales, 2007). To analyze the obtained data obtained from case studies and in-depth interviews, qualitative content analysis was chosen. It is commonly used as a method of analyzing qualitative documents by finding underlying themes (Bryman, 2012). This approach helped us to see the patterns within the data.

3.1.1. Case Study and Expert Interviews

The focus of this paper was on one case study and two complementary expert interviews. A case study, according to the literature, is an appropriate approach to analyze a recent phenomenon whose context needs more in-depth analysis and it allows the researcher to get a deeper and more detailed understanding of a case (Yin, 2013), which was the ultimate goal of this paper. Yin (2013) argues that case study should be used when "(a) the focus of the study is to answer 'how' and 'why' questions; (b) you cannot manipulate the behavior of those involved in the study; (c) you want to cover contextual conditions because you believe they are relevant to the phenomenon under study" (p.45). As our prime focus is to answer a "how" question in order to uncover contextual conditions and we are not able to manipulate respondents´ behavior, case study is an adequate research approach. Conducting a qualitative case study complemented by expert interviews ensured a variety of data sources and also ensured that our topic was explored through a variety of lenses allowing multiple phenomenons to be revealed (Stake, 1995). Focusing on the field of Scrum, the selected cases were narrowed down to only one case representative of the field. We based the case on the examples best practices in the field and the amount of experience and knowledge obtained.

The case we focused on was a scrum team of the company *Funda*. Funda works in the field of internet based real-estate, taking the role of the middle man between the real-estate agents and the public ("Funda factsheet," 2015). The company has years of experience in the field of web and product development and has an extensive team that has adopted the Scrum method of work. The company can be considered as one of the pioneers when it comes to implementing Scrum on a larger scale and has extensive knowledge and experience with this methodology ("Funda factsheet," 2015). We believe that focusing on Funda as a model company gave us a lot of insight on Scrum and how it works in real life settings. The case provided us with valuable information, which would have been hardly obtained using any other approach. The team we focused on consisted of 5 team members, each having different job specification and set of experiences. Each team member offered a valuable insight on their own experiences with Scrum and their perception on the facilitation of innovation. The level of knowledge and experience within the team varied, which also added to the variety of the team.

The first expert worked both in small companies and corporations such as KLM and Achmea, thus, was able to offer an insight on the different aspects of Scrum when it comes to the size and background of the team. He has experience in IT for 5 years, resulting to be an all-around fought for developer within the industry. His insight was crucial when it comes to this research as he offered first-hand information and his vast experience within the field. The second expert worked in the development field for more than 10 years for corporations such as Sony Erickson and IKEA. He was involved in many projects within the development industry and had a vast knowledge of Scrum. Due to years of experience with Scrum methodology, this expert's insight was very valuable for this research. Both experts offered in-depth information on the methodology from expert professional point of view, providing a more holistic insight (Stake, 1995).

3.1.2. Interviews

The above mentioned case and expert interviews were analyzed by conducting in-depth interviews with Funda Scrum team and two Scrum experts. Qualitative interviews as a research method were chosen in order to shed light on what aspects of Scrum enhance innovation and creativity amongst team members. Interview offered the space to gather in-

depth insights on Scrum from people who have high level of knowledge in regards to this method, which gives this research valuable inside information on the researched topic (McCracken, 1998). Moreover, in-depth interviews are a method of intensively interviewing respondents in regards to their perspective on a certain issue/situation. We believe that using this method facilitated the understanding of the communication essential of Scrum innovation from the point of view of team members and Scrum experts. This method also gave respondents an opportunity to share their point of view on the topic, which resulted in more valuable data to work with. We relied on in-depth interviews as they offer a wide spectrum of opportunities to gather desired data and to get more accurate perception of the field of Scrum, coming from the participants and experts themselves (Turner, 2010). This method, in an ethnographic setting, was useful to get a more complete picture of the communication aspect of Scrum innovation.

The seven interviews we have conducted were open-ended and face-to-face. Using this method facilitates more understanding and insight on the researched topic (Wimmer, & Dominick, 2013). The interviews were structured by topics: *team diversity, creativity, social aspect* and *innovation.* These were chosen based on the theoretical framework, guiding our interviews. Although the interviews followed themes, the questions we asked were fluid. This allowed us to ask follow up questions if needed and make the interviews unique to the interviewee and the situation.

3.1.3. Observation

To complement the information obtained in the interviews and to achieve a holistic perspective (Wang, Hawk, & Tenopir, 2000), ethnographic research as method to explore cultural phenomenon was chosen. Ethnography is defined as a systematic approach where learning about social aspect of communities or institutions is of an essence (LeCompte, & Schensul, 2010). It is a scientific and investigative approach which is based on the perspectives of the people in their cultural settings (LeCompte, & Schensul, 2010). In this sense, the researcher immerses themselves in the lives of the people researched in order to comprehend the studied phenomena in their natural setting (Myers, 1999).

In this study, we used an ethnographic approach to complement our case study with the aim to obtain first-hand experience of the work setting of Funda Scrum team members.

Nonetheless, it is important to understand the differences between case study and ethnography. The main difference between these two approaches is the extent to which the researcher immerses themselves in the social group (Myers, 1999). While case study focuses mainly on interviews as a primary source of data, occasionally complemented with other documentation, the main source of data of ethnography is participant observation (Yin, 2013). Thus, the researcher is required to spend time in the field to be able to obtain the necessary data (Myers, 1999).

Observation, as an ethnographic method of data collection was chosen in order to understand the underlying social and cultural phenomena within the Scrum team members. This approach offered us the opportunity to observe the mentioned aspects in real-life settings - where the team operates. This was be done by conducting an observation in the work space of the Funda Scrum team. The observation as a method of data collection was chosen to gain more understanding of how the team operates, team dynamics and overall perspective of the team.

The observation was performed in form of a focused tour through the work premises of Funda and the introduction of the projects the team worked on. We were accompanied by the Head of user experience, who walked us through the working area of the Scrum team. We walked through the overall office, Scrum team area of work, meeting rooms and common areas. We focused on surroundings, working area and team communication in terms of our theoretical framework. During the observation, notes were taken at all times.

The observation was conducted from a non-participant point of view, thus, having a limited interaction with team members (Atkinson & Hammersley, 1994). This approach allowed us to collect data on the process of Scrum and its different aspects, which gave us a base for follow up questions during the interviews.

3.2. Sample

Our sample consisted of one case, Funda scrum team, and two Scrum experts. Purposeful sampling allowed us to choose the case based on a pre-selected criterion – level of experience with Scrum on a team level. The type of project the team worked on and its complexity was not the main focus of the selection criterion. The focus was on the

commonality between the different experts, more specifically the industry they operate in: software/product development.

When it comes to the two experts, we used purposeful sampling, thus, selected the key informants to create a productive sample (Marshall, 1996). This method is a more intellectual strategy compared to simply choosing the sample based on the demographic stratification (Marshall, 1996). This sampling method allowed us to select key experts within the Scrum industry that could offer expert insights on our research. The sample was chosen based on long-term experience and background within the field of Scrum and their name within the industry.

This research aimed to interview both Funda team members and Scrum experts with the aim of gathering more profound data. The case study complemented by expert interviews consisted of seven respondents, from which five were Funda team members and two were experts within the field. The respondents had vast experience within the Scrum field and were enthusiastic about this topic. This study did not aim to generalize, rather gain in-depth understanding of how Scrum facilitates communication aspect of innovation based on a case study, observation and two expert interviews.

Table 1. Sample Overview

Sample	Background	
Case: Funda Team	**COMPANY BACKGROUND:** • Online real-estate provider • 27,3mil website visitors per month • 394mil page views per month • Extensive experience in Scrum • 6 different Scrum teams within the company	**TEAM BACKGROUND:** • Head of User Experience & Designer • Chief Product Owner • Front-end Developer • Agile Tester • Software Developer & Scrum Master
Expert One	• Freelance Front-end Developer & Scrum Master • 4-5 years of experience with working in IT • Worked with: KLM, Achmea	
Expert Two	• Technical Lead & Scrum Master at Hackers and Founders • Freelance developer of more than 10 years • Sony Erickson, IKEA, Funda	

3.3. Procedure

Before the interviews with Funda Scrum team members took place, we received a briefing from the Head of User Experience on the project the team was working on, including the tour of the Funda office. During this process field notes were taken; the notes focused on the workplace environment, current project objectives and other imperative information shared by the Head of User Experience. The collected notes were cleaned and comprised from all stages of observation.

The interviews with experts took place in informal settings of a café, finding a spot with the least distractions. This place was chosen as it allowed the respondents to feel more comfortable during the interview. On the other hand, the interviews with Funda team took place in the meeting space of Funda. Although this setting was not necessarily informal, it provided a place with no distractions. Before each interview, the respondents received an explanation of the goals of the study and the interview duration. This way the respondents were informed, knew what to expect and what to focus on during the interview.

Before the interview started, each respondent was given a consent form to read and was asked if they agree with the premises of the study. Only after their vocal agreement the interview was started. The respondents were told that the interviews were used for academic purposes and their names will not be mentioned in the study. They were also informed about the recording device used to record the interview. All the interviews took between 30 to 60 minutes. The transcripts were sent to the interviewees who asked to see them for approval.

3.4. Operationalization

This section will focus on explaining the data collection process and will aim to operationalize the different themes that the data collection touches upon.

Interviews

The interviews were structured in 3 parts: introduction, core and the end. The introduction focused on the topic of team diversity, which aims to find out more about the interviewee. This section contained questions such as: “Could you please tell us about yourself?”/”How would you define yourself in three words?” and more. We also probed the respondents in regards to their team role and their perception of their role within the team.

The collected data provided us with the information in regards to the diversity of the team as a whole, based on individuals. By asking questions about the individuals we were be able to see the whole team composition, the similarities and differences within the team members.

As creativity and innovation are fairly challenging concepts to operationalize, we used existing scales as a source of theoretical inspiration. However, as the nature of this study is qualitative rather than quantitative, by no means were these questions asked in the final reviews in such a rigid way as they would be in quantitative research. In fact, a more open approach was used, in which follow-up questions were asked in order to obtain an in-depth understanding of the phenomenon. By using a set of questions backed up by academic literature, we aimed to reduce the possible bias. Thus, to conclude, the aim of this study was to have an open approach when interviewing the respondents; therefore we would not want to compromise it with asking close-ended quantitative questions.

