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Open innovation and organizational creativity – do they go together?

A case study of the creative climate in an open innovation arena

Master of Science Thesis

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Abstract

During recent years' development towards more competitive markets and more complex products, many organizations have started to use open innovation. As creativity can be viewed as a prerequisite for innovation, it is interesting to study how open innovation organization forms affect creativity. The aim with this thesis is to study the relationships between organizational creativity and open innovation. The thesis assesses the creative climate in an open innovation arena called SAFER and compares it to a previous assessment done in 2009 in the same arena. Furthermore the challenges and possibilities associated with creative climate in an open innovation setting are studied.

The empirical data contains the results of a Creative Climate Questionnaire (CCQ) performed at SAFER. The questionnaire was followed up with interviews with people from SAFER, which provide a deeper understanding of the motives to the result of the CCQ, as well as other insights about creative climate within an open innovation arena.

SAFER is found to have a highly creative climate, although improvements can be made in some aspects. The creative climate appears to have been stable over time. SAFER's results are compared with reference data from innovative and stagnated organizations, and parts of the results are compared with an innovative technology company. The trust between the different partners at SAFER appears to have increased over time according to the interviewees, but this is not captured in the CCQ. We therefore conclude that studies of creativity within open innovation contexts could benefit from including a dimension corresponding to openness between the partners. It is also concluded that the CCQ is applicable in an open innovation context, but could preferably be complemented with a qualitative study.

The thesis finds that an open innovation arena facilitates creative climate by being organized in a cross-functional way. However, the project form that SAFER is organized in also has some disadvantages. There is limited transparency between the different projects, which implies that the learning from different projects is not spread within the organization as much as it could be. SAFER has some problems capturing new ideas, and the fact that almost all SAFER projects are financed by research funding causes long lead times.

The analysis shows that the output of an open innovation arena depends on that the partner organizations are devoted to the work, and that there is a flow of knowledge and ideas between the arena and the partners. This implies that the success of open innovation initiatives is dependent on their surrounding organizations and actors. People at SAFER have some identity issues, and the view of SAFER is fragmented. As the purpose of open innovation is to create diverse meetings, we recommend that open innovation arenas not to strive for one singular creative climate. In a future with looser organization forms, it would be interesting with future studies that look more into this.

Keywords: *Open Innovation, Open Innovation Arena, Organizational Creativity, Creative Climate, Case Study, CCQ*

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Table of contents

1 Introduction 1
1.1 Background 1
1.2 Aim and research questions 2
1.3 Scope 2
1.4 Delimitations 3
2 Theory 5
2.1 Definitions 5
2.1.1 Organizational creativity 5
2.1.2 Creative climate 6
2.1.3 Open innovation 7
2.1.4 Open innovation arena 10
2.2 Creativity and open innovation 11
2.2.1 Creativity and organizational performance 11
2.2.2 Open innovation and organizational creativity 13
2.3 Assessing creative climate 15
2.3.1 The creative climate questionnaire 15
2.3.2 Previous studies using the CCQ 18
2.3.3 Innovative and stagnated organizations 18
2.3.4 KEYS 19
2.3.5 Assessing open innovation environments 19
3 A case description of SAFER 21
3.1 Previous assessment of the creative climate at SAFER 25
4 Methodology 27
4.1 Research strategy and design 27
4.2 Literature study 28
4.3 Questionnaire 29
4.3.1 The design of the questionnaire 29
4.3.2 Collecting questionnaire answers 30
4.3.3 Quantitative analysis 31
4.4 Interviews 32
4.4.1 Interview design and interviewee selection 32

4.4.2 Qualitative analysis 32
4.5 Comparison with a technology company 33
4.6 Quality criteria of the study 33
5 Findings 35
5.1 Quantitative findings 35
5.1.1 Respondents 35
5.1.2 The results of the CCQ 36
5.1.3 Comparison of SAFER's CCQ results from 2009 and 2012 37
5.1.4 SAFER compared to the innovative and stagnated organizations 37
5.1.5 SAFER compared with a technology company 38
5.2 Interview findings 39
5.2.1 SAFER's creative climate 39
5.2.2 The environment at SAFER 41
5.2.3 SAFER's creative climate over time 42
5.2.4 Relations with the SAFER partners 43
5.2.5 The project organization 44
5.2.6 Goals and limits 46
5.2.7 The capturing of ideas 46
5.2.8 Different perspectives on SAFER 48
5.2.9 Financing and research funding 48
6 Analysis and discussion 51
6.1 SAFER's creative climate over time 51
6.2 The relation between SAFER and partners 53
6.3 Limitations of an open innovation arena 55
6.4 Organizing an open innovation arena 56
6.5 One creative climate? 58
7 Reflections on the CCQ 61
8 Conclusions 63
9 Limitations and future research 67
10 References 69

1 Introduction

In this chapter the background to the study, aim, research questions, scope, and delimitations are presented in order to get an overview of the study.

1.1 Background

In today's competitive markets, few actors can be innovative on their own and according to Chesbrough (2004) there is no sustainability in the use of merely closed in-house innovation. To keep industries growing and being productive, innovation is needed and open innovation is argued to have the ability to speed up and help the innovation process (West et al., 2006). Chesbrough (2003a) concluded that industrial development work is undergoing a paradigm shift, from a closed internal development to a more open and collaborative way of developing innovations.

An innovation can be defined as something novel and useful, i.e. a product or service that is new to the world and has found a successful commercial application (Granstrand, 1999). In order to create an innovation, some element of creativity is involved. Creativity can be defined in various ways, and different authors have different views upon the subject. Some argue that certain individuals posses creative potential and the task is to manage their potential (Cummings and Oldham, 1997, Sternberg, 1999), while others argue that the circumstances determines who can be creative (Amabile, 1998). However, most seem to agree to that the environment is highly important for the creative process (Amabile et al., 1996, Andriopoulos, 2001, Cummings, 1965), and that many organizations have practices that do more harm than good when it comes to facilitating creativity (Amabile, 1998). The subject of managing creativity is thus important for all organizations with the desire to stay competitive. In this reasoning, a creative organizational climate is a prerequisite for innovation. Therefore, it is interesting to assess the creative climate of an innovative organization, especially in relation to the growing concept of open innovation (Gassmann et al., 2010).

This master thesis will assess the creative climate in an open innovation arena called SAFER Vehicle and Traffic Safety Centre (from now on referred to as SAFER). SAFER is an open innovation arena where partner organizations from industry, society and academia work together to become leading in the research field of vehicle safety and reduce the number of casualties in traffic (SAFER, 2011b). What makes SAFER unique is that it consists of several, sometimes competing, organizations that work together for the benefit of everyone, and that

SAFER has its own strategic vision and physical premises. A study from 2010 (Ili et al., 2010) found that it is more suitable for the actors in the automotive industry to use open innovation than closed innovation. Thus, SAFER's safety mission is relevant in this time.

1.2 Aim and research questions

The aim with this thesis is to study the relationships between creativity and open innovation, with the purpose to make a contribution to the combined research field of open innovation and creativity. This is done by assessing and discussing the creative climate in the open innovation arena SAFER and comparing it to a previous assessment done in 2009.

In order to relate creativity to open innovation, we first want to assess the creative climate at SAFER and study the development over time. Information about SAFER's creative situation is a prerequisite to draw conclusions about the relationship between creativity and open innovation. Thus, the first research question is as follows:

How is the creative climate at SAFER, and how has it developed over time?

Open innovation is sometimes argued to facilitate organizational creativity (e.g. Lazzarotti and Manzini, 2009). It is therefore interesting to reflect upon what different aspects of open innovation practice that affect creative climate. As the creative climate model was developed with a more traditional organization in mind it is also interesting to study how creative climate is affected by the arena's way of organizing, as it differs from a traditional organization in many ways. Therefore, the second research question is as follows:

What possibilities and challenges can be associated with creative climate in an open innovation arena?

1.3 Scope

This thesis is a part of a collaborative research project called Managing open innovation, which has been conducted jointly by SAFER and Chalmers since 2008. In 2009, a master thesis was conducted within the project which included a study of the creative climate at SAFER at the time, using the Creative Climate Questionnaire (Balta and Zwick, 2009). That thesis has been used as input material to this thesis, and the results from the questionnaires have been compared. The qualitative findings were also compared.

As this study is part of a larger research project, a large amount of material on open innovation and SAFER already exists and has enabled a thorough case description and

analysis. This is valuable as such arenas are rare at the present time. The presence of a lot of reference data has given the thesis a time dimension which is beneficial for longitudinal case studies.

1.4 Delimitations

The main two themes of the thesis are creativity and open innovation. The area of creativity was limited to focus mainly on creative climate in organizations. This was done as the field of creativity is extensive, and we have no possibility to include all aspects. The decision was also to look at organizational creativity and not individual creativity. This means that areas of individual and group creativity, as well as organizational culture, will not be treated to any large extent.

The empirical data was gathered from people who come to SAFER to work, mostly by participating in SAFER projects. The majority of them are Swedish, and all are residents of Sweden. The literature studied is mainly developed and written in western countries, even though some literature tests the theories in other cultural contexts. The possible cultural context implications of this focus have not been considered. The decision to make a case study research design implicates that the findings will be subjective to the specific context in question, and the possibility to generalize outside that context will be limited. However, a case study is a reasonable choice considering the depth we want to accomplish with the questionnaire and interviews within the time schedule.

2 Theory

This chapter describes the theoretical frameworks used within the thesis. The chapter starts with explanations of the definitions used, and after that relations between the concepts are explored. Furthermore the tool used is described and explained.

2.1 Definitions

This section describes and defines the concepts that are central within the study.

2.1.1 Organizational creativity

There are various definitions of organizational creativity. The outcomes of organizational creativity should be new and useful, i.e. be valuable to the organization (Amabile, 1998, George, 2007, Isaksen and Ekvall, 2010, Cummings, 1965). Sternberg and Lubart define creativity as "the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful, adaptive concerning task constraints)" (Sternberg, 1999, p. 3). Moultrie and Young (2009) argue that creative acts should correspond to a known situation, when they refer to creativity as "the production of ideas which are both novel and applicable to an identified opportunity" (p. 300). Perry-Smith and Shalley (2003) develop the value perspective by arguing that creativity is continuous, so the outcome is more or less creative, not either or. Some definitions have a system perspective, for example Woodman et al. (1993) who define organizational creativity as "the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system" (p. 293).

Both Moultrie and Young's (2009) and Woodman et al's (1993) definitions have a process perspective but they highlight the output of the process. This output correlates to the term innovation. Creativity is a prerequisite for innovation and thus creativity is a starting point for innovation (Amabile et al., 1996). In other words, innovation can be viewed as a successful implementation of creativity (Ekvall, 1996).

Within this thesis, it was deemed important to capture the dynamics of the creativity concept, and to look upon the change of behaviour or mindset that occurs within creative work. With that in mind, it was also deemed important that the output of the creative process was mentioned, and that the definition had an organizational perspective. We therefore use Stacey's definition (1996), which is as follows:

Creativity is "some alteration in the recessive schema of an individual, a group, or an organization that leads to a change in the dominant schema that then turns out to improve fitness" (Stacey, 1996, p 286)

2.1.2 Creative climate

In his extensive work on organizational creativity, Ekvall (1996) uses the term creative climate. Creative climate is seen as an offspring of organizational culture and is defined as *"an attribute of the organization, a conglomerate of attitudes, feelings, and behaviours which characterize the organizational life*" (Ekvall, 1996, p. 105). Not all authors share the view that creative climate is an offspring of culture. In Andriopoulos literature review (2001), organizational climate and culture are seen as two factors of five that together constitute organizational creativity. However, the dimensions constituting the different concepts of organizational creativity, creative climate, organizational climate, and organizational culture overlap, and as Denison (1996) puts it: "many of these recent quantitative culture studies have become virtually indistinguishable from the research…//…in the tradition of organizational climate" (Denison, 1996, p. 620)

When describing organizational climate, it is useful to discuss the difference between culture and climate (Ekvall, 1996). There is extensive literature on the difference between organizational culture and climate (Denison, 1996, McLean, 2005). Even though organizational climate it is not the same as creative climate, the differences between the concepts still holds. There are various uses of the two terms, and it is sometimes unclear whether they are different phenomena or the same phenomena studied in different perspectives (Denison, 1996). In comparison to organizational culture, organizational climate is more visible, the observable traits of an organization, perceptions, and activities close to the "surface" of the organization (Denison, 1996). Culture is typically more about deeper issues such as underlying values (Ekvall, 1996). McLean (2005) discuss the relation between culture and climate, and state that: "It is culture that creates the parameters for what behaviour is desirable and will be encouraged and what behaviour is unacceptable and will be censored. Climate may be viewed as a more concrete and tangible way to measure elements of culture in terms of specific behaviours and characteristics" (McLean, 2005, p 240-241).