The core of the interview focused on the creativity, social aspect and innovation within the team. The questions in regards to the creativity of the team were inspired by the Team Creativity Scale (TC) of Jiang and Zhang (2014) which consists of 9 items divided into three dimensions: team creative thinking, team creative action and team creative outcome (p.268). Even though this scale was created for measuring creativity quantitatively, it provides a good overview of different dimensions that compose creativity, thus, gave us a better idea of what questions to ask. Also, we asked specific questions in regards to the team creativity and how it is perceived by the interviewees. Looking at the social aspect, we were inspired by the Scale of McAllister (1995) which focuses on after-trust and cognition-trust measures. Again, although the scale aims to be used within quantitative research, it gave us a good overview of the dimensions to focus on when asking about social aspect. This section also compiled specific questions in regards to the team the interviewee operated in and how a dream team would look like in their opinion. Finally, the innovation section was inspired by the Team Climate Inventory (TCI) scale defined by Kivimäki and Elovainio (1999) that consists of 14 items which focus on Vision, Participatory Safety, Task Orientation and Support for Innovation. As mentioned previously, the scale helped us to operationalize the term and gave us guidelines in regards to the themes the questions should cover. Thus, this

part included both specific questions about the team innovation within their team but also more general questions such as how to achieve team innovation.

In the final part of the interview we asked the respondent to add anything that has not been discussed. In this sense, we gave the respondents the space to talk about anything that we might have missed in relation to the topic of this research.

Observation

The observation took place on two separate occasions; first we had a separate focused tour of the work premises of Funda and on second occasion, before conducting interviews with team members, we had a smaller but more informative tour of the rest of the office.

The observation focused on three main aspects: the surroundings, projects and extra information. Talking about the surroundings, the observation focused on the workspace of Funda. This included the space where the team operates, the common areas and the overall office of Funda. Secondly, the projects focused on current work projects the team was involved in; we received a briefing in order to gain a better understanding of the current situation the team operates in. Finally, we focused on the extra information shared by the Head of User Experience, who gave us the tour of the work premises of Funda. During the tour, we would get information on different aspects of the team but also the company Funda. In order to make maximum use of the information gathered, the notes were taken at all times.

To take notes, we kept a journal where we kept notes of what we have observed (Crang, & Cook 2007). We noted down the impressions experienced in the field, such as what we observed, encountered, heard, engaged in, and both verbal and non-verbal communication. We included the date and place to make it more memorable. These notes were hand-written during and after the tour of the premises. The notes were reviewed afterwards and cleaned up in order to prepare them for the analysis.

3.5. Data Analysis

After the interviews were conducted, they were transcribed literally using transcription software and a pedal to ensure the quality and ease of work. Following this, the exploratory (content driven) qualitative content analysis has taken place. This approach was

chosen as it allows exploring the obtained data, not necessarily by being based on existing hypothesis, but rather by finding new patterns and emerging themes within the gathered data. Exploratory approach, thus, allows us to derive the codes/categories straight from the data (Braun, & Clarke, 2008).

In this regard, thematic analysis took place. It is based on identifying implicit and explicit ideas or patterns within the text going beyond counting words. To help us with this, we chose the 5 steps thematic analysis approach following Braun and Clarke (2006):

Table 2: Five-step thematic analysis (Braun & Clarke, 2006).

Step	Description of process
1. Familiarising with data	Transcribing data, actively read data
2. Identify themes	Coding data according to four-dimension framework
3. Review coding	Asses validity and code additional data
4. Identify sub-themes	Look for corresponding data within themes
5. Produce report	Write coherent story and answer propositions

The above mentioned type of analysis provided us with a way to study and search for themes and patterns within the collected data (Braun & Clarke, 2006). This method allowed us to see the themes present within the interviews and interlink them to each other or with the raw, data and also capture the complex meanings within the text.

The table gives us an overview of the 5 steps to this analysis. The first step calls for data familiarization, which is done mainly while transcribing the data, when the text is be read and revisited numerous times (Braun & Clarke, 2006). The second step requires us to look for the themes within the four-dimension framework we will be looking at: *team diversity, creativity, social aspect and innovation.* The third phase involves reviewing the coding that has been done, in order to make sure that there is internal coherence as well as clear distinctions made when it comes to the different themes (Braun & Clarke, 2006). Fourth stage involves identifying sub-themes, within each of the themes analyzed previously (Braun & Clarke, 2006). Lastly, we will aim to produce a coherent story from the data that will answer our research question. In other words, after the thematic analysis is conducted,

we aim to present the patterns and connect the themes to see the overall picture of the gathered data.

In order to analyze the observation, we used an *Etic* approach, where we used the conceptual framework presented in previous chapter (Silverman, 1993). We used this approach in order to introduce some systematization into our observation and increase the reliability of this study (Silverman, 1993). As the context of the observation is of an essence, we followed the four sets of observational data introduced by Spradley (1979) and Kirk and Miller (1986):

Table 3: Four sets of observational data (Kirk, & Miller, 1986; Spradley, 1979).

Step	Description of process
Step One	Notes made in situ
Step Two	Expanded notes are made as soon as possible after the initial observations
Step Three	Journal notes to record issues, ideas, difficulties etc. that arise during the field-work
Step Four	A developing, tentative running record of ongoing analysis and interpretation

The field data was analyzed using Etic analysis, therefore, having a set of pre-determined concepts. In this manner, we could clearly see which field data corresponded with the theoretical concepts used in this study. We used the data obtained in observation as an addition to the interviews, thus complementing the results of the interviews with the data gathered in the observation. The following section will discuss the reliability and validity of this study.

3.6. Reliability

The reliability of a study refers to the quality of the research method used (Baarda, de Goede & Teunissen, 2001). This is tied to the extent to which the operations of the study can be replicated, obtaining the same results as initially (Yin, 2013). Therefore, the goal of reliability is to minimize the bias and errors within the study (Yin, 2013). In this study, there were several measures taken in order to increase the reliability.

To make a case study as reliable as possible, Yin (2013) states that it is important to have a case study protocol that documents the case study to detail, to make sure the study is repeatable (p.109). Even though we did not use a case study protocol in this paper, this thesis contained very detailed information on the objective, methodology and data analysis which ensures the repeatability of this study.

Secondly, in regards to the reliability of the interviews conducted in this study, it can be said that they were standardized to a certain extent. All interviews were conducted using the same Interview Protocol (see Appendix A) and were conducted in similar settings (interviews with Funda team in the meeting room of Funda and expert interviews in relaxed setting of a café). The analysis of the data was standardized by using a five-step thematic approach that allowed us to make sure that the analysis is the same across all interviews and is understandable and replicable by other researchers.

Thirdly, looking at the inter-rater reliability, it refers to the consistency with which the raters evaluate the same data following the same criteria (Bailey, & Brown, 1999) with the aim to increase the reliability of the study. In our case, it has both positive and negative impact. In this study there was only one rater used, therefore, we cannot say that there was an inter-rater reliability achieved. Nonetheless, by using only one rater we made sure that there was no ambiguity in the rating process which usually leads to error (Saal, Downey, & Lahey, 1980). Therefore, we can say that we ensured reliability by making sure we had an objective approach and followed the criteria of the study.

Finally, the researcher avoided any preconceptions during both data collection and data analysis. During the interviews we asked open questions to make sure that the respondents have the opportunity to share their opinion. The interviews were recorded and transcribe in order to make sure the data would not be drawn from memory but rather the exact opinions expressed by the interviewees.

3.7. Validity

Focusing on validity of a case study, Yin (2013) introduced three tests: Construct validity, Internal validity and External validity (p.99). Construct validity refers to identification of correct operationalization of studied concepts, Internal validity refers to the extent the method used was correct to study our research question and External validity

refers to the extent the findings of the study can be generalized (Yin, 2013). Nonetheless, it should be kept in mind that the meaning of validity is different between qualitative and quantitative research; in qualitative research the validity refers more to the consistency and trustworthiness (Baarda et al., 2001).

Focusing on the construct validity, we defined the specific concepts based on the previous theory and connected it back to the aim of our study (Yin, 2013). We defined four dimensions that were supported by previous research and tied to our research question. These dimensions were operationalized using existing academic literature that defined the measures of the concepts we were focusing on (Yin 2013).

Also, to ensure the validity of our study, we let the respondents give feedback during the data collection process. This ensured interactivity between the researcher and the interviewees and allowed respondents to comment on the questions freely. We also asked follow up questions to make sure that we get as much valid data as possible and in-depth knowledge of Scrum teams.

Finally, looking at the External validity, it is to be said that this study did not aim to generalize the results to bigger population. Rather, we aimed to get a deeper understanding of the communication aspect of innovation within the Scrum teams. Therefore, it can be said that the external validity is rather low; this we make up by the construct and internal validity mentioned above.

4. Results

In the previous chapter we provided the methodological guidelines to analyzing a case study and two expert interviews. Following the five steps of analysis by Braun and Clarke (2006), we first identified themes and subsequently identified several sub-themes per each main theme. This helped us to further explain and strengthen our argument and gave us more specific and coherent outlook on the collected data. However, the sub-themes will be only discussed if they are in-line with our research question or our argument. To further understand the themes and their connections, figure 2 (see below) provides a thematic overview for the four main themes and the corresponding sub-themes, based on the thematic analysis we have conducted. Although we could see some overlap with the theoretical framework presented in Chapter 2, this thematic overview is more focused and directly derived from the thematic analysis of our data.

This section will focus on presenting the results of the five-step thematic analysis and is structured as follows. First, we will offer a general overview, which aims to present the reader with an overall summary of the results of the study. Second, we will focus on the four dimensions identified in our framework: *team diversity, creativity, social aspect and innovation* and discuss the key findings more in detail whilst providing examples from the in-depth interviews. It needs to be kept in mind, however, that due to the qualitative nature of this study, the results that are presented in this section do not provide hard empirical evidence; they merely give us more insight and in-depth understanding of Scrum in regards to communication and collaborative innovation in team members.