In Ekvall's terminology, creative climate consists of ten dimensions; Challenge, Freedom, Idea support, Trust/Openness, Dynamism/Liveliness, Playfulness/Humour, Debates, Conflicts, Risk taking, and Idea time (Ekvall, 1996). These dimensions will be further

explained in section 2.3.1. Amabile and associates (Amabile et al., 1996) have a slightly different view on organizational creativity. In their tool to asses organizational creativity they use different dimensions than Ekvall (Amabile et al., 1996). However, in a thematic analysis by Moultrie and Young (2009) the different tools are compared and are found to be rather similar in content. Hunter et al. (2007) found that many quantitative tools used to assess creative climate, including the CCQ, share the same themes.

Numerous studies have shown that creativity and innovation are influenced by the organizational context (e.g. Amabile et al., 1996, Ekvall, 1996, Tesluk et al., 1997), although none has to this point focused on creativity in an open innovation setting. Previous research has suggested that creativity and innovation are more likely to occur in organic rather than mechanistic organizations (Mumford et al., 2002), as the first is argued to offer the type of contact and autonomy that is known to encourage new ideas (Pelz, 1967). Ekvall (1997) showed that the type of structure in an organization has an effect on people's perception of the creative climate, where a flat and/or empowered structure is preferred if creativity is desired.

Lin and Liu (2012) showed that creative climate was related to creative achievement, regardless of culture and country. Furthermore, it seems that creative climate is important across different settings, such as profit, non-profit, R&D, manufacturing as well as mixed settings (Hunter et al., 2007). Also, if the job requires creativity and innovation, for instance in an R&D organization, the strength of the relationship between climate measures and creative achievement increases.

2.1.3 Open innovation

The term Open innovation was coined by Chesbrough in 2003. The original definition is as follows:

"[when] firms commercialize external (as well as internal) ideas by deploying outside (as well as in-house) pathways to the market" (Chesbrough, 2003a, p 36-37).

Chesbrough (2003b) stated six principles of open innovation and related them to closed innovation, by which he meant a more traditional way of working with innovation. He argued that in the closed model of innovation, firms believe that control is needed and that the R&D process must be protected and complete in order for success. The differences between closed innovation principles and open innovation principles can be seen in table 1.

Table 1. Contrasting principles of Closed and Open Innovation, adapted from Chesbrough (2003b).

Contrasting Principles of Closed and Open Innovation	
Closed Innovation Principles	**Open Innovation Principles**
The smart people in our field work for us.	Not all of the smart people work for us, so we must find and tap into the knowledge and expertise of bright individuals outside our company.
To profit from R&D, we must discover, develop and ship it ourselves.	External R&D can create significant value: internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to the market first.	We don't have to originate the research in order to profit from it.
If we are the first to commercialize an innovation, we will win.	Building a better business model is better than getting to market first.
If we create the most and best ideas in the industry, we will win.	If we make the best use of internal *and* external ideas, we will win.
We should control our intellectual property (IP) so that our competitors don´t profit from our ideas.	We should profit from other's use of our IP, and we should buy others´ IP whenever it advances our own business model.

The definition of open innovation has been debated, and some authors argue that open innovation has a much broader application than proposed in Chesbrough's definition (Piller and Walcher, 2006). However, Chesbrough has developed the concept as 2003 and states that *"Openness generally refers to ways of sharing with others and inviting their participation"* (Chesbrough, 2011, p. 88). Elmquist et al. (2009) argue that within recent open innovation research there is a tendency towards a more critical perspective on open innovation, as well as towards a broader perspective. They also suggest that open innovation is often viewed upon as an internal process, inside an organization, and propose two new dimensions of open innovation; the locus of the innovation process and the collaboration extent, as important aspects of an open innovation collaboration (Elmquist et al., 2009). Thus, it can be argued that the original definition is suitable, but that there could be uncertainties in what should be included within the definition. However, as no other definition has been agreed upon we will use the original definition within this thesis.

According to Chesbrough (2003b) open innovation enables actors to work together and generate ideas and synergy effects, and it is a way for knowledge to be spread and developed. Open innovation also creates possibilities for organizations to commercialize ideas through channels they would not have access to through internal development, and thus the organization can then generate value from something that probably would not have been

exploited at all in traditional R&D. This contact with areas outside the company's own business area is beneficial not only for the company, but in many cases for society as a whole (Chesbrough, 2003a). To sum up, open innovation can be said to make the boundaries between firms and the outside environment more porous, as can be seen in figure 1.

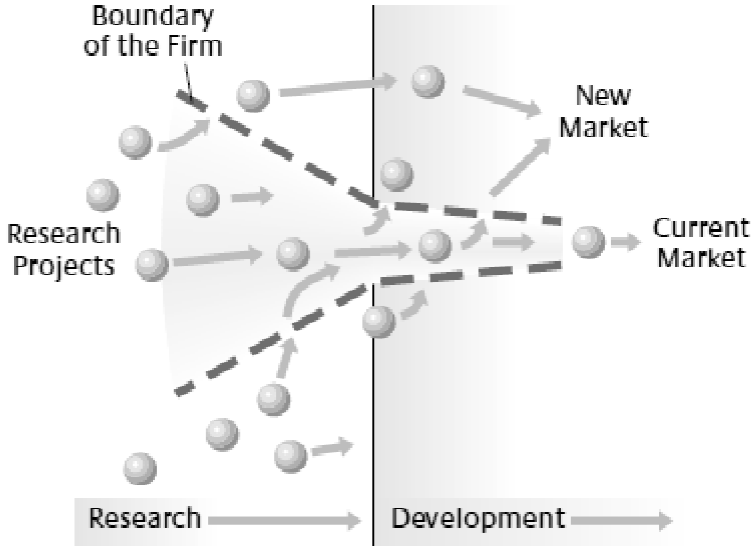

Figure 1. The porous boundary between the company and its surroundings (Chesbrough, 2003a)

The technology of today is very complex and firms are finding that it is better for them to develop new products in partnerships and alliances with other firms (Enkel et al., 2009). These alliances can be with universities as the competition gets harder and the need for knowledge and research increases. As firms become more and more accustom to the use of open innovation, they begin to professionalize the internal methods for this kind of research (Gassmann et al., 2010), and the traditional R&D design is developing from the popular stage-gate process towards a probe-and-learn approach which supports open innovation.

In an article from 2009, Trott and Hartman question whether Chesbrough has acknowledged the antecedents to the concept of open innovation enough and they propose that he might just have repackaged old knowledge and presented it in a new way. The authors claim that companies have used these kinds of methods to gain external knowledge for a long time and that Chesbrough's "closed innovation firm" does not exist in reality, it is only a caricature that is easy to disaffirm with arguments for open innovation (Trott and Hartmann, 2009). Huizingh agree to that not many fully closed firms exists when it comes to innovation (2010). However, Chesbrough's study is based on empirical findings (2003a) and therefore it

obviously already exist companies that have used open innovation for some time. Regardless of the debate on the concept, the term open innovation has spread rapidly (Elmquist et al., 2009), and many firms have due to increased need for integration started to use open innovation (Herzog and Leker, 2010).

Gassmann et al. (2010) described some trends for the future of open innovation: For instance, the companies that utilize open innovation are no longer lonely pioneers. Furthermore, the size of the firms practicing open innovation has traditional been large, but the small and medium-sized firms has started to catch up and some has began to use open innovation too (Gassmann et al., 2010).

It is important to keep in mind that organizations should not necessarily use the same exploitation strategies for all services or products. Open innovation is not a competitor or a replacement for internal R&D (Chesbrough, 2003b), it is a different way to develop ideas and innovations. How effective open innovation is depends on the context, all situations are not helped by the same remedy (Huizingh, 2010).

2.1.4 Open innovation arena

Within the open innovation process there is a set of actors who are called open innovation intermediaries, who facilitate the innovation process. These are often divided into brokers (Howells, 2006) and network facilitators, broking things like knowledge or technologies (Agogué et al., 2012). According to Ollila and Elmquist (2011) an open innovation arena is not like these common intermediaries but something different as it is not merely supportive but has its own proprietary goals, they also state that they have not found any prior studies on this kind of open innovation actor before SAFER. In their study, Ollila and Elmquist (2011) define an open innovation arena as ”an actor trying to enable open innovation within a specific field of expertise, while at the same time seeing itself as a key player in the field” (Ollila and Elmquist, 2011 p 274). Thus, an open innovation arena is a collaboration platform with its’ own vision, strategy, proprietary goals, and physical premises, while at the same time being solely constituted by its partner organizations and not an organization in the juridical sense. As can be seen in figure 2 below, the open innovation arena brings the partners together, and acts on its own as well as acts as a player in the industry or field that it operates in.

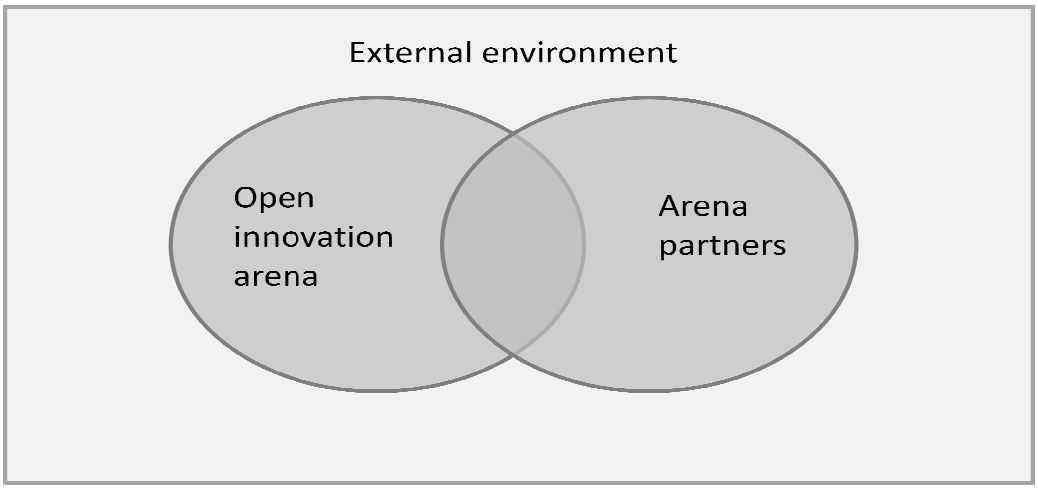

Figure 2. The open innovation arena and its relations to partners and the external environment.

2.2 Creativity and open innovation

This section gives an overview of the research field combining creativity and open innovation. The section starts with a description on how creativity affects organizational performance, followed by a section about creativity and open innovation. The section ends with the identification of a research gap within the combined research field.

2.2.1 Creativity and organizational performance

A highly creative climate has been shown to have a relation to high organizational performance, for instance in market share, sales volume, improved ability to implement complex work designs, and more (Isaksen and Ekvall, 2010). In a study using KEYS (se section 3.3.4) a creative climate was shown to have a positive impact on innovation, as perceived by the employees, with work motivation as an important link between the two (Lin and Liu, 2012). In a study of idea generation among middle management, Shah and Ali (2011) state that "the organizational climate dimensions play a decisive role in motivating the workforce to think creatively and augment organizational performance by having radical product innovations" (Shah and Ali, 2011, p. 438).

The value of a creative act is determined by the different stakeholder groups, and the benefits that the group in question gains from the creative act (George, 2007). There might be differences in what different stakeholder groups consider useful, and thus creative. This is important to keep in mind when discussing organizational creativity. In development groups, the process of generating ideas can be seen as creative, regardless of whether the ideas are useful or not (Drazin et al., 1999). This might seem contradictory, but as Fey and Birkinshaw (2005) showed in their study on external knowledge sourcing; "Openness to new ideas

emerged as the single most important predicator of R&D performance, with a direct effect on performance" (Fey and Birkinshaw, 2005 p. 616). Thus, the generation of new ideas can be useful to a company, regardless of the specific idea generates a creative outcome, in the form of the product, process etc. This implies that open innovation initiatives can be beneficial to the involved organizations, even if they are not producing any product, service or process outcome, simply due to the learning involved.

In 2007, Hunter et al. conducted a meta-study based on 42 studies assessing creative climate (Hunter et al., 2007). Their analysis included 14 dimensions of a creative climate, covering 90% of the dimensions of the 42 studies. By comparing the two models, it can be concluded that Ekvall's ten dimensions (1996) are covered within these 14. Also, his instrument (the CCQ) was used in some of the 42 studies. Hunter et al. (2007) found that an intellectually stimulating environment is critical to creativity and innovation, autonomy is however less important (but not unimportant). They draw the conclusion that it is desirable to provide resources and recognize creative work, but it is not as important as a creative, stimulating, and challenging environment. Furthermore, they saw that the assessments of creative climate can be generalized regardless the type of performance measure. Both subjective and objective ratings of innovative performance corresponded to the assessment of the creative climate (Hunter et al., 2007).

Hunter et al. (2007) further argue that a requirement for people to work together did not moderate the relationship between creative climate and innovative achievement. However, a high cohesion in a group tended to induce the "not invented here"-syndrome (Lichtenthaler and Ernst, 2006), which gave a stronger relationship to creative achievement in groups of lower cohesiveness than higher. Horizontal organizations showed stronger relationships between creative achievement and climate than vertical ones (Hunter et al., 2007).

As stated before, innovation is needed in order to keep up with a fast market (Amabile, 1998) and creativity is needed to be innovative (George, 2007). Organizations operating in highly competitive and pressured markets show a stronger relationship between creative achievement and climate, compared to organizations operating in less competitive markets and there appears to be a stronger correlation between creative climate and innovative output in low capital intensity organizations (Hunter et al., 2007). This implies that prior investments might limit the possibility to try out new ideas, this restricting the creative climate. However, another finding within the same study was that organizational wealth was associated with a

more creative climate, showing support for the need of sufficient resources (Hunter et al., 2007).

2.2.2 Open innovation and organizational creativity

An organizations' openness when practicing open innovation is said by Lazzarotti and Manzini (2009) to be related to the kind and number of collaborating partners. A large number of partners correspond to a more open innovation process (Lazzarotti and Manzini, 2009). Being too open is argued to potentially come with high costs, such as when other actors exploit one organization's resources without compensation, or that an organization fails to protect intellectual property (Dahlander and Gann, 2010). Dahlander and Gann (2010) describe different kinds of innovation strategies depending on the degree of openness. When a firm reveals internal information but does not charge for it or seek an immediate monetary benefit, an advantage could be that similar firms can learn and grow, and in turn enable the original firm to develop by also being open with their innovations. The disadvantages with this strategy could be that it is hard to capture the benefits of the innovation and that competing firms may be better suited to handle the new knowledge (Dahlander and Gann, 2010). Thus, to reveal internal information with the hope to get other firms to reveal their internal information might give possible creative outcomes, but there is also a risk that the organization merely discloses knowledge without gaining from it. The reasoning about openness connects to organizational creativity as open innovation, with its emphasis on transparent organizational boundaries, and in- and outflow of ideas and competence, has been argued to be a way of working that enables creativity (Lazzarotti and Manzini, 2009). The organizational diversity which exists in open innovation teams can be positive for teamwork, but it can also frustrate and obstruct the process (Du Chatenier et al., 2009). Du Chatenier et al. (2009) cite Crossan & Inkpen "Collaborative knowledge creation in open innovation teams can spark creativity, but many pitfalls, related to for example power distributions and political agendas, can make the process difficult and frustrating" (Du Chatenier et al., 2009, p. 370).

Amabile et al (1996) suggested three broad organizational factors, related to creativity and innovation in organizations. *"(1) Organizational motivation to innovate is a basic orientation of the organization toward innovation, as well as supports for creativity and innovation throughout the organization. (2) Resources refers to everything that the organization has available to aid work in a domain targeted for innovation (e.g., sufficient time for producing novel work in the domain, and the availability of training. (3) Management practices refers to allowance of freedom or autonomy in the conduct of work, provision of challenging,*

interesting work, specification of clear overall strategic goals, and formation of work teams by drawing together individuals with diverse skills and perspectives."(Amabile et al., 1996, p. 1156). The third factor can be argued to be closely related to open innovation, in fact a motivation to start working with open innovation, as organizations do not have the means to provide such diversity in-house.

Herzog (2010) compared different business units, some who practiced only closed innovation and some open innovation. He concludes that the not invented here syndrome (NIH) is more rare within open innovation units, and that open innovation units tend to be more risk-taking than closed units. These findings highlight the differences in open and closed innovation culture. Scholars argue that organizational culture has a strong impact on innovative performance, but evidence is lacking (Herzog, 2008). Three different levels of organizational culture can be distinguished: shared basic values, norms, and artefacts and behaviours (Schein, 1984). The values are the base, and in line with Denison's reasoning (1996), climate is manifested through the later, outer levels. Herzog (2008) builds upon the concept of organizational culture, and argue that an innovation culture can be defined as: *"(1) organization-wide shared basic values that support innovation, (2) organization-wide norms for innovation, and (3) perceptible innovation-oriented practices (artefacts and behaviours)"* (Herzog, 2008, p. 69). The third level can be argued to correspond to the organizational climate (Denison, 1996). These values and norms, Herzog continues, should support creativity and invention (2008). He concludes that open and closed innovation cultures need to be different, in accordance with the underlying innovation strategy (Herzog, 2008), but there seems to be a distinguishable open innovation culture, although different open innovation units can have different cultures.

The presence of many actors within the product development process can be argued to reduce risk for the different actors, but also to cause difficulties for the people operating in the work place (Du Chatenier et al., 2009). Thus, although open innovation generates many possibilities for being creative, it can also be harmful to the creative behaviour within the own organization (Du Chatenier et al., 2009).

Perez-Freije and Enkel (2006) argue that fast-changing environments and industries need a high level of creativity in order to react quickly to changing demands. In order to achieve such flexibility, leaders needs to continuously interact and support creativity, energizing the behaviours that influence the organizational environment (Politis, 2005). Organizations can

use organizational structure aspects in order to stimulate innovation (van der Meer, 2007), for instance by engaging in open innovation initiatives. Emphasis on openness in order to be innovative is a management signal that could enhance the desire for open innovation within the organization. Lichenthaler and Lichenthaler (2009) highlight that knowledge management issues can occur within open innovation, and encourage organizations to constantly reconfigure their knowledge capacities. As knowledge or expertise is a core part of creativity (Amabile, 1998) it is implied that organizational creativity within open innovation depends on effective knowledge sharing.

After this literature review, we conclude that research combining the two concepts of open innovation and creativity are rather rare, although much literature has been published about the two concepts separately. Especially, theory building knowledge on how open innovation can enhance creativity is lacking. We therefore conclude that there seems to be a research gap in the combined area.

2.3 Assessing creative climate

This section describes the conceptual framework underlying the creative climate questionnaire. It further describes some historical studies using the CCQ, which provides reference data for the analysis. The section ends with an overview of how organizational aspects can be measured within an open innovation context, however there is no explicit method to measure creativity within such contexts.

2.3.1 The creative climate questionnaire

The creative climate questionnaire (CCQ) was developed by Göran Ekvall in the 1980s, in a research program concerning organizational conditions' effect on creativity (Ekvall, 1996). The questionnaire consists of 50 questions which together cover ten dimensions, that have been shown to be important for creative climate (Isaksen and Ekvall, 2010). The dimensions are as follows (adopted from Ekvall, 1996):

Challenge: The amount of energy and emotional involvement in the tasks. When this dimension is high, much energy is invested and employees feel that their tasks are exciting and meaningful. The opposite holds when people feel alienated and uninterested in the tasks.

Freedom: How much room there is for independency in the workplace. High scores in this dimension implicate that people easily make new contacts and that information is transferred

and spread within the organization. Low scores implicate that people stay inside established frames and are passive and rule-bound.

Idea Support: This dimension corresponds with how new ideas are met. In a highly idea supportive climate, new ideas are received with attentive and supportive reactions, both from colleagues and bosses. The highly creative climate enables and encourages idea testing. If the idea support is low, new ideas are met with suspicion, faultfinding, reflexive declines, and counter-arguments.

Trust/Openness: The level of safety in relationships. A high score indicates a climate where people dare to present their ideas and opinions and the communication is straightforward and open. A low score indicates suspicion against other people, fear of failure and its consequences, and fear of being robbed of good ideas.

Dynamism/Liveliness: The amount of events and happenings within the organization, both social and work related. Work places described as “full speed”, “constantly moving”, “maelstrom” etc. score high in this dimension, while work places with low scores are typically slow moving and “go their usual way”.

Playfulness/Humour: The displayed ease, and type of atmosphere. A relaxed one, with a lot of jokes and laughter, scores high in this dimension. Low scores indicate the absence of joking and has a more grave and serious characteristic.

Debates: The differences in ideas, the clashing that causes, and the extent to which people debate ideas. If many voices are heard, and people like to put forward their opinions and points of view, the scores are high. If scores are low, people tend to follow patterns without questioning them.

Conflicts: The amount of personal and emotional tension in the work place. If there is a high degree of conflict, both groups and individuals may dislike each other, and traps are put out for co-workers and colleagues. A low degree of conflict does not necessarily mean that people like each other more, but they tend to control their feelings in a more professional way.

Risk Taking: How the organization handles uncertainty. When the organization makes decisions and takes action fast, and people dare to have ground breaking ideas, the scores are high. In the opposite kind of organization risks are avoided by slowing down the processes

and before new decisions are made the risks have been reduced or eliminated due to other factors.

Idea Time: The amount of time set aside for employees to generate and analyze new ideas. An organization that have high scores in this dimension allow their people to test and talk about their ideas. If scores are low, employees have no time to spare for new ideas when they are done with their regular assignments.

These dimensions together constitute a creative climate, and a highly creative climate is beneficial for an organization in many aspects (Isaksen and Ekvall, 2004). However, it is important to keep in mind that this model was developed in a context of traditional companies and not in an open innovation context.

In a study from 2009, Moultrie and Young (2009) divide the CCQ dimensions into two groups, "attitude to work" and "work atmosphere". The division can be seen in figure 3. This division might be suitable to take into consideration when it comes to an open innovation environment. When the boundaries between organization and outside are porous, the possibility to affect the two groups of dimensions might vary.

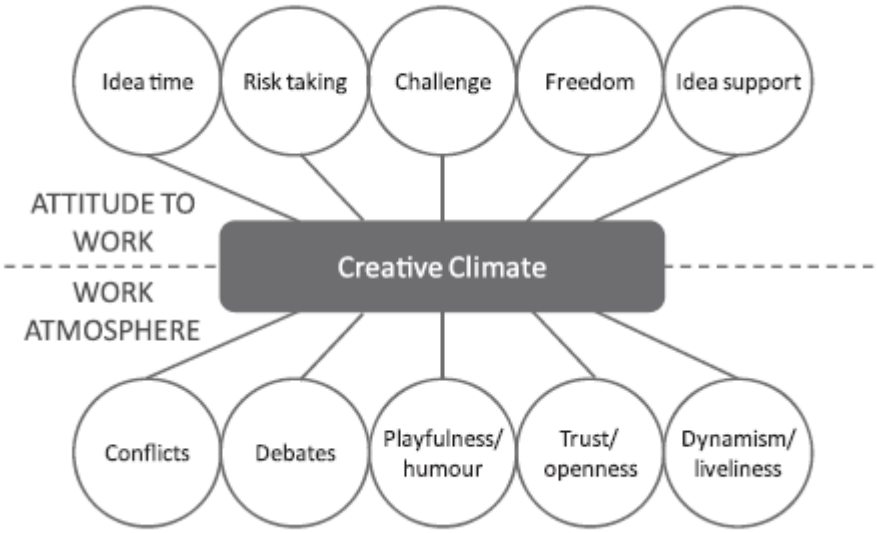

Figure 3. The CCQ dimensions divided in two groups (Moultrie and Young, 2009).

The study by Hunter et al. (2007) concluded that these types of methods for assessing creative climate is mostly suitable in a work environment where people can design their own tasks or methods to some extent, and were people tend to be dissatisfied with "business as usual". Hunter et al. (2007) also shows that external demands on innovation have a powerful

influence on the creative climate, but they stated that during such circumstances, it can be very difficult to produce such a climate.

2.3.2 Previous studies using the CCQ

Isaksen and Ekvall (2004) have made various tests to secure the validity of the CCQ. Correlations have been found for instance between creative climate and innovation rate (Ekvall, 1996) as well as creative climate and job satisfaction (Isaksen and Ekvall, 2004).

Other researchers have also tested the CCQ in various settings. In a study of eight Malaysian companies, the CCQ was proven valid outside the Scandinavian context (Mohamed and Rickards, 1996). The causality was not possible to test, but it was concluded that more innovative firms had a more favourable creative climate (Mohamed and Rickards, 1996).

Moultrie and Young (2009) developed a questionnaire based on both the CCQ and KEYS (see section 2.3.4.) which was distributed to representatives for creative industries, i.e. design, branding, and architecture. They found that the CCQ was more agreed upon by the population. This finding is followed up by a discussion on whether Ekvall's dimensions (Ekvall, 1996) represents creativity in a more robust way, or if the categories are too broad and cannot represent an organization as detailed as KEYS. The conclusion was that a combination of the two tools would be favourable (Moultrie and Young, 2009).

2.3.3 Innovative and stagnated organizations

During the validation and development work of the CCQ, Isaksen and Ekvall (2004) tried to determine whether the CCQ could distinguish between organizations that were successful in their innovation work, compared to organizations that were not. The two categories used were innovative organizations, meaning organizations that had what was regarded as innovative product strategies and had successful records in product development, and stagnated organizations, organizations that were in need of new products but were lacking an innovative strategy in order to develop these products (Isaksen and Ekvall, 2004). The use of the word innovative refers to development of new product or services (Isaksen and Ekvall, 2010) and not, as in some other cases (Mohamed and Rickards, 1996), internal changes in processes.

The measurement of the firms' innovative capacity was based on a earlier method developed by Nyström (Isaksen and Ekvall, 2004). The sample consisted of fifteen firms, of them ten were classified as innovative and five as stagnated. Data was gathered from other organizations as well, but they were not possible to classify and were thus excluded from the

study (Isaksen and Ekvall, 2004). The outcome of this process was a set of reference data, with the mean values from the different organizations. These different populations were accumulated to two sets of data, one containing the mean values from all the innovative organizations accumulated to one data set, and the other containing the mean values from the stagnated organizations accumulated to one data set. The cumulated mean values were then divided by the number of organizations in each set. These values can be seen in Appendix A.