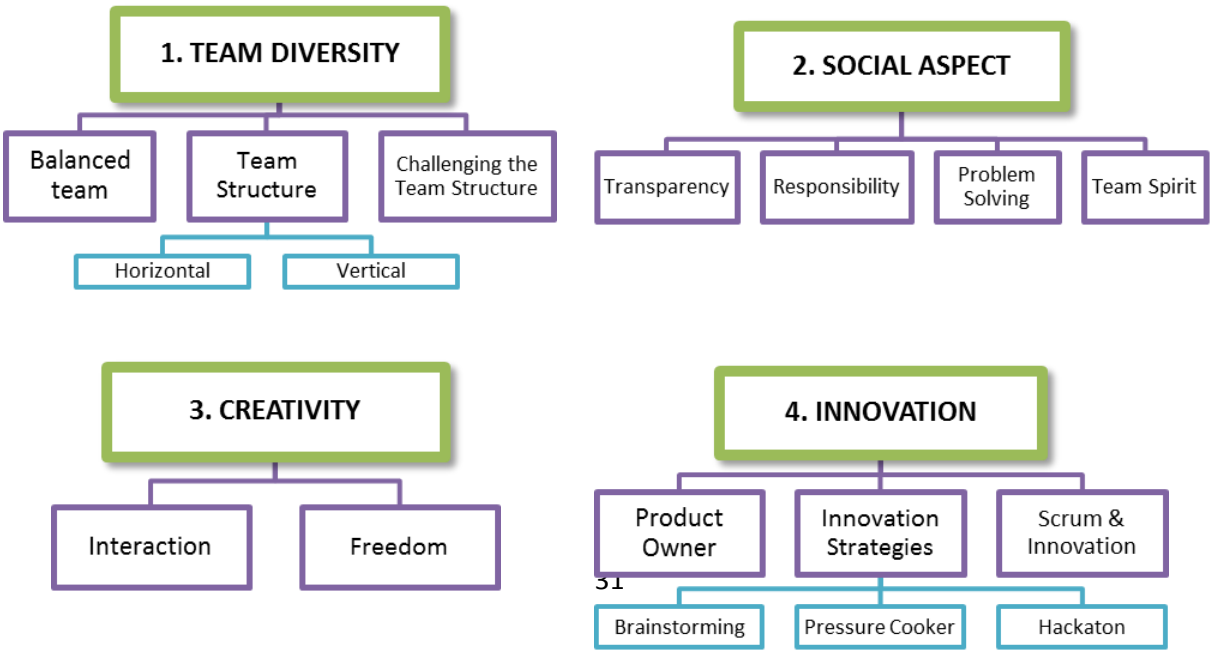

Figure 2 – Thematic Overview

4.1. General Overview

In total, one case study and two expert interviews were conducted via observation and in-depth interviews. The analysis of the interviews based on our four-dimensional framework showed interesting results. This section will briefly present an overview of the findings, which will be further explained in-depth in the following section.

The results have shown that the team diversity within the team members can lead to a more productive and balanced teams. The diversity was not proven to be limited to the background of the team members, but mainly focused on the diversity of the roles within the team. The team structure, both vertical and horizontal, has shown to be essential when it comes to successful communication and problem solving within the teams. The heterogeneity within the teams on the vertical level could also facilitate creativity within the teams. We have found that the team interaction, partially facilitated by the team background and team structure, plays an essential role in the process of creativity and, thus, coming up with ideas.

The freedom of work and flexibility that Scrum facilitates seemed to be a key element. By giving freedom to the team members we could foster responsibility within the team members and increase the feeling of importance of their work. Responsibility resulted to be very important when it comes to the team itself, as it seemed to enhance the motivation and productivity of the team members. The responsibility was also translated to problem solving; freedom of the team over coming up with a solution also seemed increase the responsibility and focus of the team.

The team spirit also became an important ingredient to a successful team. We found that a successful team should get along well and the team members should be comfortable around each other. The results have shown that with time, teams voluntarily engage in team outings without the involvement of the company,which can also lead to tribe creation. Finally, to make sure the innovation is achieved we found that the product owner plays a crucial role as they are the middleman between the stakeholders and the team. The stakeholders seemed to be the spark that begins the process of innovation and the team brings it to the finish line.

4.2. Team Diversity

The results of the analysis indicated that there are several reoccurring aspects of maintaining the team diversity besides having people of different backgrounds. The analysis showed that individual roles within the team could play a crucial role, not only from the point of view of their expertise but also the hierarchical division of these. The results indicated that balanced team with different roles within it and the varying team structure including changing up the Scrum masters could be considered to be the ways of how to facilitate team diversity within the company and its importance. The following sections will discuss each of these results more in depth.

Balanced team

When looking at the team diversity, the results of our analysis show that people with diverse roles within the team can create a team balance. Having people with different backgrounds and set of skills seems to be important in achieving balance and being able to successfully execute tasks. The balanced team seems to be a facilitator of creativity and productivity. The tester at Funda states: "(…) right now especially for building new website, I think, we have got a nice balanced team you know, couple of guys doing front-end, couple of guys doing back-end, me as a tester, ehm, our product owner ehm and we are trying to have a nice time here" (Respondent 6). In a similar fashion the Chief product owner at Funda states: "we found that (…) when you really have a balanced team with creative skills like UXer, or your developers are also in a way creative so you have front-end, back-end in the team, then the team itself is very much able to come up with creative solutions for whatever challenge I presented (…)" (Respondent 4). Thus, we found that the team members make the team; as the tester at Funda states: "(…) it's the persons on the team that make team (…)" (Respondent 6).

To conclude, it can be said that diversity in skills and roles within the team could create the balance that is needed to facilitate creativity and coming up with solutions. In other words, the individuals with their individual skillset make the team what it is.

Team structure

The analysis showed that the team structure, or so to say the management diversity within the team, could be an important part of maintaining team diversity. Funda also

achieved diversity by defining different management roles within their team. When looking into their team structure, it can be said that it is both horizontal and vertical. They challenge the Scrum ways by introducing team leads who are basically the line managers for their group of developers. The head of user experience states: “And one of the things Scrum actually says is a bad idea, but we do because of management reasons, is in the team we always have for developers a team leader who is their line manager and who will do the reviews and stuff like that and the reason for that is that we have 6 teams, 25 developers and it just takes too much time to… to have one manager for 25 guys. So instead, we said, well, let's create team leads and let him focus on four or five guys” (Respondent 2). Thus the results show that by having the team together but still having a role scheme, the project management is easier.

We also found that the team diversity could be facilitated by having vertical focus teams that are heterogeneous; each team is focused on different part of the product and has team members with different role schemes and skill sets. The Head of user experience states: “So we have the focus teams and they are a feature teams, they are verticals they are responsible front and back for a certain area of the product. Then there are developers, designers, testers, product owners” (Respondent 2). Thus, on the vertical level the diversity within the team can be seen as the diversity of skills and roles, whereas the between team diversity can be perceived as having diverse focus teams. The vertical team structure seemed to facilitate creativity within the team. The Chief product owner at Funda states that creativity is fostered by: “[having different people in the team with] different backgrounds and make sure that they interact with themselves with people in the team also but they also interact with stakeholders in brainstorm sessions and stuff” (Respondent 4).

Next to the vertical team structure, we found that there is a horizontal team structure as well, where people with the same roles within the team or the same interests create a group, or so called cluster. This structure enhances the team diversity, as the team members get mixed up with the goal of sharing their common interests in regards to the product they are working on. The team diversity could be achieved by combining people from different teams on a horizontal level that share different experience or insights coming from different focus teams. The Head of user experience states: “Spotify introduces (…) something that I believe they call a cluster. There is a group of people of any discipline who

share a common interest in a topic, for example we have a performance cluster, so those are developers, and maybe even the designer, who care about the performance and they will meet with each other in a week or have a stand up or whatever feel like they need to do" (Respondent 2).

Although this structure challenges the Scrum ways to a certain extent, the respondents believe that there is no other way around it within a large organization due to management reasons. There is always a certain kind of management structure and hierarchy. Tester at Funda states: "a Scrum team within a larger organization always has a certain position in a hierarchy. Ehm so taking the whole organization into consideration, no that's not true it's not flat (…) and there are very few companies where it's actually flat like Zappo's in what they are trying to do (…)" (Respondent 6).

In conclusion, the team diversity can be defined by the team structure, or so to say management diversity. There were two types of team structures found, a horizontal and vertical. The vertical team structure is heterogeneous, where team members have a different role within the team. At the same time the horizontal structure is more homogeneous where the team members have similar roles or interests, creating a cluster. We found that the Scrum team structure is challenged in larger companies, where the hierarchy within the teams is inevitable.

Challenging the Team Structure

Another quite interesting result found during our analysis of data was the strategy used by Funda to make sure the diversity within the team is achieved. This is done by switching Scrum masters within the teams once in couple of month, giving the opportunity to the actual team members to try out a different role next to what they are currently doing. They encourage everybody who wants to try it out to become a Scrum master for a period of time believing that if they care enough to do it; they might as well do a good job. This ties back to the facilitation of the feeling of responsibility within the team members we will discuss more in depth in the next sub-chapter. The Head of user experience at Funda states: "We switch Scrum masters too. (…) We give them 3 months, 6 months to try it out. It's not going to be perfect, it's going to hurt the team in short term because it's a different experience but we think in the long run it will be better for us" (Respondent 2). The results

showed that switching the Scrum master every couple of months facilitates diversity within the team. This is not only by switching up the structure of the team people are used to, but also by the fact that every person executes the role of Scrum master differently. Therefore, the diversity is based on the individual approach to tasks and switching up the general settings of the team in order to increase the team productivity and awareness. The Head of user experience at Funda states: “it is funny because it resets the team, where you give a new Scrum master who does the things a bit differently or they (…) will make the mistakes and it really makes the team conscious again (…) and that's good because it will make them aware of the way we work and then we'll find a new ways to do it which are better” (Respondent 2).

To conclude, changing up Scrum masters and thus challenging the team diversity can be considered a way to achieve more awareness within the team members and a way to make them not only more aware of their surroundings but also it acts as a facilitator of creativity and problem solving within the team.

4.3. Creativity

The results of our analysis show that creativity can be achieved several ways when it comes to Scrum teams. The creativity is not only based on individuals, who however do play a crucial role within this process, but also in the interactions within the teams. Before we get to explain that more in depth and connect it to the different enablers of creativity in the team setting, it is to be mentioned that individual creativity was understood differently by the respondents based on their role within the team.

Focusing on the individual creativity of team members, it could be seen that the creativity differs based on the role of the team member within the team. For instance, front-end developers focus on building the product, thus, enhancing the experience of their build is the part where creativity comes in place. Front-end developer at Funda states: “for me getting creative means finding a new solution or improving on some kind of build strategy that will save time or maybe more interesting, to develop something that won´t crash while you are running it or that kind of stuff” (Respondent 5). The results also showed, in relation to individual creativity, that each individual member with their set of creativity compliments the rest of the team. In other words, although the creativity of individual team members

differs based on their role, they complement each other which results in a coherent cooperation towards the desired product. As the front-end developer at Funda states: “If it´s about creativity the visual designer and also the UX guys, they make the visual concept. Once they have settled on something, and let´s implement this, and then it´s still creative because I have to make an Html from the image and that´s creative in a way” (Respondent 5). In the following section we will discuss how creativity is achieved within the team and what are the possible strategies used to foster creativity focusing on two themes: Interaction and Freedom.