The classification of organizations into stagnated and innovative has been criticized (Mohamed and Rickards, 1996). Mohamed and Rickard's (1996) study used a classification of high-innovation active and low-innovation active organizations. The findings showed that the two kinds of organizations had rather similar results (Mohamed and Rickards, 1996). The same study also urge for caution in the selection of the sample, as the results may be dangerously similar if proper benchmarking is not examined.

2.3.4 KEYS

There are other tools for measuring organizational creativity. The most well-known one is probably KEYS, developed by Teresa M. Amabile (Amabile et al., 1996). The exact details of how KEYS is composed is beyond the scope of this report, however, in a comparison between the CCQ and KEYS, the similarities were found to be substantial (Moultrie and Young, 2009). Both the tools use the themes time, risks, conflicts, rewards, challenge, debate, and freedom (Moultrie and Young, 2009).

2.3.5 Assessing open innovation environments

Perez-Freije and Enkel (2006) argue that the degree of an organization’s need for creativity depends on how fast the industry is changing. To get the balance between freedom and flexibility compared to the managerial possibility to ensure that a project is moving in the desired direction is not easy, especially in a rapidly changing environment. In order to do so, Perez-Freije and Enkel (2006) described four areas where innovation measuring can be done: strategic management of technologies, project portfolio management, project management, and innovation performance measurement. According to Remneland-Wikhamn and Wikhamn (2011), academic contributions have been made merely in the first two categories. They therefore present a new assessment tool, called the Open Innovation Climate Measure, in order to capture the changing dynamics within open innovation and to measure the aspects that are less tangible, such as learning, growth, and internal business processes, as well as financial outcome and customer reactions. The Open Innovation Climate Measure builds upon

three dimensions; flexibility/innovation, outward focus, and reflexivity (Remneland-Wikhamn and Wikhamn, 2011). With this tool, the aim is to assess the open innovation processes. The focus is on how a single firm (or many single firms) can benefit from open innovation, and not how open innovation initiatives themselves can be measured. There have been other attempts to create other measurement ways for assessing the value of open innovation initiatives (Remneland-Wikhamn and Wikhamn, 2011), but to our knowledge, non that focuses on creative climate.

3 A case description of SAFER

SAFER is an open innovation arena for research on traffic and vehicle safety. For more information about open innovation arenas, see section 2.1.4. SAFER was established on the first of April 2006, and Chalmers University of Technology acts as a host. When this study was started, SAFER consisted of 24 partners from industry, society and academia. During the study, SAFER was further expanded to include 27 partners, however this happened after the empirical data had been collected and the study is therefore based on the 24 partners that were at SAFER when the study started. These partners can be seen in figure 4.

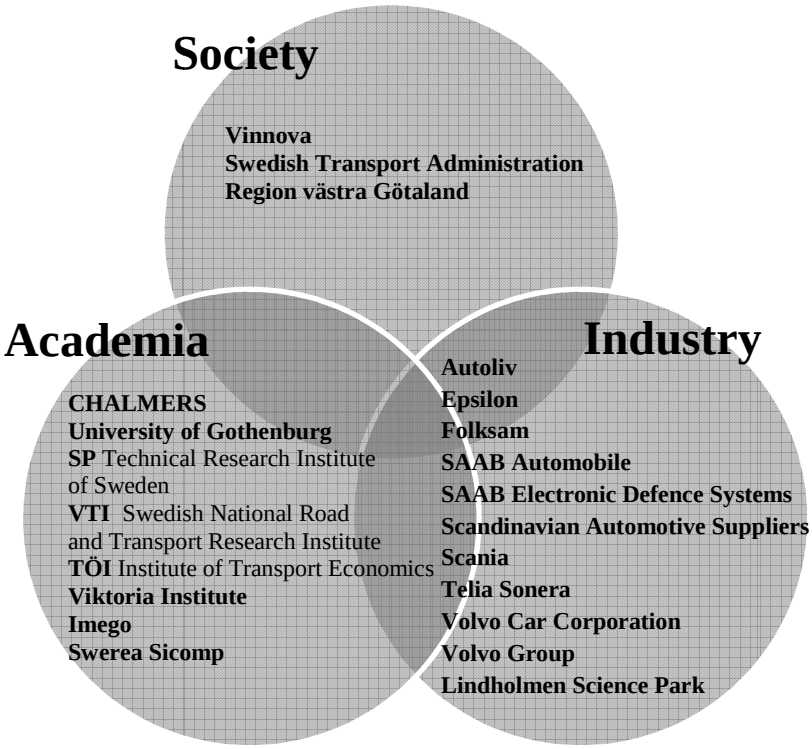

Figure 4. SAFER's partners adapted from SAFER (2011c).

SAFER's vision is as follows: *"SAFER provides excellent multidisciplinary research and collaboration to eliminate fatalities and serious injuries, making Swedish society, academy and industry a world leader in vehicle and traffic safety"* (SAFER, 2011a, p4). The aim is 20-fold growth in project money turnover, after the first ten years.

SAFER wants to provide excellent research within the field of traffic and vehicle safety. The purpose could be interpreted as divided into two parts; the first is to try to reduce or even eliminate traffic accidents, which is the world's most common cause of death apart from diseases, and the second is to gain competitive edge to the partners involved in SAFER (Balta and Zwick, 2009). One characteristic of SAFER is that the research is multidisciplinary, and

various different types of specialties are involved. The rationale behind this diversity is that different aspects are needed in order to do successful research that can help to decrease traffic accidents.

When SAFER started, it was granted funding for ten years, mainly from Vinnova. These ten years are divided into three stages, from 2006-2009, 2009-2012, and 2012-2016. After 2016 it is not clear how SAFER is going to be financed. SAFER is organized in projects, and some projects are financed by research funding together with funding from participating partners. Some projects are financed by SAFER, for example small pilot projects. Most of the projects are financed by the Swedish government or the EU. There are also associated projects at SAFER, connected to SAFER but consisting of more partners than the ones involved in SAFER.

SAFER's projects are divided into four programs: Pre-Crash, Crash, Post-Crash and Traffic Safety Analysis, as can be seen in figure 5. These areas correspond to four stages of an accident. Each program has a reference group which is supposed to ensure a suitable project portfolio. Every reference group has a reference leader. All the partners have one vote in each reference group, and project ideas are discussed and decided upon within the reference groups. The financing and strategic aspects of some projects are also discussed in the board, which then makes the final decision whether to start a project or not.

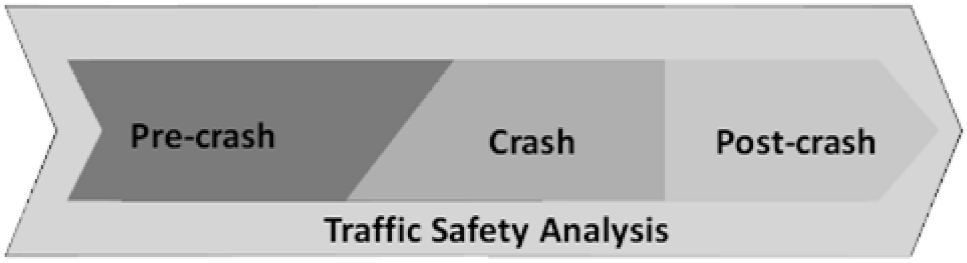

Figure 5. The four research programs at SAFER (SAFER, 2011a).

In addition to the research programs, SAFER has identified six focus topics and twelve competence areas that are most relevant in their work. Each competence area has a competence leader (SAFER, 2011a).

SAFER has a director and a management group consisting of the director, the reference group leaders and a communications officer. The management group is responsible for the operative management. In addition to that, there is an extended management group, consisting of the management group, the competence area leaders, and a financial officer. The purpose of the

extended management group is to develop the SAFER research environment and ensure scientific quality as well as project relevance. SAFER has as previously mentioned a board, which is responsible for the overall strategic work of the arena. This board consists of managers from some of the partners, mainly industry, and representatives of Chalmers. The board grants projects that have an estimated cost over a certain limit. As early 2011 an International scientific advisory board, consisting of three researchers, contributes with input to the scientific work. The management structure of SAFER can be seen in figure 6.

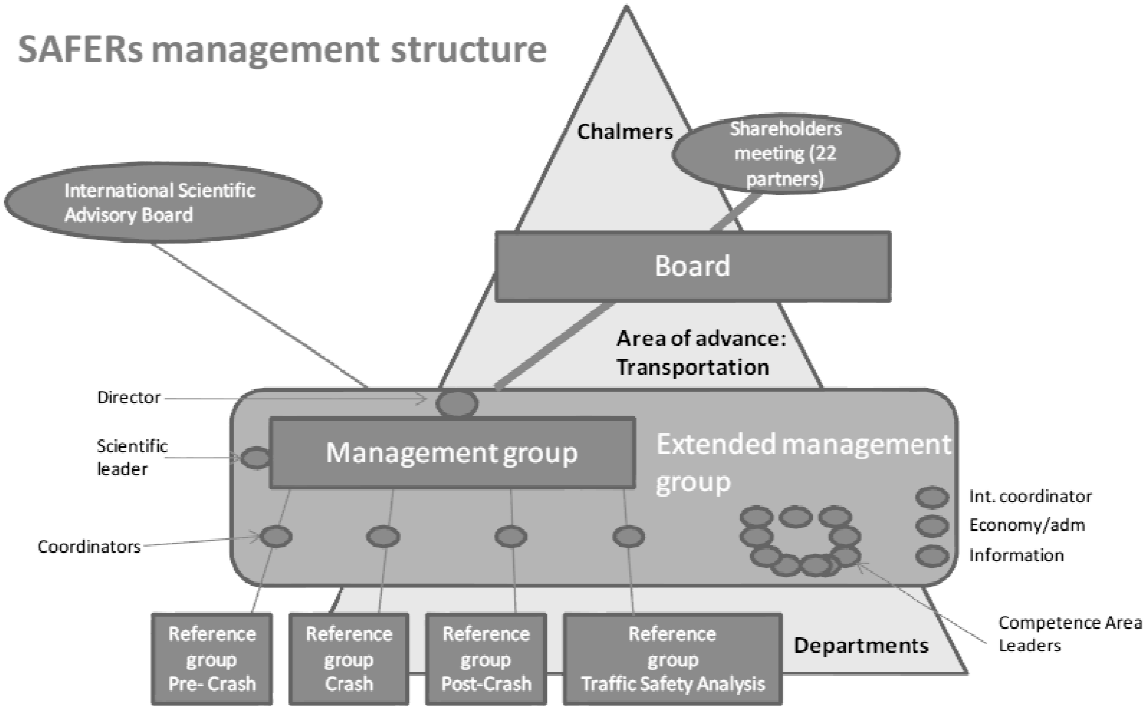

Figure 6. SAFER's management structure (SAFER, 2011a). At this point there is no scientific leader or international coordinator.

There is only one manager at SAFER, the director. A part from that, the reference groups, competence areas, and projects have leaders, but they do not act as SAFER managers. Thus, the management structure is rather flat. All the people at SAFER are employed by partners, and they work at SAFER with different projects. Most people do not work full time at SAFER, but divide their time between SAFER and their home organization. The degree of that division varies, some people have their permanent work station at SAFER, and some people only come to SAFER for project meetings, which might only be a couple of times a year. The management and administration staff is employed by Chalmers and some Chalmers divisions have located parts of their operations at SAFER.

SAFER has lunch seminars every second Thursday where people get the possibility to present and discuss current projects and research. A “SAFER day” is held a few times a year where people at SAFER get to do things together under relaxed conditions as a team building activity. In addition to that, several seminars and events are held every year.

SAFER is physically located at Lindholmen Science Park. The premises are a mix of open office workplaces, small rooms, and conference rooms. There are some spaces shared with other organizations at Lindholmen Science Park which include a lush lounge and coffee machines. This dedicated work place is one of the things that make SAFER unique as a research collaboration. This differs from other innovation actors (Ollila and Elmquist, 2011), and to the authors knowledge there is no other open innovation initiative in the world that provides this.

The fact that people at SAFER come from different organizations and have different backgrounds can cause some difficulties in the collaboration. These are described as four tensions experienced at SAFER in an article by Fredberg et al. (2011). The four areas of tension are career, loyalty, trust and knowledge sharing. When an individual work at SAFER there might be limited possibilities for him or her to get recognition from the home organization. Due to this, an employee’s career might not develop as quickly as otherwise. This is obviously problematic, but depends more on the home organization than SAFER, and thus some individuals might have this problem to a large extent, and some not at all. However, SAFER is dependent on that people contribute and put time into their SAFER projects, but if this is not seen as important and give career opportunities, there is a risk that people do not want to engage so much in SAFER projects and activities.

The loyalty tension means difficulties knowing when to see to SAFER’s best interest or to the home organization’s best interests. As the different partners at SAFER are competitors, there might be situations where individuals have problems knowing who at SAFER they can talk to. The trust tension includes difficulties in knowing who to trust and form project groups with among SAFER partners, again due to competition. The last tension that Fredberg et al. (2011) describe is knowledge sharing tensions. Some partners might in certain situations want to gain as much as possible, but share as little as possible. This problem is further reinforced as people do not know how other people reason in a certain issue; whether they will share a lot or not. Fredberg et al. (2011) argue that all the tensions revolve around the issues of participating fully in SAFER or committing more to the home organization.