Interaction

The results of the analysis showed that interaction is a crucial enabler of creativity within the team members. The interaction focuses both on interactions of team members within the team but also on interactions of team members with the stakeholder. The stakeholder offers a different insight on the issue therefore an interaction with them can foster creativity within the team members. However that is only a part of it as most of the companies’ state that fostering creativity is a combination of different factors. The technical lead at Hackers and Founders states: “we base it on the stakeholder but the stakeholders only have so much knowledge; but we also look at the competing product see what features they have and we incorporate that as well” (Respondent 3). They add that although the interaction with stakeholders fosters creativity, it is only a part of the whole picture. In their case they enhance that by studying the competition which further ads to the creativity enhancement by seeing different ideas. In this line of thought, the Chief product owner at Funda states that creativity is fostered by: “[having different people in the team with] different backgrounds and make sure that they interact with themselves with people in the team also but they also interact with stakeholders in brainstorm sessions and stuff” (Respondent 4). This can be also connected to the team diversity described in the previous section. Thus, in addition to the stakeholder interaction, having a heterogeneous team that is interacting with themselves can be useful when attempting to foster creativity. However, when dealing with stakeholders the product owner is the bridge of the interaction.

Product owner facilitates the communication between the team and the stakeholders and as stakeholder communication is essential when fostering creativity, the

product owner is a part of this process. The Scrum master at Funda states that creativity: “is something which is usually initiated by the product owner, in our case, who says okay there is this need from the stakeholders, what can we do about this? And this is usually a general brainstorm where everybody has equal input to what it can look like” (Respondent 7).

Although the respondent 4 and 7 mentioned that brainstorming could be a method of enhancing creativity, other respondents believe that specific method is not necessary, it is people who matter. The Scrum mater at Funda, thus, states: “(…) it´s not that we are going to a specific room and become Zen that is not creativity flow for us. I think people are creative themselves” (Respondent 7). In this regard the freelance developer states that creativity is: “(…) based on the feedback (…) you try to create a dialogue and also think out of the box” (Respondent 1).

In conclusion, it can be said that creativity is fostered by interaction and feedback and thinking out of the box, for instance by being informed about the competition. The interaction has resulted to be a facilitator of creativity within team members. It has been found that both interaction between the team members and interaction between the team and stakeholders could foster creativity. The product owner resulted to be an important part of the creativity process as they were a bridge between the team and stakeholders and usually is the initiator of the process.

Freedom

The analysis of the data also showed that another enabler of creativity could be freedom. The freedom can be understood in many ways, such as freedom of workplace and freedom over being creative. Focusing on the freedom of workplace, the Hackers and Founders base their creativity on the ability to work from wherever, this not only enhances the creativity by not being space bound but creates extra motivation to perform. As the technical lead states: “We also give them a lot of freedom so they have the freedom to work from home, they have the freedom to work the late hours, they don't have to be there from 9 to 5; these also are the perks of the people I work with and that results in extra motivation” (Respondent 3). The company also involves in team outings were they work and travel. The technical lead states: “we're also traveling and working there as well. And we organize a special week for this where we can still work with the client from Spain but we

can also (…) go out swimming, kitesurfing and we come back and start working and this is what we do every year now" (Respondent 3). Thus, it seems that by having a more relaxed setting and more freedom to work on their own means, combining leisure with work can facilitate creativity within the team members.

Focusing on the freedom over being creative, it could be connected to the responsibility of the team members over a task. This feeling of responsibility caused by the given freedom over the task seems to facilitate creativity. We can see it in two different scenarios. The freelance developer says: "at Ahold for instance, we were working on one single website so we were the only ones who were responsible for that website. Then you have more freedom in creativity, in creating new things" (Respondent 1). However the developer also believes that this depends on the size of the product and the company itself. We also found out that by presenting the team with a challenge and giving them freedom to create the solution themselves, it fosters creativity through the feeling of responsibility. Chief product owner at Funda states: "(…) we try to avoid me or even worse like stakeholders coming up with website solutions (…)" (Respondent 4). Thus, not giving the solutions to the team members but leaving the process of solving the challenge facilitates the flow of creativity within the team members and the team itself.

To conclude, we found out that freedom is essential when facilitating creativity. There were two types of freedom found, freedom of workplace and freedom over being creative. Freedom of workplace, or so to say the ability to work from wherever could increase creativity. The freedom over being creative could also foster creativity through the increased feeling of responsibility. Thus, the more freedom over the task, the more responsibility the team has and the better they want to perform.

4.4. Social Aspect

The analysis of our data shows that social aspect is an important building block when it comes to the themes. The results indicate that there are several traits within the social aspect that enhance the positive collaboration of team members. The following sections will discuss more in depth the effects of transparency, responsibility, problem solving and the team spirit in relation to the team and individuals within the teams.

Transparency

The results of the analysis showed that transparency and feedback are valuable assets when it comes to the social aspect of Scrum teams. Transparency as a way of keeping the whole team, the stakeholders and the company up to date with any kind of information necessary proved to be a crucial part of the social side of the teams. As the results indicate, transparency is understood as being on the same page when it comes to being informed about the team members and having the same goals in mind for the product. The freelance developer states: "(…) you are a team, you are working on a product, all the phases need to be pointing in the right direction, so I think with the meetings I really got to understand what product is and what everybody was struggling with and, so you have a lot of transparency with your team members. (…) That's when I really saw the value of Scrum for me" (Respondent 1). We found out that the transparency begins at the meetings, where the team members are encouraged to share their insights and experiences and that´s the moment where the team members get to understand their team. The meetings proved to be essential in this sense, however, it was found out that the meetings were not so easy to adjust to for the team members as at the beginning they did not see the purpose; this came only in time when they realized that the meetings provide with valuable insight into the project. We identified different kinds of meetings that are designed to facilitate transparency not only on a team level, but also on a company and stakeholder level.

The retrospective proved to be a place where the team members get to discuss openly and transparently the previous sprint. According to the respondents this is the place where not only team grows by discussing issues but also team members get to grow as individuals. The Head of user experience at Funda states: "The retrospective as we do it it's not only a group thing but also an individual thing and we try to discuss and reopen in transparent manner and really discuss how we can grow as individuals or also as teams" (Respondent 2). Thus, we found out that the meetings are not only designed to share the information in a transparent manner but also to grow as a team and as individuals.

We also found that the Quarterly roadmap meeting is a valuable way to keep the company up to date on the development of the project, where the product owners share their insights and strategies with the management. With the transparent way of sharing the information the company makes sure that they are in line with each other and the company

goals. The Head of user experience states: “the quarterly roadmap meeting with higher and middle management and that's the meeting of an entire day where product owners will present a roadmap for coming quarter to the entire management and that's where we will agree that we are still in line with each other we are in line with the company's strategy we are in line with whatever Marketing is doing and stuff like that” (Respondent 2). This type of meeting, thus, proves to be a good information source for various departments within the company with the aim of informing and keeping up to date the whole company. Reviews, on the other hand, proved to be more challenging when it comes to being transparent and sharing information with the rest of the company.

The structure or so to say the execution of this kind of meeting proves to be essential to achieve a successful transparent session. Funda located a problem with this type of meeting in a sense that at the beginning they would have dedicated review sessions where the teams would present their cases for an hour or two. Although, this way the company could share valuable feedback, when it came to the technical terms, the teams outside of the product development had difficulties to follow. This process became too long, thus, the company shortened the presentations which made the progress easier to follow for the rest of the company. This proved to be a way which enhanced transparency, not necessarily basing it on the feedback but more on the information sharing and making sure everybody is in line with the aim of the company. The Head of user experience at Funda states: “So for the past half a year we flipped it around and said well communication and transparency is more important than collecting feedback because people that want to give feedback should give feedback continuously and not as an incidental review thing (…)” (Respondent 2). However, how to keep the inter-departmental feedback flow proves to be an issue that has not been resolved yet. Thus, we can conclude that short and focused sessions when it comes to communicating between departments make the transparency easier to happen as all the parties involved have more means of understanding the progress.

The results also indicated that transparency between the team and the stakeholders is of an essence. Keeping in mind that the product owner acts as a gatekeeper between the team and stakeholders, there can be seen a conflict between trying to shield the team members from the stakeholders but at the same time keeping them in line with the company. The Head of user experience at Funda states: “Our goal was getting people in line

or in touch with our company and at the same time you have a product owner and Scrum Master that are trying to shield the team from the company so there's a bit of conflict there. So we are really trying to consciously be still… try to shield them but still make sure that on occasion as they are talking to other people they are understanding what someone from Marketing says, what someone from sales says. Because if that doesn't happen then we will be back to the old situation where instead of having a design document we will have the product owner telling the guys what needs to be done" (Respondent 2). In this sense, the team members need to be in touch with the stakeholders to a certain extent to make sure they can work on the product on their own without being told what to do, which is not what Scrum aims.

Therefore, collecting feedback from stakeholders is essential to make sure the team is in line and is informed about the necessary things. For instance, the front-end developer at Funda states that in the: "redesign review meeting you get the feedback from stakeholders about how it looks or why it doesn't look good in what page or the design looks nice or the design doesn't look nice if they want to change that too" (Respondent 5). This proves to be, however, difficult in a sense, as mostly there is a lack of involvement from the stakeholders which proves to be the main issue with trying to maintain transparency within the team. The Chief product owner at Funda states: "(…)if you want to be agile you want to be able to (…) get feedback from customers and stakeholders (…), it would be cool if stakeholders themselves are more involved and actively check up on themes what they're doing and visit the daily stand-up sometimes" (Respondent 4). The results show that more active involvement from the part of the stakeholders makes the transparency and feedback more feasible and makes the process of delivering the desired product easier.

To summarize, the transparency and feedback has resulted to be an important part of the social aspect of the team. We found that the team needs to be up to date and informed in order for a team to be successful. The transparency was found to begin at the meetings where the team members are encouraged to share their insights. In this regard, the most vital meetings resulted to be the Retrospective and the Quarterly roadmap meeting. However, we also found that the structure of the meeting is essential when facilitating transparency; short and focused meetings resulted to be more productive.

Moreover, transparency between team members and stakeholders also resulted to be essential as it facilitates the process of product delivery.