The people who are engaged in SAFER are called “key people”, meaning that they need access to SAFER’s premises on a regular bases, thus: they have a key to the premises. When the questionnaire was sent out, there were 235 key people. 107 of them were employed by Chalmers, and 38 were PhD students. Out of those 38, 18 are industrial doctorial students. 18 people (including the authors) were doing their master thesis at SAFER. Many key people are former doctorial students that are now working for one of the partners and have thus kept their key, even though they are not present at the premises as often as before. The partners decide whether they want to participate in a project, and they then make a decision about who of their people will work at that project. This means that some people only do one small project at SAFER, while others participate in many. The people who participate in SAFER activities and projects thus depend on whether the partner company can “spare” those people. These factors make the turnover rate of personnel rather high and the participants seldom work full time at SAFER. In reality this means that many people are not at SAFER every day, some only once a month or even less, and when a project is finished the participants might not continue at SAFER (Balta and Zwick, 2009).

3.1 Previous assessment of the creative climate at SAFER

In 2009, another master thesis about the creative climate at SAFER was carried out within the Managing Open Innovation project. In order to assess the creative climate, that master thesis included a CCQ, from which the result in figure 7 was obtained.

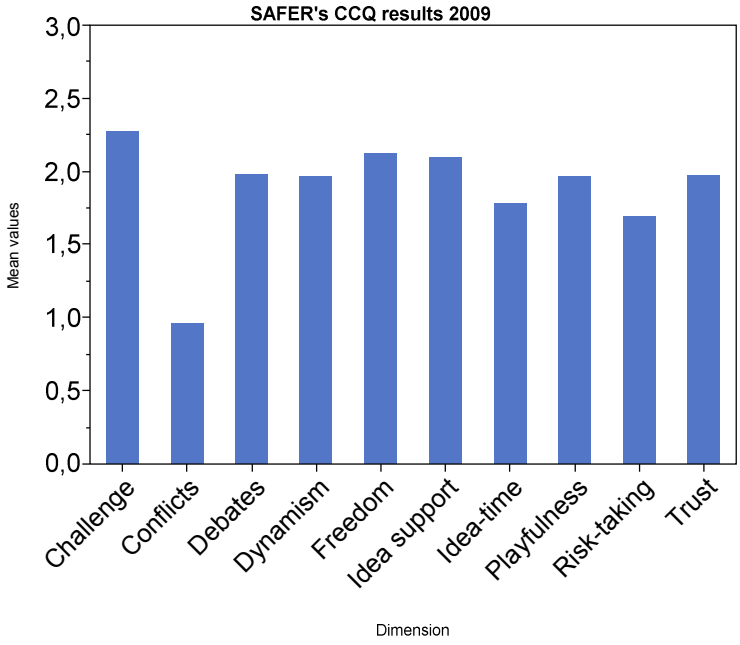

Figure 7. Results of the 2009 CCQ, mean values for the dimensions.

The full result can be viewed in Appendix B. A high value on each dimension correlates to a highly creative climate, except for the dimension conflicts, which is inversely correlated. As can be seen, SAFER scored high on most of the dimensions. The results were also quite similar to the innovative organizations, as defined by Ekvall (1996).

149 people had a key to the SAFER premises in 2009, and thus received the CCQ but only 33 answered. This gives a response rate of 22%. Balta and Zwick (2009) argue that the low response rate is due to that many people at SAFER who received the questionnaire did not have enough knowledge and experience from SAFER to answer the questions and that their answers, should they have answered anyway, could have interfered the accuracy of the results. The study in 2009 also included qualitative data gathering. The conclusions are summarized below.

The key people at the time saw SAFER as a good meeting place and perceived a high degree of freedom in the SAFER related work. It was felt that the environment generally provided the means to be creative. The interviewees felt like there was a high degree of trust at SAFER. However, there was a lack of motivation, dynamism and playfulness within the arena. People expressed an uncertainty of what SAFER is, what the goals are, and what people could expect from their work at SAFER. They generally did not identify with SAFER, more with their respective home organizations.

SAFER is not very hierarchical, and some respondents saw that as a problem. They expressed a need of a stronger leadership, in terms of more leaders, so that everyone would know who to turn to in case of a problem or opportunity.

The thesis found a lack of communication within SAFER. People did not network as much as expected, and some interviewees stated that there were problems knowing who is related to which project. It was experienced as rather difficult to gain contact with someone from another project. This was found partly related to the fact that rather few key people are at the SAFER premises often.

Shortly after this thesis SAFER was going to relocate into larger facilities, and therefore the study focused on the physical environment to a large extent.

4 Methodology

This chapter describes the research design and methods that were used in the study, and give information about how the data was gathered and analyzed. The chapter ends up with a discussion about the quality criteria of the thesis.

4.1 Research strategy and design

The research design of this thesis is a case study, containing both quantitative and qualitative data gathering. Case studies are valuable in knowledge building, as they represent an important type of higher learning (Flyvbjerg, 2006). The specific context-dependent knowledge that case studies can provide is necessary in order to develop knowledge and become an expert, while using only context-independent data, the knowledge building can never reach a more advanced level (Flyvbjerg, 2006). Quantitative data is useful in finding correlations, the extent to which a phenomenon is represented within a population, and other things, but in order to understand the underlying motives and objectives to the data, qualitative inquiry is more suitable (Flick, 2009). One limitation that is sometimes pointed out when using case studies is a lack of generalizability (Bryman and Bell, 2011). When comparing quantitative and qualitative analysis it is important to keep in mind that both methodologies contain a certain amount of interpretation. Alvesson and Sköldberg (2008) state that *"successive expansions of the theory's empirical application area within a certain possible domain are both possible and desired"* (Alvesson and Sköldberg, 2008, p 53). They give the example of a hypothetical pricing strategy, whereas if found successful for a hypothetical company should be successful in a real company of the same kind. Flyvbjerg (2006) argues that cases are valuable in many settings when it comes to generalizing, one is the example of the exception, or the black swan, as he puts it. The reasoning is that it is enough with one example to disprove a relationship, or previous theory, i. e. if all swans are white there cannot exist a black swan, and if a black swan exists not all swans are white (Flyvbjerg, 2006). This reasoning should be used with care though, since all theory and models are simplifications. Siggelkow (2007) argue that case studies can be used for three things: motivation, inspiration, and illustration. For instance, a case study can explain and motivate a certain relationship. A case study is a useful starting point, and as the research field of creativity and open innovation is rather small, this is beneficial for the field. The use of case studies as illustrations to certain phenomenon will be important in this study. If there is a relationship between two variables, given that other forces operate, a case study is well suited in order to verify that relationship and describe how the given forces create the relationship

(Siggelkow, 2007). In this study, the relationships between the two variables creative climate and open innovation will be studied, and thus a case study is a well suited research design. As reported by Siggelkow (2007) organizations are often selected for study because they are very special, and thus cannot be a representative sample, which is a common criticism against case studies. SAFER is unique in its kind, and it is therefore inadvisable to choose any other type of study design, as no other examples are available. To the best of our knowledge no other organization can provide the means for gaining this kind of insights (Siggelkow, 2007).

The chosen approach has similarities with an explorative study in the sense that it aims to elucidate a subject comprehensively and contribute with new knowledge that can guide future research (Patel and Davidsson, 2003). However this is a follow up study which takes off from a previous thesis, and is thus not purely exploratory.

The combination of quantitative and qualitative data means that mixed methods research and triangulation was performed (Bryman and Bell, 2011). The rationale behind the selection of mixed methods was to enable a more complete picture of the context in question. In some cases, investigation of perception only through a questionnaire may not be sufficient to capture the dynamics of the organization, as reported by Holmberg et al. (cited by Bryman and Bell, 2011). The use of both quantitative and qualitative data increases the trustworthiness of the findings, and allow us to gain insights into underlying rationales (Flick, 2009).

When linking qualitative and quantitative data, there can be various outcomes. Flick (2009) describe three different conceptual outcomes; when the results from the different methods support the same conclusions, when the results diverge, and when the results focus on different parts of an issue, but are complementary and give a more full picture. It is our opinion that the complex environment that SAFER is cannot fully be described with questionnaire data, but a sample of interviewees might have some representative weaknesses, again due to the complex environment. Thus, the qualitative data is used to investigate the subjective meaning of a certain creative climate aspect, while the quantitative data is used in order to find the different creative climate aspects distribution at SAFER. The various data collection methods are described below.

4.2 Literature study

In order to get an understanding of the research field in question, a literature study was performed. The literature study is fundamental in the thesis work and studies of relevant sources continued throughout the whole work. The starting point was material on

organizational creativity and open innovation, which had been recommended by our supervisor as well as sources that we were previously familiar with. More sources were found through the Chalmers Library Homepage and Google Scholar, as well as in the reference lists of relevant sources. We also used the following e-book collections: books 24x7, ebrary and SpringerLink. Finally we used the databases Web of Science and Scirus. The key search words and expressions that we used were; open innovation, creativity, organizational creativity, organizational climate, motivation, interfirm collaborative innovation, and collaborative innovation. The search was performed from January to March 2012.

The literature studied has been published books and peer-reviewed articles, except for a very small number which were conference papers.

After the gathering of literature, a thematic literature analysis was made. With a basis in the read articles, we identified a list of themes that were reoccurring. The themes were derived based on our impression after reading the article. From this list, some themes were selected for further study, and some were dispensed with. The selection was done in accordance with the scope and delimitations of the thesis, the possibility to link the articles to the research questions, and whether the theme was described enough in the literature to make a sufficient analysis based on it.

4.3 Questionnaire

To gather the quantitative data on the creative climate at SAFER the Creative Climate Questionnaire (CCQ) was used. The CCQ has been proven to be robust in various studies regarding measurement validity, reliability and stability over time (Isaksen and Ekvall, 2004).

4.3.1 The design of the questionnaire

The CCQ was kept in its' original form, with the 50 questions randomized so that it would not be too clear to the respondent which question was related to another. Two background questions were added, namely:

- What kind of organization do you work for?
- How often are you present at the SAFER office?

The first question had four response alternatives: Academia, industry, institute, and society. These response alternatives were chosen based on the different key peoples' home organizations. At SAFER, the two organization types institute and society are both classified as "Society". Therefore, those two response alternatives were analyzed as one group. Each

response alternative had a given example, in order to guide respondents to identify their category. The second question had four given response alternatives, namely: almost daily, at least once a week, a couple of times a month and a couple of times a year. The respondents also had the possibility to choose “other” and describe their presence in free text. These background questions were added in order to have the possibility to analyze the different groups separately.

After the introduction to the survey, the original CCQ followed. After the 50 CCQ questions, the respondent had the possibility to comment on the CCQ, the study, or anything else they thought was relevant to the study. These comments were included in the qualitative data analysis. The respondents were also given the opportunity to volunteer as interviewees. That information was collected in a separate survey in order to keep the anonymity of the respondent in the original questionnaire.

The questionnaire was distributed through Google documents, which had been deemed suitable for practical handling of data. As the CCQ is owned by the creator Göran Ekvall, it is important that it does not get spread to unknown sources, and it was our opinion that this will not happen with the use of Google documents. Before the questionnaire was sent out, members of the MOI research group and the management group at SAFER gave their input and some small changes were made, clarifying the meaning of some of the statements. One example of a change is that the expression “the company” was replaced with SAFER. This was done consequently in the questionnaire, as SAFER is not a company. In one statement, the word anxious was used, and in the 2009 study of the creative climate at SAFER, a lot of people had misunderstood the meaning of the word, leading to the exclusion of that question in the analysis. In order to avoid that, we added “anxious=eager” after the statement.

As the CCQ is a property of Göran Ekvall and we were given permission to use it in this study, it will not be included in the Appendix.

4.3.2 Collecting questionnaire answers

The questionnaire was sent to all 235 SAFER key people, through a shared emailing list. In addition to the questionnaire, a small introduction text was provided in the email explaining the motive to the study, the fact that a previous assessment had been done in 2009, who would take part of the answers, and other relevant information to the respondents. The same information was summarized at the start of the questionnaire.

In order to get even more answers, two reminders about the questionnaire was sent via email, one from the managing director of SAFER. We also held a presentation about our study during a lunch seminar. In the presentation, we explained the motives and rationales behind the study, and encouraged people to answer the survey. In the SAFER office, small notes were placed in all social areas as well as some working areas. This is a potential bias to the study, as not all key people got that reminder. However, it is our perception that this will not have a big effect on the study, and that a high response rate was more important.

The CCQ had 56 respondents, but one had to be excluded due to the fact that he or she neglected to answer the majority of the questions. Because of this, the existing answers were not seen as reliable. 55 responses gave a response rate of 24%, which is rather low. However many people that have keys to the SAFER premises, and thus received the questionnaire, do not participate actively in any projects. Therefore the response rate considering people that actually were capable of answering the questionnaire accurately might be higher than 24 %. It is however hard for us to estimate how many these people are.