Responsibility

The analysis of the data showed that responsibility is a key to keeping the team active, interested and motivated. The overall aim of the company is to make the whole team responsible for the product rather than having individuals responsible for the part they were working on. The freelance developer states: “What you want is that everybody feels responsible for the product, not purely on his own little piece he is working on but on what are we building together” (Respondent 1). The results of the analysis show that the key to responsibility is giving the team members freedom in how they do things. The Head of user experience at Funda states: (…) if you want to make people feel responsible you have to give them a bit of freedom right (…) in how they do things... So that's why that's how every company comes in their own way, if you want to make people responsible, the team and individual people, they have to feel comfortable in how they carry out their responsibilities” (Respondent 2). Thus, it is important to make people responsible for what they do, and one way to achieve this is to give them the freedom over how to do it. The responsibility over the product seems to be connected with the individual motivations of the team members to perform well. The results showed that the motivation to perform is fueled by the responsibility that comes with their task and their own reputation that is on the line. The Head of user experience at Funda states: “And then all of a sudden they are very interested with what they are doing because it's one of their own ideas right people really care about their own ideas. Then all of a sudden it's their ego as well on the line there time is on the line and then they really start working harder and try to come up with better solutions and they really care about getting the product working well” (Respondent 2). Thus, responsibility then ties back to ones ego and reputation and translates into the motivation of the individuals for the product they are working on. The Technical lead at Hackers and Founders states: “people get very motivated because they have to think for themselves and they're important themselves (…)” (Respondent 3).

The analysis also showed that not only freedom over the task is the facilitator of responsibility but also the interaction with the stakeholders and the resulting product that is

presented to them. This can be, again, tied back to the ego and reputation of individuals within the team, where the aim is to deliver a high-class product and showcase ones skill. The Technical lead at Hackers and Founders states: “(…) everyone wants to deliver a very beautiful product, we have only high skilled people they get a motivation from actually building working software. Apart from that it's basically the interaction they have with the client themselves and the stakeholders as well that make them feel engaged with the product to build a better product” (Respondent 3).

In summary, the team responsibility enhanced the interest, motivation and activity of the team members. It proved to be essential to make the whole team responsible for the product rather than have individuals responsible for a small portion of it. The responsibility was found to be connected to the individual motivations of team members to perform well. Thus, the responsibility is connected to the motivation of the team to perform well where the reputation is on the line. Moreover, the responsibility resulted to be enhanced by the freedom over the task performed and the interaction with the stakeholders.

Problem Solving & Decision Making

The results have indicated that problem solving and decision making are both an essential part of teamwork, not only to resolve issues but to also to make sure that the team works well. Focusing on the problem solving, the analysis shows that the team needs to be given an issue to enhance the teamwork. By giving the team a problem to solve, they are stimulated to start performing. The Head of user experience at Funda states: “(…) if you want the team to really work well it's true to believe that the team needs to be given a problem. They need to be given a problem on a as high level as possible preferably you tell a team we need to make more money go” (Respondent 2). Looking at the problem solving strategies, the results of the analysis show that the problem solving is enhanced when discussed in a group, thus, within the team. The solution to the problem is established when the problem is discussed in a group setting.

Nevertheless, there have been identified two different approaches to this matter: Individual problem solving and Group problem solving. Individual problem solving seems to be a method that allows the team members to think of the problem separately from the group, giving them more freedom to come up with the solution on their own. The Technical

lead at Hackers and Founders states: “in first step of the problem solving we are not communicating with each other (…) or just have an exercise that we were alone, and later we put everyone's ideas together and then we make decisions together” (Respondent 3). The second strategy is to discuss the problem within the team straight away, without teammates having a moment for them, thus, purely based on the discussion within the team. The Scrum master at Funda states: “(…) it usually is talking to other people and get their views on the same problem which usually triggers things and then one thing comes to another. And I think that also is the case with the whole team. So if we sit together sit together and thing about a problem, we have way more ideas than people on their own” (Respondent 7). This opposing idea contradicts to the individual approach in a sense that more people can come up with more and better solutions than individuals themselves.

The analysis did not give an answer to which method works better. It is to be assumed that the approach the team selects when trying to solve the problem, individual or group approach, is purely based on the team itself and what the team members find the more practical. However, the thing that seems to be what is effective in problem solving is when the team is asked to come up with the solution on its own. In other words, the team is not given a solution to the problem, merely challenged to solve it. The Chief product owner states: “it is important for the team to come up with their solutions so that is like (…) try to avoid telling them exactly what you need and almost coming up with designs, no, but leave that to the team because that's what they are there for what they are the specialists” (Respondent 4). In a similar fashion the Head of user experience at Funda states: “you don't want a product owner or a company that tells the team something that is disguised as a problem but it's actually a solution. So what you see and a thing we do quite well and other companies are in worse position is that they disguise a user story as a solution not so much a problem” (Respondent 2). Thus, the results have shown that it is crucial to leave the team to come up with their own solutions in order to make this process successful.

The results have also shown that when it comes to the part of decision making, it could be based on the prior discussion within the team. As the freelance developer states: “So it is more of you are questioning things and you get a discussion and then you make a decision” (Respondent 1). However, it seems that the decisions are not, however, made on the team level; these are rather made on an individual basis with the prior agreement from

the team. The freelance developer states: “(…) when the team grows bigger, most of the time the senior developers eventually make the decision, alright we are going to do it like this. But uhm, yeah everybody has to agree with” (Respondent 1). Thus, the solutions are created on a team level based on questioning things which leads to their discussion, and the decisions are made by senior team members after making an agreement with the team.

In conclusion, the problem solving resulted to be an essential part of teamwork. We found that problem solving is based on a prior discussion within the team. Moreover, we discovered two approaches to coming up with solutions: individual and group problem solving. The individual problem solving is based on individuals thinking of a solution segregated from the group and sharing it with the team later. The group problem solving on the other hand is based on sharing the ideas within the group straight away. Both approaches, however, end up with group discussion that leads to problem solution on a group level.

The Team Spirit

Within the agile methodology the team component is an essential part. Looking at the team component from the social aspect, our analysis indicated what an ideal team is perceived to be and what the current teams are the strategies to enhance the team spirit.

Focusing on the ideal team, the results of the analysis indicate that the team spirit is based on personal interaction. The personal interaction and the relationships between the team members are essential and they set the mood of the whole team. It has been found out that there needs to be mutual respect and understanding. The freelance developer states: “A team really thrives when they understand each other, so I have no basic definition of my dream team only if you are with people who are… em… who respect you, who respect other developers and who are really willing to work together” (Respondent 1). The interaction and collaboration is another aspect that resulted to be of an essence when having the right team spirit. The Chief product owner at Funda states: “Dream team... That’s the team that is able with confidence pick up whatever challenge the product owner has for them and is able to come up with a solution themselves” (Respondent 4). Although these aspects seem to be of an importance, the results of the analysis show that the main feature of a successful team is the closeness of the team members and their personal relationships.

Some respondents call this phenomenon a vibe, where the team shares a positive feeling. The freelance developer states: “And if you understand each other then it goes naturally, (…) then you get to really understand each other and that’s, you know, kind of a feeling, kind of a vibe” (Respondent 1). On a similar note the tester at Funda states: “I have been working with some of my colleagues within the team for last I don't know... year and a half and well the way we work together it's like uhm, basically right now I feel like I can look at Marius or Joerden and just by look we know enough (…)” (Respondent 6). Besides the personal interaction, the results showed that the ideal team should have all the necessary skills to be able to tackle any kind of problem. The Scrum master at Funda states: “The dream scrum team would be team consisting of people who have all the skills needed to put something into production” (Respondent 7). This would prove to be useful to make sure the process of product development will be smooth.

Looking closely on the personal interaction of the team members, the analysis showed that team outings play a crucial role in maintaining the good spirit and relationships between the team members. Companies organize team outings on regular basis in order to enhance the process of team building. For instance, Hackers and Founders organize a flexible working holiday where the team is engaged in non-work related tasks such as swimming and kitesurfing combined with work related settings. Funda also organized similar team outings, which were aimed to facilitate team building.

However, the results showed an interesting phenomenon occurring within the teams, where the team members started to organize their own team outings after work. The Chief product owner at Funda states: “The teams spontaneously started to have their team outings and stuff. We used to have outings for the whole product development (…) 2,5 years ago (…) and after like half a year the first team started to have these team outings which were not a Funda thing but they came up with it themselves. So after work they went for a dinner and drinks and stuff, I went for climbing with a team once. Eh… we did one of those escape rooms” (Respondent 4). It is interesting to see that the team members voluntarily started engaging in team outings, thus, enhancing the team spirit by engaging in different activities together. Nonetheless, these spontaneous team outings come with a certain risks – the tribe creation. The results have indicated that the voluntary team outings can create separation between the different teams. This seems to be due to the fact that the team

members tend to stick together and disregard other teams, which leads to creating the tribe effect. The Chief product owner states: “at the same time you get the risk is that the tribe thing (…). They get too close together, too bonded and then you start forgetting about the other teams so that’s where you have to find the balance and that’s up to management I think” (Respondent 4). In this sense, the balance needs to be kept when it comes to team outings to neutralize the possibility of the tribe creation.

In summary, the team spirit was found to be an essential part of the social aspect of the Scrum team. The team spirit begins with the interaction, understanding and respect between the team members which set the overall mood of the team. We found that closeness between the team members is an important feature of a successful team. The closeness and good relationship was enhanced by team outings, which were mostly organized by the team members without involvement of the company. These team outings resulted to be an imperative part of the team spirit, resulting in a tighter team. Nonetheless, we also found that when the team members got too close, they began to eliminate members of other teams and created so called tribes.

4.5. Innovation

The analysis of innovation in the team setting showed several underlying patterns that were brought up by the team members during the interviews that will be presented in the following section. However, before we get to that, it is to be mentioned that just as creativity, innovation was understood differently based on the respondent´s role within the team. The tester at Funda states: “For me personally because I'm a tester I would try to or I always try to keep up with like the newest developments in my field and I would just try stuff right and try new stuff I didn't know or think different“ (Respondent 6). The freelance developer similarly stated that: “when it comes to solutions you are trying to come up with the newest technologies. If there is room to improve your code or your usability of the product, there is always room” (Respondent 1). Also, innovation in the setting of software development can be understood at different levels, such as the tester at Funda states: “you can have innovation and different levels I guess, you can have innovation in a way you structure code, sure, eh and maybe that's what one of the guys did, they looked at the code at the legacy code so let's do it again in a better way” (Respondent 6). Although the

definition of innovation happened to be role-specific, the overall understanding of the concept of innovation was similar across the respondents.

The following section will touch up on this more, being divided into three sub-sections, discussing the involvement of Product Owners in the process of innovation, the innovation strategies and Scrum in connection with innovation.

Product Owner

The results indicated that one of the main facilitators of innovation within the team is the product owner. The product owner, as described by one of our respondents is "(…) the bridge between the customers" (Respondent 4). Thus, the product owner plays the crucial role of being the bridge, or so to say the middle man, between the team and stakeholders. This role of the bridge comes with the two-way information sharing between the team and the stakeholders, which seems to be one of the most important features. By sharing feedback or ideas of stakeholders with the team, there becomes a room for the team to be innovative and come up with ideas or solutions that would not only be innovative, but also fit the needs of the stakeholders. The freelance developer states that: "(…) I think innovation starts with the product owner. They need to go to the stakeholders and say you know what we have this and this idea that might improve our website or might improve our product and when they are convinced, they go back to team and start at the drawing board, like alright how can we implement this" (Respondent 1). As understood from this statement, the feedback from stakeholders is in a sense a facilitator of innovation, as their ideas are the base the team builds their innovative work; and in this sense the Product Owner is a facilitator as well, as they are the communication bridge between these two groups. However, as mentioned by Respondent 1, in regards to the product owner being the facilitator of the innovation, the innovation process itself depends mainly on the company and the team structure. The freelance developer states: "(…) when we were working on one single website (…) we were the only ones who were responsible for that website. Then you have more freedom in creativity, in creating new things. While at KLM when you are a part of a team that's only responsible for only a part of the website (…) then yes you can have innovative ideas but it also has to fit in to the whole website. So really it depends on how big is the product, how big is the company" (Respondent 1).

All in all, the product owner was found to be an essential part of innovation; the role of the product owner being the link between the team and stakeholders resulted to be one of the key facilitators of innovation. By sharing feedback between the team and stakeholders they create the room for innovation where the team can come up with new ideas and solutions.

Innovation Strategies

The next pattern that emerged when analyzing the results were the different strategies companies used to facilitate innovation within their Scrum teams. There were several methods used by the companies to enhance innovation and idea flow within their employees, such as brainstorming, the pressure cooker and hackathon.

The first strategy was **brainstorming**, where the team members would be motivated to come up with ideas. This can not only be viewed as a creativity enhancer or part of the social aspect of the team, but also as a facilitator of innovation within the team. The experience at Funda showed that thanks to the brainstorming session at their company, one of their co-workers came up with an idea, which although wasn't put into production, that was innovative and had a competitive advantage compared to the competition of Funda. The tester at Funda states: "what's kind of innovative, on Funda you could like search for a home that is within 25 minutes on bike and not many sites have this and that's one of the ideas of one of my team members I guess, (…) this was just an idea that came from a (…) brainstorm session" (Respondent 6).

Another interesting method we found in our analysis was a so called "**pressure cooker**", where people in the team are put under pressure not knowing exactly what they are building. This certain uncertainty seems to be the facilitator of innovation. The technical lead of Hackers and Founders states: "Innovation happens, I think, when people are put under pressure and we have a complicated problem to solve" (Respondent 3). Therefore, it can be said that having a complicated problem or issue to solve, while being under pressure, can be one of the ways to facilitate innovation within teams.

This idea of being under pressure goes hand in hand with the third method that was found by analyzing the data, which is **hackathon**. Hackathon at Funda, under the name of FedEx, was claimed to be the stimulus for innovation within their company. As the tester at

Funda states about their upcoming hackathon: “Next Thursday in the afternoon we will start hacking, all night long toward Friday I guess, we will work and present the stuff (…). This is one platform to stimulate innovation within our company” (Respondent 6). This platform, based on our analysis, seems to be a facilitator of innovative ideas based on the concept of hackathon, where people are working whole night on a project/product and in the morning they present their result. Based on the analysis of the results it seems to be a productive method as the employees of Funda came up with various innovative ideas of their own that can further translate to the real-life setting. As the tester at Funda states: “couple of FedExes before, some of the guys made a Google Glass application and some guys were making Oculus Rift applications, so all kinds of stuff; and (…) if it's really nice and we can do it, we can actually make or expend the products that we made during the hackathon and use it on the production site” (Respondent 6).

In summary, Scrum teams use different strategies to make sure the process of innovation happens; we identified three prevalent strategies: brainstorming, the pressure cooker and hackathon. All three methods put the team members under pressure which creates the motivation for the team or individuals to perform. We found that all three strategies showed successful results and enhanced not only innovation but creativity within the team.

Scrum and Innovation

Looking at the Scrum being an enabler of innovation from the point of view of Scrum team members, the analysis of the results showed that Scrum could certainly be a facilitator of innovation, which is mainly based on specific features of Scrum. We found that one of the main facilitators within the Scrum methodology is the team structure, where there are fewer boundaries and people work closely with each other. As the Scrum master at Funda states: “I think it's an enabler at least for innovation, cause we put people closer together with less boundaries and more flow to get things done, more focus so they are not distracted by other things” (Respondent 7). The tester at Funda had a similar view: “because of the short feedback logs within the team and Scrum facilitates this in a way right…It´s dependent on the short interactions” (Respondent 6).

We also found that although Scrum indeed could facilitate innovation, the process of innovation could be dependent on the company itself and its priorities; this is where the role of Product Owner comes in place again, who approves if the ideas will be further worked on. As the tester at Funda states: "I guess Scrum can help innovating, ehm, and it I think it all depends on where the priorities will be, because we kind of have to convince the product owner that some ideas that are innovative are a good idea to actually work on" (Respondent 6).

4.6. Conceptual Model 2

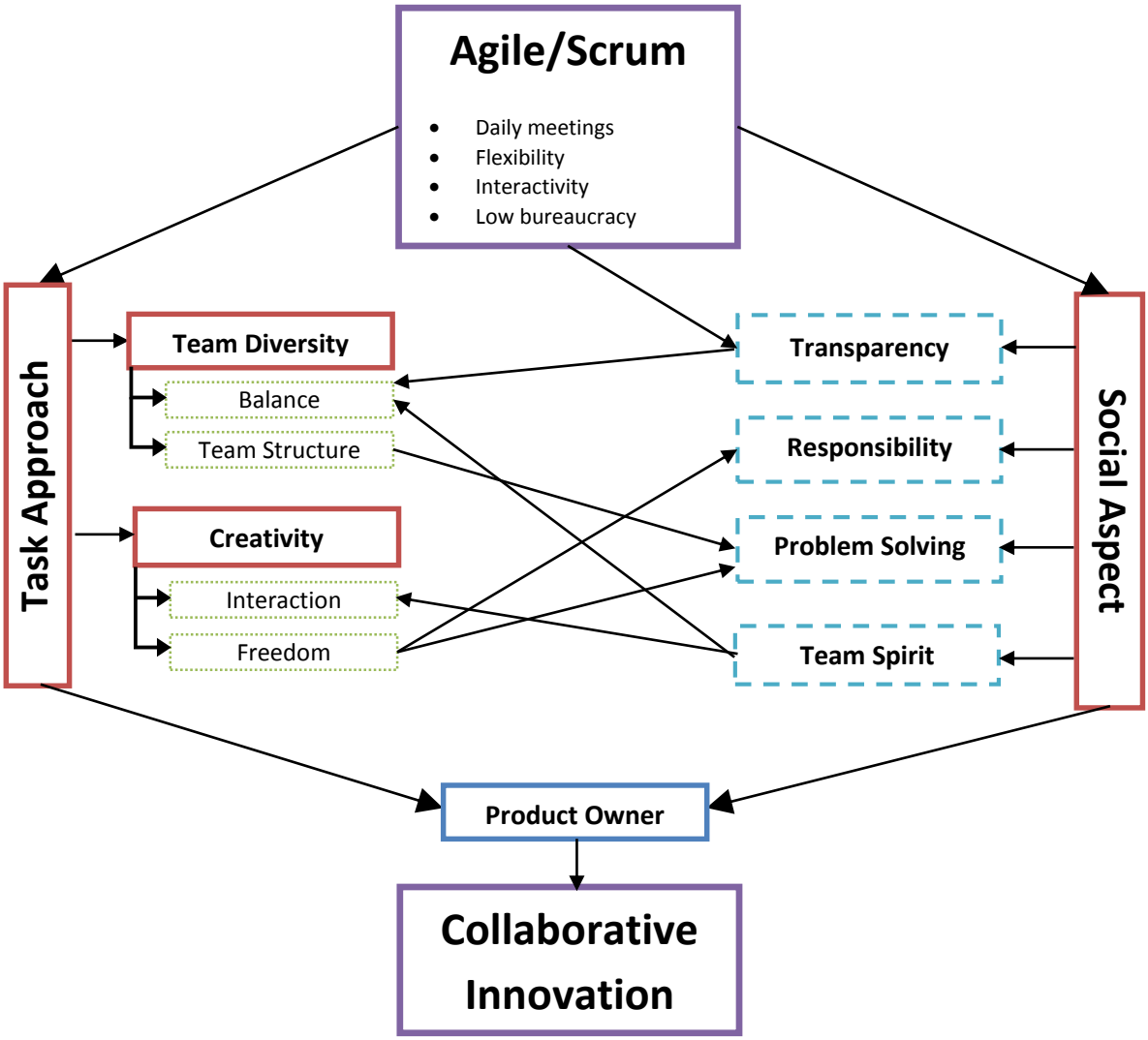

Figure 3. Conceptual model 2

Looking at our data, it is clear that there is more to successful collaborative innovation than previously expected based on our literature review. Our analysis has shown that there are more specific elements of the team that facilitate communication and

innovation within Scrum teams than just task approach and social aspect, such as balanced team, the team structure, interaction, freedom, transparency, responsibility, problem solving and team spirit. Therefore, based on the obtained insights from our empirical investigation, we propose a new, enhanced conceptual model (see figure 3). This model shows how the four-dimensional concept of innovation is positioned towards the specific Scrum team features found during our research.

In this revision of the original conceptual model (see figure 1), the overall flow of the dimension in terms of meetings, flexibility and low bureaucracy remains the same. However, what is different compared to the original model is the fact that the dimensions that belonged under the Task Approach are believed to be on the same level of importance as the Task Approach itself. This is because both dimensions have found to be important within the team and the process of innovation. That is why we decided to end up with a four-dimensional concept (Team Diversity, Creativity, Social Aspect and Innovation).