The full results of the CCQ are displayed in Appendix C. Some respondents have neglected to answer some of the questions; these fields are blank. The answers were collected from February 8th to March 1st 2012.

4.3.3 Quantitative analysis

When the questionnaire was completed the answers were analyzed in accordance with what Isaksen and Ekvall (2004) suggested. On each question the respondents could choose from 4 response alternatives; disagree completely, disagree, agree and agree completely. Accordingly with Ekvall's method for analyzing the results of the questionnaire (Isaksen and Ekvall, 2004), the answers were first coded to numbers 0 (disagree completely) to 3 (agree completely) and grouped according to which dimension the question corresponded to. After that, the mean value for each dimension was calculated. The mean values were then compared with reference data on innovative and stagnated organizations (Ekvall, 1996). The data was also compared with Balta and Zwick's (2009) study of the creative climate at SAFER in 2009. The mean values were compared and a test of significance was performed on the two populations. All statistical analysis was performed with the statistical software JMP.

4.4 Interviews

A qualitative interview study was done in order to deepen the understanding of the subject. Themes and topics for the interviews were based on literature and the quantitative findings. In total, ten persons were interviewed.

4.4.1 Interview design and interviewee selection

The interviews were semi structured. This approach was chosen as semi structured interviews gives the possibility to ask follow up questions (Bryman and Bell, 2011), which might give insights not captured by a structured interview or a questionnaire. An interview guide was used, but the interviewees had the possibility to express their thoughts on what they felt was of importance when discussing a subject. Also the order and phrasing of the questions was altered depending on the natural flow of the interviews. The interview guide can be found in Appendix D. Most of the interviews were held in Swedish with a Swedish translation of the interview guide.

The selection of interviewees was done with assistance from a member of the SAFER management group who provided information regarding the background of the interviewees, i.e. how often they are present at SAFER, how long they have been here etc. This might be a potential bias to the study, but as there is no documentation about people's patterns at SAFER, some background information to make an appropriate selection was necessary. Also, volunteers from the questionnaire were interviewed. The interviewees were selected in order to get input from key people employed by the three different partner types (society, academia, industry) and key people that were present at SAFER often and less often. These selection criteria were used in order to see if the groups had any differences in perception of the creative climate. Some of the approached candidates for interviews did not participate. This was mainly due to two reasons. The first one is that they felt that they did not have enough knowledge about SAFER to provide relevant information, and the second one was that they were not possible to get in contact with. This could be a potential bias to the study, as all of the interviewees are often present at SAFER, or have some sort of leader engagement in SAFER.

4.4.2 Qualitative analysis

In order to increase the internal reliability of the study (Bryman and Bell, 2011), we have discussed each interview immediately afterwards to share impressions, as it is not possible to have the exact same interpretation of an interview. All interviews were recorded. This

improves the internal reliability, as it gave us the opportunity to go back and listen to the interview and thus creating a joint understanding between us. All of the interviews were transcribed, in order to facilitate the analysis, and to deepen our understanding of each interview. These transcripts were then frequently used in the qualitative analysis. We both read the transcripts several times, and after that we summarized the content into different themes, that were discussed on many occasions. When analyzing the qualitative data, we used the method outlined by Miles and Huberman (1984), as follows. After deciding upon themes to use, we coloured the transcripts in different colours; corresponding to which theme they belonged to. After that, the coloured passages were cut out from the transcripts, and sorted into different headings. These headings were then the base of the empirical chapter, and some of the statements, that were found illustrative, were chosen as quotes.

4.5 Comparison with a technology company

As a part of another research project, we analyzed data from a CCQ survey done in a technology company. Due to confidentiality issues, we are not permitted to reveal the company name. The company in question is considered innovative in their product development, and is situated close to SAFER physically. The employees are rather diverse in their background, as in the case of SAFER.

In that CCQ study, the decision was made to use the ten dimensions, but only two items per dimension. The selection was done by researchers outside this research group, and the description is beyond this report. The survey had 48 respondents, and their answers were collected between the 3rd and 9th of May, 2012. The mean values were calculated, and then compared with the mean values for SAFER, based on the same 20 items. This comparison was done rather late in this study's time frame, and will thus not be included in the analysis to any large extent. However, since Ekvall's type organization data is from the early nineties, we thought it would be interesting to account for the results.

4.6 Quality criteria of the study

There is a quality aspect on the mixed methods approach; if the findings support each other the study can be considered stronger than a single approach study (Bryman and Bell, 2011). In this study they have supported each other to a large extent, which is argued to improve the quality of the study. Due to the mixed methods approach, there is a high element of synchronic reliability in this study. Although the different methods address slightly different things, some elements are the same and can therefore be used in order to assess the synchronic

reliability. Also, the robustness of the CCQ as a tool makes it possible to compare the SAFER results with reference data from various studies and environments, which provides a high external reliability (Bryman and Bell, 2011). As this is a follow-up study with partly identical measures (CCQ), there is an element of diachronic reliability; measuring at different discrete points in time in order to ensure quality and robustness of the findings. However, criticism of diachronic reliability points out that the object itself cannot not undergo large changes when using that quality criteria, making this criterion misleading (Flick, 2009). At SAFER changes have occurred, making this criterion difficult to use.

Validity is sometimes considered more important than reliability in the discussion of qualitative data (Flick, 2009). One issue within this subject is whether the researchers have asked the right questions. In order to secure the accuracy and suitability of our questions, we have studied the former investigation of SAFER closely, trying to find underlying issues that were not addressed within that thesis. We have also studied other publications about SAFER. There has been room for both interviewees and respondents to add elements that they think are important, trying to ensure validity. Other issues within validity could be to draw a conclusion that is incorrect, or fail to identify an existing relation, type 1 and 2 errors. In order to avoid this, the data gathering and analysis process have been made as transparent as possible, considering that this is a case study. We have also had various discussions about data interpretation in order to make our illustration of SAFER as true as possible. However, there can never be an absolute certainty of the validity of knowledge (Flick, 2009).

When discussing qualitative inquiry quality, the subject of selective plausibilization should be addressed. Selective plausibilization is whether the quotes used in the study are illustrative of the study object in question (Flick, 2009). In this study, the quotes that are chosen are something that is similar in content and meaning to many other interviewees' statements, if nothing else is stated. Due to the semi structured interview method all of the interviewees have discussed the same topics, although some of them discussed more than others. Thus, we have rather many passages in the interview transcripts that touch upon the same issues, and that provides us with the possibility to illustrate something that many interviewees felt with the quote that was most suitable. In the cases where the interviewee or respondent gave a statement that was not considered illustrative for the entire population, it is stated that this view was given of one interviewee or respondent.

5 Findings

This chapter describes the findings from the study. The chapter starts with an overview of the questionnaire responses, which is then compared with reference data. The chapter continues with findings from the interviews, which are displayed thematically.

5.1 Quantitative findings

This section describes the quantitative findings. The section starts with introducing the respondents and their answers. After that, the results are compared with the results from 2009, the innovative and stagnated organizations, and the technology company.

5.1.1 Respondents

The respondents of the CCQ represented all three employer categories. Figure 8 shows the different types of respondents based on their employer. A table of the respondents' answers to what kind of home organization they have can be found in Appendix F.

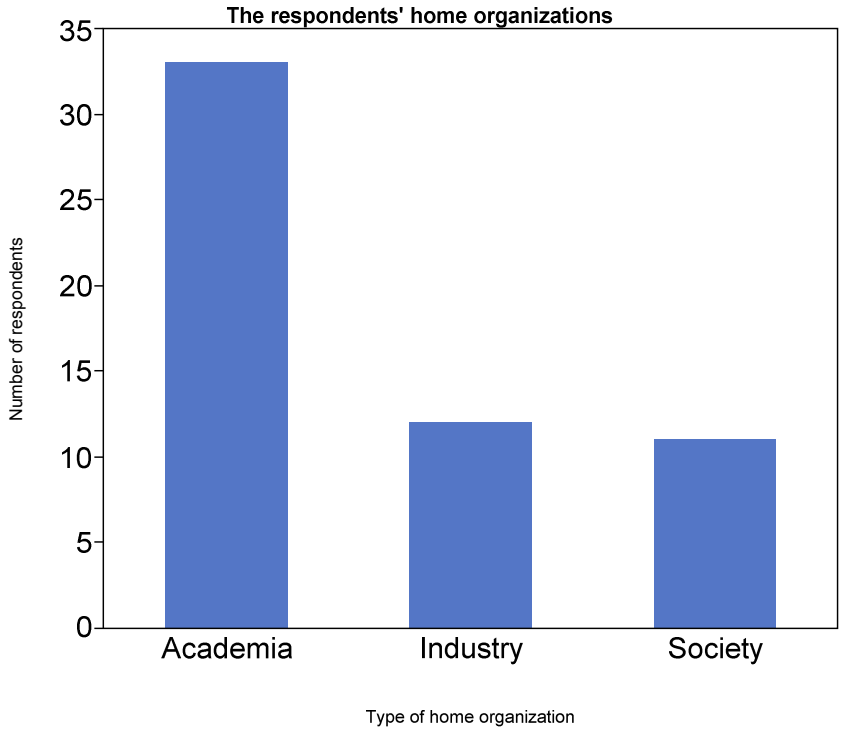

Figure 8. Number of respondents from the different types of home organizations.

As can be seen in the picture, Academia represents 32 persons, which is a little over 60% of the total respondents. When this questionnaire was sent out, 107 out of 235 key people were employed by Chalmers (approximately 45%), meaning that academia is over represented in the survey. 32 of the respondents are present at SAFER at least once a week, representing a

majority of 59%. Out of them, 20 people are at SAFER on a daily basis. The complete answers to how often the respondents are present at SAFER can be found in Appendix G.

5.1.2 The results of the CCQ

The results from the CCQ are displayed in figure 9 below. For the complete answers, see Appendix C. The graph shows the mean value for each dimension. As described above, the dimensions consist of five items each. The items show consistent values in each dimension. The highest value is 3 (agree completely) and the lowest is 0 (disagree completely). The dimensions correlate directly to creative climate, except conflicts which is inversely correlated.

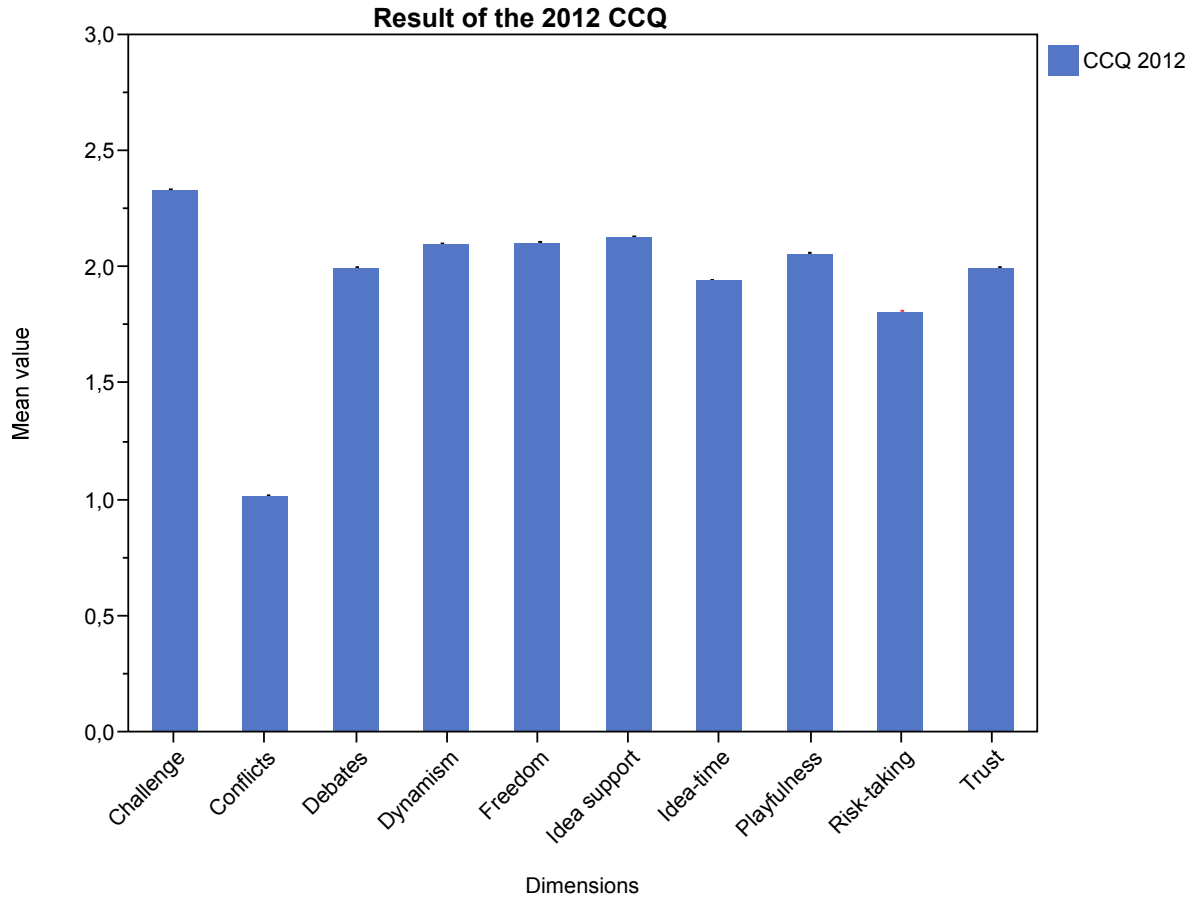

Figure 9. Results from the CCQ, mean values for the dimensions.