Moreover, we also found that there are possible relationships between the Team Diversity, Creativity and Social Aspect Dimensions. We believe that they are highly interconnected and mutually dependent on each other. The Transparency is based on the Scrum team concept and leads to a balanced team. The Freedom leads to Responsibility but also to Problem Solving, as the Team members are given a free hand to deal with the issues and, thus, given the responsibility to do a good job. The Problem Solving is also based on the Team Structure, as the solutions are found on the team level but the decisions are made on a management level. The Team Spirit leads to the balance within the team but also enhances the interaction within the team members.

Finally, both Task Approach and Social Aspect are connected to the Product Owner, who resulted to be the middleman when it comes to not only the communication, but also facilitation of the innovation within the team. Thus, the Product Owner acts as a gatekeeper of the process of innovation.

For all the relationships presented above it has to be stated that the positioning and the direction is based on the literature and our results and does not represent hard causal relations. The data analysis only shows possible explanations of the directions and positioning. The next section will connect to the updated conceptual model by connecting our findings to theory.

5. Discussion & Conclusion

The previous chapter has provided the results of the case study and the two expert interviews. This section will focus on connecting the obtained results with the theoretical background presented in Chapter 2 and critically reflect upon these findings. We will discus on the implications of the results with the theory and practice, providing a rich insight of the findings, and answer our research question. It will be structured based on the structure of the theoretical framework in order to make it easier to see the theoretical implications of our results. The conclusion will summarize the obtained results.

The research question this thesis aimed to answer was: "*How does Scrum enhance the communication essential of collaborative innovation?"*

5.1. Discussion

Since this research is qualitative in nature and based on a relatively small sample, we have to be careful in generalizing our findings and drawing definite conclusions. Based on the findings of this research, it seems that higher levels of heterogeneity in Scrum teams may increase the quality of communication, which in turn might lead to increased innovation within the teams. With the flexibility of Scrum, thus the freedom and low-bureaucracy, the communication might be enhanced as it is largely based on the climate the team operates in. In this sense, we found that freedom plays an important role. The freedom of workplace, thus the ability to work from anywhere and the freedom over completing the task may lead to increased creativity within the team, which is an essential part of process of innovation. The built-in interactivity of Scrum also resulted in possible enhancement of communication in relation to creativity. We found in our research that Scrum seems to be conducive to transparent communication, which in turn may increase innovation. This was also connected to problem solving which seemed to be enhanced by clear communication. Going back to freedom, the responsibility seemed to be enhanced due to the lack of bureaucracy. We did not find connections between the responsibility and communication as this occurred naturally, nonetheless it can be said that increased responsibility might lead to increased innovation. Finally, team spirit was found to play a crucial role within the communication aspect of innovation. The team spirit seemed to be enhanced by the Scrum structure that is flexible and open. The team, thus, has the possibility to engage in a less formal

communication.This seemed to lead to team cohesion and increased collaboration.In the following section the results are discussed more in depth, connecting them to existing literature.

The results of this study indicate that, in line with the literature, **team diversity** is important when it comes to the performance and creativity of the team. The diversity was found to be relevant in relation to different roles within the team and the team structure. Team diversity seemed to be leading to team balance, which is essential for team creativity and problem solving (Horowitz, & Horowitz, 2007). There were two types of team diversity found in the structure of the Funda Scrum team: horizontal and vertical. The vertical structure seemed to be heterogeneous, thus, each team member had their own role within the team. The theory demonstrates that role scheme is essential within the teams and that it enhances the project management (Hazzan, & Dubinsky, 2006). The horizontal team consisted mostly of homogeneous team members, providing diversity in the background. The theory, however, states that heterogeneous teams tend to be more creative when coming up with ideas compared to homogeneous teams (Nemeth, 1986; Kanter, 1983). The team structure was challenged by switching the Scrum Master once in several months, giving team members the opportunity to have a new role this strategy corresponds with the theory discussed in the chapter 2 (Hazzan, & Dubinsky, 2006). The theoretical background suggests that team diversity enhances the opinion flow within the teams (Hazzan, & Dubinsky, 2006); our results indicated that this might have had more to do with the Team Spirit and Freedom rather than team diversity.

Connecting *communication* to team diversity, it can be said that heterogeneous teams with functional diversity seemed to increase communication outside of their team (Ancona & Caldwell, 1992). Dahlin, Weingart and Hinds (2005) also believe that educational diversity of team members facilitates communication and team action (p.1111). Connecting this back to innovation, academics believe that functional diversity, and the enhanced communication, promotes innovation within the teams (Jackson, 1999).

Secondly, looking at the **creativity**, the results of the interviews show that creativity within the team could be based on interaction and freedom. The *interaction* between the team members and with the stakeholders could lead to creativity, which corresponds with previous theory (Hirst et al., 2011; Pirola-Merlo, & Mann, 2004). We also found that

interaction could enhance individual motivation. The theory supports this by stating that interaction has to do with the individual motivation and goal orientation which influences creativity (Hirst et al., 2011; Hirst et al., 2009). Here, the Product Owner was also found to be an essential part of the interaction, partially facilitating the creativity within the team by communicating the insights of the stakeholders and managing the communication between them.

Freedom in workplace and freedom over being creative are two ways that may foster creativity. The results have shown that the freedom in workplace, such as not being space bound seemed to enhance the creativity within the team by enhancing the motivation of the team members which is in line with previous literature (Hirst et al., 2009; Taggar, 2002). The freedom over being creative, thus having the free hand over completing tasks, also seemed to enhance the feeling of responsibility within the team. Thus, the low bureaucracy seems to be the main facilitator; this is also supported by the literature that states that bureaucracy can suppress ones creativity and motivation within the team (Hirst et al., 2011).

Communication of ideas was found to be essential in the creative process (Binnewies et al., 2007). Connecting our results to the communication aspect of innovation, the theory suggests that for effective communication of creative ideas, the climate of creativity needs to be present (Roffe, 1999). This relates to the aspect of flexibility and freedom of work, both workplace and creativity related. The climate for creativity seemed to be essential as it facilitates the dynamics of creativity which leads back to innovation.

Thirdly, there were four components of **social aspects** in Scrum teams: transparency, responsibility, problem solving and team spirit. Based on the interviews with the team members we found that it is essential to be *transparent* in the communication and share information with the team and stakeholders in order for the team to function well. This is in line with the literature that states that cohesive team is formed by individuals who have a regular feedback from the team, knowledge of the team activity and commitment to the team goals (Whitworth & Biddle, 2007). We found that transparency seems to begin at the meetings, where the team members are encouraged to share their insights and also communicate with stakeholders; this also is supported by the literature (Whitworth & Biddle, 2007). Again, the product owner seemed to be essential, being the gatekeeper when sharing insights with stakeholders.

The *responsibility* seemed to be facilitated by the freedom over completing a task; this is connected to the individual motivation of team members. The theory supports our results that low bureaucracy and thus freedom can enhance individuality and motivation which can result in increased responsibility within the team members (Hirst et al., 2011).

Looking at *problem solving*, the team should be given an issue to be able to come up with solutions. The team showed two approaches to problem solving, the individual approach where the team members think of the solution on their own and share it within the team after, and the group approach where the team communicates their opinions straight away.

Team spirit seemed to be supported by personal interaction, respect and understanding. Fostering communication therefore could lead to good relationship within the team. The literature supports this by claiming that the conflict within the team occurs when there is need-only communication between the team members (Whitworth & Biddle, 2007) and that it is reduced within agile teams (Runhow, 2007; Yauch, 2007). To enhance team spirit, team outings are organized by the companies. We found that after a while the Funda Scrum teams voluntarily engaged in team outings and bonded naturally. This, however, came with a negative consequence – the tribe creation. According to the literature, strong interpersonal ties like this can negatively affect team innovation (Yauch, 2004). Our results, however, did not support or reject this theory.

Connecting *communication* to our results, the transparency can be understood as an enhancement of communication by making the information clear and accessible, which further connects to successful innovation (Moenaert et al., 2000). Responsibility was not communicated within the team members; it was rather something that occurred naturally based on team and the individual dynamics. This shows that responsibility could occur without communication, but is rather based on the cohesion of the group (Smith et al., 1994). The problem solving could be connected to communication. According to our research communicating ideas within the group could lead to problem solving. The literature also states that problem solving and productivity is based on communication (Lott, & Lott, 1961) which can be further connected with the process of innovation. Team spirit could be enhanced when less formal spontaneous communication occurs, which could then lead to team cohesion and could be further connected to the previously mentioned concept of

freedom. This result was also supported by the literature (Smith et al., 1994). The team spirit could also lead to team collaboration (Bassett-Jones, 2005), which plays role within the team innovation process (Drach-Zahavy & Somech, 2001).

Fourthly, regarding **innovation***,* the results have shown that the innovation within the Scrum team could be facilitated by several factors. One of the main factors could be the team structure which provides fewer boundaries between the team members and thus could bring the team closer to each other. The literature suggests that cognitive diversity of team members within the heterogeneous team facilitates innovation (Horowitz, & Horowitz, 2007). This outcome, however, was not found in our results. On the other hand, in regards to the team structure we found out that the Product Owner within the Funda Scrum team could play an important role as they are the bridge when it comes to communication between the company and stakeholders, but also have the main say when it comes to innovative ideas. Thus, they could not only be the facilitator of creativity but also of innovation within the team. Finally, the results of our study show that there could be several strategies to facilitate innovation within the Scrum team. The main strategies used within the Funda team and experts were found to be brainstorming, pressure cooker and hackathon. Brainstorming as a team act seemed to be useful when coming up with innovative ideas, which is supported by the literature as well (Faure, 2004). Other strategies used were the pressure cooker and hackathon. These seemed to be productive methods of innovation enhancement; this is based on the results of the team members and their innovative ideas.

5.1.1. Unexpected findings

To start of it is to state that every study has some unexpected findings. Coming from our theoretical framework, we found some results that were not initially anticipated. We believe that these findings enrich our study and shed new light on the topic of Scrum. Therefore, they will be discussed more in-depth in the following section, including a theoretical explanation for better academic understanding.

The social aspects of this study showed the most surprising results. For a better understanding, we provide theoretical explanation. We found that the responsibility could be essential to keep the team motivated and active. The literature on team performance

management supports our results. The study by Yang and Choi (2009) found a positive relationship between the responsibility and performance of the team (p.298). Our results also showed that it could be more beneficial to make the whole team responsible rather than leave the responsibility on an individual level. Equally, the literature proves that when a collective sense of responsibility within the team is achieved, the team becomes more proactive and decisive (Kirkman, & Rosen, 1999). We also connected the freedom over completing the task with enhanced responsibility and motivation of team members on an individual level. However, we did not find an academic source that would touch up on this finding. Academic articles offered theories on freedom over being creative, where the freedom results in increased motivation of team members (Yang, & Choi, 2009). This corresponds with our results on the aspect of creativity.