5.1.3 Comparison of SAFER's CCQ results from 2009 and 2012

The results from 2012 were compared with the results from the CCQ done in 2009. The comparison is displayed in figure 10. As can be seen, the results are very similar, and a confidence test shows that the results for debates, dynamism, idea time, and risk taking are statistically significantly similar, with alpha = 0,05. Challenge came very close, with a p-value = 0,0511. The entire set of p-values can be seen in Appendix E. The similarities are interesting in our opinion, as SAFER has gone through a lot of changes in those three years. Therefore, this result was discussed in the interviews.

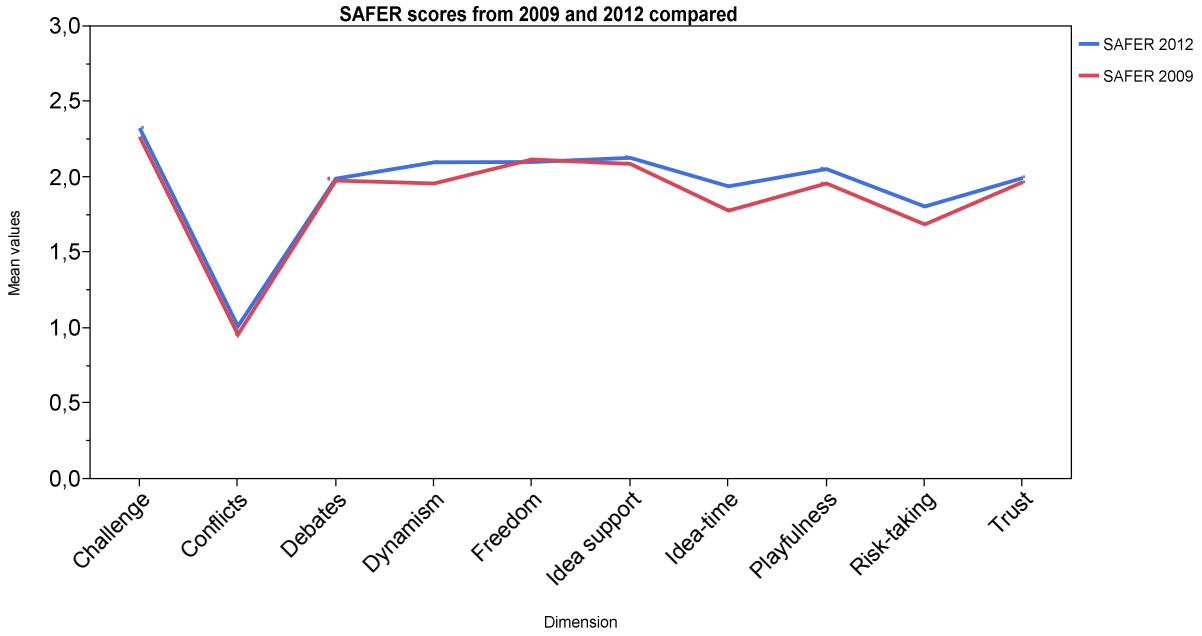

Figure 10. Comparison between SAFER's scores 2009 and 2012.

5.1.4 SAFER compared to the innovative and stagnated organizations

To put SAFER's results into a context they are compared to values of innovative firms and stagnated firms, developed by Isaksen and Ekvall (2004) described in chapter 2.3.3. The comparison is displayed on the next page in figure 11. As can be seen, SAFER has a result that lies rather close to the innovative firms and far away from the stagnated firms. It has a higher value on debates, idea support, idea time and trust than the innovative firms. However, dynamism, playfulness and risk taking are below the result of the innovative firms and conflicts is slightly above.

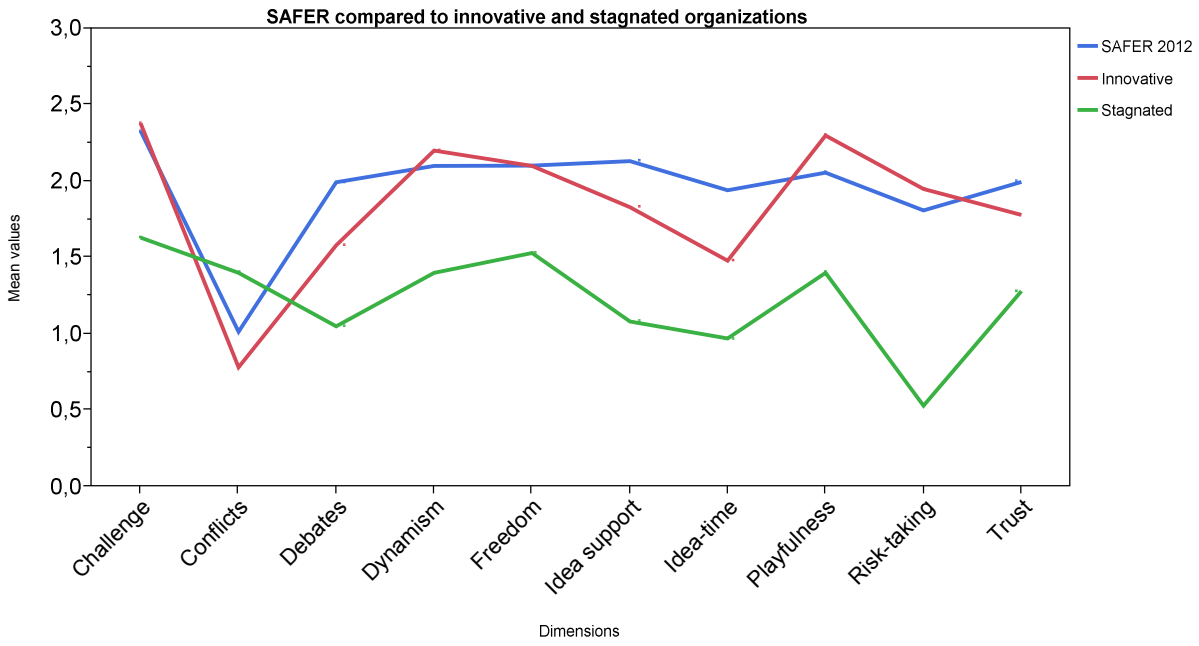

Figure 11. Comparison between SAFER 2012, innovative and stagnated organizations.

5.1.5 SAFER compared with a technology company

As mentioned in section 5.5, we compared SAFER's CCQ results with the results of a technology company. The results are displayed in figure 12, and the answers in total from the technology company are displayed in Appendix H.

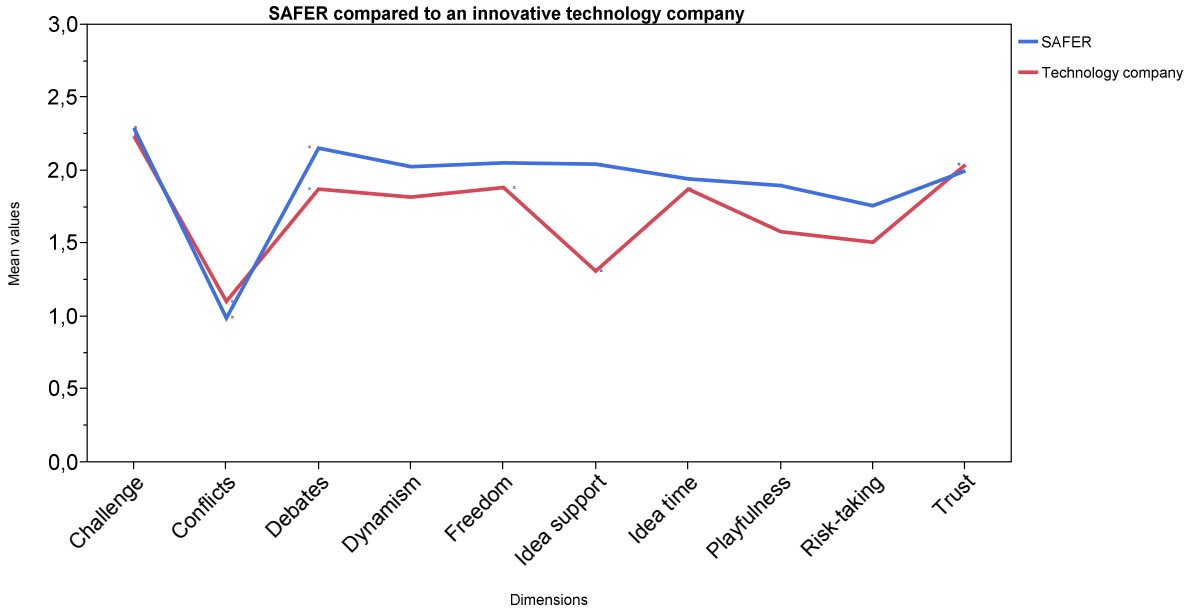

Figure 8. SAFER compared with a technology company.

As can be seen, SAFER scores higher in almost all dimensions, and lower in conflicts. This further implies that SAFER has succeeded with their creative climate. The results should be handled with care though, since they are based on only 20 of the in total 50 items.

5.2 Interview findings

This chapter presents the findings from the interviews and qualitative data collected from the questionnaire. It will first present the interviewees overall perception of the creative climate at SAFER, and then continue with a deeper investigation of some factors that have been found important in the study, such as the project organization, the relation between SAFER and the different partners, and the funding system.

5.2.1 SAFER's creative climate

"Here at SAFER you sit with a lot of different people who come from different cultures with different educations and experiences. And that is what makes you more creative" (Key person from SAFER)

Several of the interviewees emphasized the importance of SAFER as a meeting place, both to generate new contacts and preserve old ones. It was considered valuable to meet people from different fields and different organizations, and get new perspectives on problems or projects. One interviewee stated that SAFER "*expand horizons*". In the questionnaire, one comment was that *"It is easy to put together a cross-functional group with all concerned parties to test thoughts and new ideas at SAFER."* The cross-functional way of working was seen by the interviewees to provide an understanding of the other parties, making it possible to see possibilities and focus on solving problems rather than inter organizational politics. SAFER was considered to give important inspiration from other people and to give a lot back. According to one interviewee "*SAFER forces you to explore and expand the room"*.

Some of the interviewees mentioned that SAFER enables researchers to "borrow" methods from other fields. This was seen as a positive thing. However one person had experienced problems to get help from another research team, due to time constraints. In the interviews, some people mentioned that there is a lack of transparency between projects and areas. One interviewee stated that *"I don't think that people would not tell you what they are doing, they are quite open to tell, but you have to ask"*.

Generally, it appears that people tend to focus more on solving problems than to protect interests, especially people who have been at SAFER for a while. Interviewees also believe

that the presence of people from academia guarantees that the focus is on solving the issues at hand and not to simply work for the partners. However, one interviewee stated that during his time at SAFER, he had learned not to share ideas until he knew more about the implementation of them, in connection with funding for example. The issue of funding will be described more in section 5.2.9.

One person stated that it would be beneficial with more debates at SAFER. Several persons noted that there is no official debate forum, and that the debates often take place inside closed rooms instead of out in the open. One person saw this as a problem, stating that *"Maybe it's more individual initiatives, 'let's come up with a good research application to the EU in order to get research funding'. Then it's a subset of the people here, so that is a bit tricky"*. One interviewee stated that the generation of ideas depends more on specific individuals at SAFER than SAFER as an organization. As one interviewee put it: *"I think that there are more ideas to gather in an area if the debate is taking place in a bigger forum, not just between two people. In-between [individuals] I think there is a good acceptance and you dare to stand for your ideas, I definitely think so. But there is no open debate climate in that [an organizational] manner, it happens mostly in too small forums."*

One interviewee mentioned that there seems to be conflicts at SAFER: "*You can sense that there are some conflicts, you still have your ears open and you can sense that SAFER as a whole, outside the project I work in, is not completely free of conflicts."* However, the other interviewees have seen no conflicts, and some of them speculate in the fact that as the personal relationships are not as close at SAFER as in other organizations, stating that conflicts have "no use". For instance, one interviewee mention that it has no point complaining at SAFER, *"SAFER is not an employer, SAFER is a meeting place, and you don't sit and complain about that [the director] is doing a bad job, because it's not your employer in that sense, it is a collaboration partner"***.**

The official division of the research areas that SAFER has made is pre crash, crash and post crash. These fields where not mentioned by any of the interviewees, instead many of them made a division between active and passive safety, a few also used the so called FOT projects to describe their research field. Among the interviewees with a home organization from the industry, many referred to Chalmers when they meant SAFER, they felt that SAFER is Chalmers.