Within the social aspect, unexpectedly, the problem solving seemed to play an important role. We found that the team seems to be more productive when they have an issue to solve. The academic literature also seems to support our findings by proving that there is a relationship between the team performance and the autonomous team decision-making (Yang, & Choi, 2009). Our results also showed that team discussion of a problem seems to enhance the problem solving. In relation to this, the academic literature only shows that the open discussion within the teams creates a psychological safety where the team members can learn from their mistakes (Tjosvold, Yu, & Hui, 2004).

Looking at the team spirit, we found that after a while, the teams engaged in the team outings voluntarily, without the necessity of the company to be involved. Research also shows that teams undertake social activities which can result in increased team unity (Prapavessis, Carron, & Spink, 1996). Interestingly, we found a negative consequence of voluntary team building activities– the tribe creation, where the teams became so tight they turn to a tribe and disregarded other teams. The theory shows that the group acquired a sense of belonging when the members discriminate against or dislike other groups (Tajfel, 1974).

5.1.2. Implications for theory

This section will focus on discussing the broader theoretical implications in relation to the results of our study. The base of the theoretical framework is the task approach (team

diversity and creativity), Social aspect and Innovation theories found in the previous research. Our research mainly complimented the present theories on the presented dimensions, however, our study also found results that were unexpected to the extent of the theoretical framework.

The results of the study found out that the social aspect is crucial when it comes to the collaborative innovation. The team spirit plays an important role and acts as an enhancer of the team aspect of Scrum teams. Previous research has touched up on the importance of the team social dynamics; however, not in connection with the Scrum teams. We believe that this research deepens the theoretical understanding of the social side of Scrum teams in relation to innovation and can be used as a theoretical addition to the existing research.

This study suggests the importance of responsibility, freedom transparency and team spirit when it comes to tasks the team is involved in, not only in regards to innovation but also in connection with the creativity and problem solving. These implications enrich the theoretical pool of Scrum team literature; there is hardly any literature on these aspects in relation to team and innovation. We believe that these implications can act as a stepping stone for more in-depth research to be done on this topic and create a theoretical base on the team aspect of Scrum.

5.1.3. Implications for practice

The focal point of this study was to understand how Scrum teams work and what aspects of Scrum teams facilitate innovation. Scrum being an increasingly popular method of work within the development sector, this study can help reflect on the advantages of application of Scrum method and provide implication towards practice.

The results of this study show that the team spirit is an important aspect of Scrum teams that facilitate innovation. Based on this research the individual Scrum teams can get a deeper understanding of the important aspects of successful tea collaboration and Scrum Masters can use this information in order to enhance the teams further. The results of the study provide a great stepping stone for team understanding which can be further used to improve the team efficiency and find the focal points of innovation enhancement.

As our focus team was within the company, Funda can use the results of this study to get a deeper understanding of their teams and the perception of the team members and use

this information to enhance the teams further and make them more productive. This also includes the importance of the Product owner who resulted to be the main connector between the innovation and the team functions.

5.1.4. Limitations and further research

This section aims to discuss the five limitations of this study and provide several suggestions for future research.

The first limitation of this study was the time frame and the sample size. Due to the short time frame and the difficulty of getting access to companies that use Scrum as a method of work, the sample resulted to be relatively limited. Although sample size depends on the type of the study, having a bigger sample with more companies and more experts within this study can provide more understanding, in-depth information and lower the sampling error (Marshall, 1996). Moreover, complimenting this study with cases such as Spotify and Zappos could bring benefits to the research. Both companies are well known to be successfully using Scrum and have vast information on this method in practice ("Spotify engineering culture," 2015; "Zappos labs," 2015). Scrum experts interviewed in this study also referred to these companies as cases of model practice of Scrum. Therefore, looking at these two companies as cases could reveal new information on Scrum in regards to innovation and communication on a larger scale. It could also offer more insight on the successful factors of Scrum in large companies.

Second, even though generalization is not the primary aim of this thesis, the sample was not found to be representative as we used purposeful sampling as a method to obtain our sample. According to the literature, to gain a representative sample it is suggested to use random or probability sampling methods (Marshall, 1996). Also, our sampling method might lead to inherent bias based on researcher's beliefs of the best case chosen (Lunsford, & Lunsford, 1995).

Thirdly, as the focus case of this study was Scrum team at Funda, the results are hardly to be generalized to other Scrum teams. The team members' perceptions were partially company specific; therefore, the results can't be generalized to population (Yin, 2013).

Fourth, this study focused on field of product development only, which is considered a limitation of this research. Our focus provides us with only a limited scope, which could be solved by having a multiple-case study (Yin, 2013), extending the investigation to different fields such as marketing. This could provide more insight on Scrum methodology and its success transcending the dogma of its technical applicability. An in-depth study of Scrum applied to different fields could add value to this study and could lead us to get more accurate insight on the methodology itself in regards to the innovation. It would be advised for the future research to focus on Scrum teams in fields different to product development to find more insight on the methodology.

Finally, only one researcher was used when interpreting data, using a single subjective perspective that affects the reliability of this study (Boeije, 2009). For future research, this study should be replicated using at least two interviewers in order to improve the reliability of the results (Boeije, 2009).

As an extension of this research, it would be interesting to conduct an experiment on the prevalent social aspect of the Scrum teams, where one team member would be controlled and purposely trying to be difficult when engaging with other team members. The field experiment would offer us an advantage of observe the outcomes in natural settings, where only independent variable would be manipulated (McLeod, 2012). Focusing on the team spirit and the vibe of the team in relation to its productivity and innovation, this approach would bring us new and unseen insights when it comes to the team, especially as this approach is more likely to reflect real life occurrences (McLeod, 2012).

5.2. Conclusion

This study offers a qualitative in-depth analysis of Scrum method of work, with the aim of obtaining more information on the team task approach and social aspect in connection to the communication aspect of collaborative innovation. The research question of this study was: “How does Scrum enhance the communication essential of collaborative innovation?” The results of this study are based on perceptions of five Scrum team members and the insights of two experts within the field of Scrum, complemented with observations.

Based on the perception of the five Scrum team members, we found that the structure of Scrum might enhance the communication aspect of innovation in the following matters. The team heterogeneity could increase communication and innovation within the team. The study showed that team diversity within the scrum team could be important in relation to team performance and creativity. We found two Scrum team structures, a vertical and horizontal within the Funda Scrum team. Vertical structure seemed to be more heterogeneous, whereas the horizontal more homogeneous.

The flexibility that Scrum facilitates could increase freedom of work which enhances spontaneous communication. The built-in interactivity of the team also seemed to increase the creativity flow within the team with the ultimate goal of innovation. Based on our interviews, creativity within the team might be enhanced by freedom and interaction between the team members and stakeholders. The freedom over being creative seemed to increase the motivation and responsibility of the team members. The interaction also might be a facilitator of individual motivation and thus creativity within the Funda Scrum team. Interestingly, the product owner was found to be the bridge between the team and stakeholders and became the push point of creativity.

Social aspect seemed to be the most significant aspect of the team, where transparency, responsibility, problem solving and team spirit are essential components. Being transparent when communicating with the team and stakeholders could facilitate the ease of communication and enhance the clarity of information flow within the team. Due to the freedom, responsibility was perceived to be encouraged. We found that within the Funda Scrum team, responsibility did not need to be communicated, it rather happened naturally during the process. Responsibility seemedto be a central aspect, which was mainly connected to the freedom and low bureaucracy within the Scrum team. The feeling of responsibility seemed to increase the motivation and productivity of the Funda team. We also found that transparent communication could be the key to solving problems and could increased innovation. According to the team and experts, problem solving was found to be the most effective when discussed in the group. The flexibility facilitated by Scrum could increase spontaneous communication and interaction of team members. This could also to lead to team cohesion and increased innovation. Based on the interviews, the team spirit resulted to be very important in regards to the social aspect of Funda Scrum team. We found

out that personal interaction, respect and understanding make the team spirit possible. The results, thus, show that fostering natural communication could enhance good relationship within the team. We also found out that the team voluntarily engaged in team outings without the company being involved. Surprisingly, we found out that even though this is positive for team building, it can create tension between the Funda teams. This is due to the fact that when the team members become too close to each other, they tend to create “tribes” and disregard other teams.

By reflecting on our outcomes, it can be said that this study contributes to both practice and theory. The practice can use the results to improve the Scrum team spirit and enhance the productivity of the team in regards to innovation. Contributing to theory, this research deepens the understanding of Scrum teams in regards to innovation and fills the gap in the research on Scrum.

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Appendix A – Interview Protocol

A: Project Background

Introductory Protocol

To facilitate the note-taking, I would like to audio tape our conversation today, if you agree with it. Note, that only researchers of this project (me and my supervisors) will be able to listen to the recordings, which will be destroyed after it is transcribed. Please, read and sign or verbally agree with the informed consent form that gives the background to this study and informs you about the risks and benefits. When you have done so, we can start with the interview.

Interview Introduction

This interview will roughly take 30-45 minutes. All your answers are confidential and will be treated carefully.

B: Interviewee Background/Demographics

1. **Can you tell us a little bit about yourself?**
2. **What is your current position at your company?**
    a. How long have you been in the current position?
    b. How long have you been at this company?
3. **Can you briefly describe your role within the Scrum team you operate in?**
    a. How are you involved in daily tasks within your Scrum team?
4. **What are your motivations to perform within this team?**

C: Task Approach/Creativity

1. In what ways would you say you are creative?
2. What inspires or motivates you when coming up with ideas?
3. How does your team come up with ideas?
4. How do you think each of your team members is a part of this process?
5. What could improve the creative process of your team?

D: Social Aspect

1. Do you think this team is your dream team?
    a. How would you define your dream team?
2. What are the roles of your team members within the team?
3. What does your team do if there is a problem?
4. How do you as a team come up with decisions?
5. How do you get along with your team members?
6. What activities outside of work does your team engage in?
    a. Why not?

E: Innovation

1. What kind of new ideas for improvements has your team come up with?
2. How does your team come up with original solutions?
3. Has your team made the stakeholders enthusiastic for your ideas? And if so, how and what idea was it?
4. How does your team translate ideas into innovations/products?
5. To what extent do you think your team's objectives can actually be achieved?
6. How worthwhile do you think your team objectives are to the organization?