5.2.2 The environment at SAFER

The physical environment at SAFER was generally considered as very good. It is seen as valuable to meet people you would not meet otherwise, but one interviewee noted that it is usually the same people you meet at SAFER. One person emphasized the importance of the different physical place (compared to home organization) in order to be creative. The social environment is seen as positive, people do not tend to talk behind each other's backs and people are generally happy. The open office environment is considered both good and bad. Some interviewees state that it is good with an open landscape, as that facilitates cross-functional project work. The office environment is found by some people to be very quiet. This is good for focusing, but not for discussing. One interviewee stated that it is difficult to work here, as the work in question includes phone communication to a large extent. Some interviewees do not find the environment quiet enough, and feel that the other people disturb them in their work. One interviewee saw it as a problem that some people have their own offices, undermining the open environment, while another saw it as a prerequisite to work. It was suggested in the questionnaire that people should use the "Think and Talk rooms" more. Two interviewees noted that compared to industry, SAFER is a quiet and calm office space.

The SAFER days and the lunch seminars were appreciated by the interviewees. The SAFER days were seen as good in building relationships and community. The lunch seminars were stated to be inspirational, create community and a good way to share ideas. One interviewee thought that it would be beneficial for SAFER to have more team building activities. This was said by a person who has a permanent work station here. On the contrary, another interviewee stated that it was stressful with so many activities at SAFER as it currently is. The person continued: "*It is good that there are a lot of possibilities, and I think that they have created a very good environment, but sometimes I think you have to respect that people have too much [work pressure], it [the high amount of activities at SAFER] can be a little intimidating for people*". SAFER was considered as quite dynamic, with a lot of seminars. However, the social events were too few, according to some interviewees. Several comments were also made about the organizational structure at SAFER, it is perceived as unclear, especially when it comes to leadership. Some of the interviewees mention problems with understanding what SAFER is, for instance who is involved, when does a project "count" as a SAFER project etc.

The fact that people are not permanently at SAFER was seen as a problem, as it obstructs communication, and several of the interviewees suggested that people should be at SAFER more often, at least during intensive project periods. The daily meetings outside of work were

seen as positive for creativity and making contacts, and it is important that they are not too controlled. Most of the interviewees felt that SAFER has a humoristic atmosphere, but people are also rather serious. One comment was that this might be due to the Swedish culture, and that people behave differently in formal and informal situations.

5.2.3 SAFER's creative climate over time

The interviewees had different opinions on the development of SAFER's creative climate over time. Some say that it has changed, and some say that it has been constant on a high level. One interviewee said that: *"SAFER is different now compared what it was three years ago. It is bigger, there are more people here and there are more people who have been here for a long period. Maybe that makes you relate in a different way. I remember that three years ago there were a lot of discussions about what SAFER is and no one quite understood what SAFER was. I feel like those discussions have petered out."*

The interviewees agree upon that SAFER has changed, and is bigger now than it was three years ago, there are more people and more projects. However, there are different views on whether that has affected the creative climate. When asked why he feels that the climate has not changed, one interviewee said: *"I see that the possibilities have not changed. What I see now … is that the routines have improved, in the beginning there were many discussions about what we do, the supporting processes were not clear. Now they are, and that has decreased the noise distortion behind the creativity. The creativity was always there, there was just a little noise distorting it."* There is also a notion that the issues that SAFER are dealing with has changed, but that has not changed the creative climate.

One interviewee mentioned that SAFER had some "childhood diseases" in the beginning, but that SAFER has had a deep learning curve. Another person said that he feels that SAFER has changed, but it could be due to that he is now more familiar with it. As for the change in the facilities, the interviewees are generally positive, but they do not think that it has had a large effect on the creative climate. They appreciate the open spaces, but they don't express a sense that this has made them more creative. One interviewee mentioned that in the older facilities people were sitting more closely together, which gave a more close communication.

When the quantitative comparison between SAFER 2009 and 2012 was presented to the interviewees, they were asked about why they think the climate has been so constant. Some made comments about the instrument, which will be described in Chapter 7. Others discussed the issue of leadership, both formal and informal. The fact that SAFER has had the same

management structure as the beginning was one reason for the stability, according to some interviewees. Some said that the core people at SAFER are the same now as they were at 2009, implying that the informal leaders are also the same as they were in 2009. One interviewee says that the turnover rate of personnel outside the core people makes it difficult to improve the creative climate, another thinks that the high growth rate makes it difficult to improve the creative climate. However, all seem to agree on that people determinate the creative climate, meaning that how people behave and what effort they put into the work at SAFER affects the creative climate. Generally, the interviewees thought that SAFER's results on the CCQ were satisfactory, even though they can be improved, and that they give a correct image of SAFER. One interviewee commented on that the fact that the creative climate has not decreased is a success for SAFER, that means that people still want to work there, even though SAFER is not new anymore.

5.2.4 Relations with the SAFER partners

The cooperation between partners that exists in SAFER has become more open and better as the partners has gotten used to the idea of sharing, according to two interviewees. One of them expresses the issue of openness like this:

"To get dynamism and a better interchange of what we are cooperating around you have to share knowledge that might border to that you can understand what we are developing and taking forward. But if you don´t formulate these questions that are critical you don´t get the answers you need either. So I would say that from where SAFER started to where we are now there is more openness and it probably roots in a larger amount of trust in that you can share information without it spreading adrift." (Key person at SAFER)

One interviewee pointed out that it is still a bit inconvenient to share information across organizations. There is politics in the choice of who to share information with and before a plot for a project idea is set, some SAFER participants are careful with whom they talk to about that project idea. As one person expressed it: "*if I feel that something [an idea] is in my field and I feel that I want that my home organization should drive it forward and maybe make a project of it, then I would be cautious about who I present it for*". A political problem that one interviewee mentioned was that when a technical solution has to be chosen for something in some project, solutions from SAFER partners should not be favoured before other better solutions. This could become a political issue if not handled well. Another organizational inconvenience that was mentioned was that there seems to be issues with

prestige between some units at Chalmers, and those issues sometimes make collaboration harder.

Three interviewees mentioned the importance of that SAFER people bring ideas from their home organization to SAFER and the other way around to stimulate the creativity and innovation, both at SAFER and the home organization. One interview said that "*SAFER offers fertilizer*" for ideas. It was commented upon the fact that some partner organizations very seldom are present at SAFER and that their benefit from being part of SAFER could be questioned. The personal contacts that people at SAFER get can often help to shorten communication routes between people in the partnering organizations.

As for the differences between the home organizations at SAFER, several interviewees stated that it is more informal at SAFER. This makes the meetings more informal, so that the communication can be more open. One comment in the questionnaire was that "*compared to industry, SAFER is a very stimulating work environment*". One person said that it should be more creative in research work than within industry. Another interviewee stated that "*You can follow a trace a little longer at SAFER, so you can develop your idea a little more than you would be able to do at a company"*. Another person mentioned that it is easier to focus on a specific issue here, compared to the home organization. The creativity was seen as "*more substantial*" at SAFER, compared to the home organization, according to one interviewee. Other interviewees said that they feel no difference in creativity between SAFER and the home organization, as they have the same tasks at both places. Some interviewees saw SAFER as a safe environment when it comes to taking risks in their career etc., as they don't have anything to lose at SAFER, compared to their home organization. The interviewees agree on that there is less politic behaviour at SAFER, compared to other organizations.

5.2.5 The project organization

An overall finding that almost every interviewee mentioned was that many of the dimensions of the CCQ, such as challenge for example, depend on the particular project that you are involved in and that it therefore is hard to generalize about how things are at SAFER based on their own project experience.

SAFER should be different from the home organization and have more space to try new ideas as it is connected to the academia, according to one interviewee. But the same person thinks that the project organization that SAFER has takes away some of the acting space and makes it similar to regular firms. Another interviewee described it in this way; "*creativity means*

quite a lot of freedom and the question is how much freedom you have because there is limitations with time, there is limitations with the goal of the project, there is limitations with resources plainly".

Two interviewees think that SAFER projects are less controlled than development projects within firms, as people and units are not dependent on each other in the same way. One of them described it like that *"If you have a project aimed at producing a product so to speak, a software for example, then it is very clear what it is going to be and it is dependent on several parts, according to the plan, like a Gantt chart. Here it is more like everyone is doing their own race and it comes down to holding together the pieces and to facilitate the communication to make the partners form some kind of network, a social network."* This makes the work at SAFER more free, according to the two interviewees. However, many interviewees express a desire for more freedom within the SAFER projects.

Even though the project processes are controlled, the changes that can happen during a project sometimes make the outcome much more valuable than the original goal, according to one interviewee. The freedom to choose means when trying to achieve a goal is important. Several interviewees say that the process mustn't be too controlled and given in beforehand, because if it is the creativity is killed.

Other interviewees mentioned that the contracts and project plans in SAFER projects limit the freedom almost as much as in regular firms. One interviewee pressured the importance of time to think of new ideas in projects and therefore wanted the project plan to be less controlled. The contracts that are made in projects make it easier for people to trust each other within SAFER according to one interviewee. Two interviewees said that people avoid risks within project as there is a demand to deliver. One of them expressed it like this; *"You want to be able to deliver, at least in some projects you almost promised, and then you might be afraid to walk to far from the path, because you are not sure that you will be able to make it back in time".*

Everyone at SAFER does not have access to all data, although information from a project can often be shared with a colleague within SAFER if that person asks someone inside the project. There does not seem to be any natural information flows inside SAFER. One person said that it is difficult to communicate in the project form that SAFER has and that this creates a time leakage when information has to be repeated again and again because people in the same project are not present at SAFER at the same time.

The organizational structure at SAFER, where there seems to be no fights to win positions and no career ladders to climb, makes conflicts rare according to one interviewee. Some interviewees mentioned that people do not really get to know each other at SAFER and that this makes it hard for conflicts to rise.

5.2.6 Goals and limits

All interviewees agreed upon that it is possible to be creative with the means at SAFER, but not with the project goals. The goal can be changed in a project, but there is a limit to how creative a SAFER person can be, given the time and financial restrains. The pilot studies that SAFER holds were seen as positive, giving the means to test out an idea but as they are very small compared to research funding from the government or similar, they still did not change much of the restraints. However, they increase the possibility for risk taking at SAFER, according to one interviewee. SAFER was considered to constantly improve their idea support, according to some interviewees. This holds for projects closely related to SAFER, but in associated projects, SAFER is not giving any idea support, and should not as it is not in charge of the project, according to one interviewee.

Many of the interviewees mentioned in some way that it is not SAFER that sets the work limits, but the home organization. One person said that almost everyone at SAFER are part of another organization and another said that; *"it is not enough to just go to [the director] here with an idea, I also always have to anchor it with my boss, because he owns me as a resource"*. Another interviewee said this about working at SAFER instead of the home organization; "*it is not like that if I work here I have less to do and have more freedom or free time. I still have the amount of work that I have to do per day or my own ambition and that does not change if I work here or if I work in another place"*. The issue of limit setting was repeated by many interviewees when it came to time to think of new ideas, risks and freedom, these were said to not be set by SAFER. One interviewee said that the home organization and its leadership style narrowed the creative dimensions of the work.

5.2.7 The capturing of ideas

The interviewees generally think that ideas are perceived well at SAFER. There is openness to suggestions and people seem willing to take in new ideas. One interviewee state: *"It feels like SAFER wants to expand all the time, and looking at new areas within traffic safety. Now there is talk about sustainability in the traffic system… and we start to include that in some way. Even though it is not the focus of SAFER"*

One interviewee describes how important inspiration from other people is:*" Mostly I dare to lift up my ideas and suggestions, and then you might be questioned or someone likes the idea. Regardless of which I have gotten some inspiration, it might not give anything but sometimes something can start a process and three years later I get something of it. I feel that I myself, definitely, have grown innovative ideas and creativity, only by listening to the other parts of the organization*".

It was considered that SAFER is a good place to generate ideas, and that the sharing of ideas is high. The integration with the industry is beneficial, according to several interviewees, even though the different prerequisites are sometimes obstructive. However, nothing is done actively to premiere ideas, which was considered as a problem by one interviewee. It is easy to get ideas at SAFER, but the possibilities to implement or test the ideas were found to be more limited. One interviewee stated that it is up to the person getting the idea to take responsibility for implementing it, and that no-one else will take any responsibility. Another person said that an idea that was outside a person's research field or PhD work was difficult to implement, unless there was someone in the home organization that could do it.

As for taking charge of new ideas, the interviewees seem insecure on what forums that can be used. As was the case with debates (se section 5.2.1.) much of the idea generation is done in closed rooms. The interviewees feel that some ideas might vanish into the operation as no one can take responsibility for them. One interviewee state: *"If I have an idea and know that someone in my home organization is working in that area I can go and talk to that person, describe and discuss the idea, and hope that the other person proceeds with the idea. So I guess the possibility is there, but if there is no-one else, it will be difficult to implement the idea"*. One person said that he hoped that there is a system to catch ideas that are not utilized right away, but he is not aware of such a system. Some interviewees say that it is much up to the individual, one saying: *"people here are quite persistent so I don't think they will let go, I think they take the next opportunity to take it [the idea] up."*

The pilot projects carried out at SAFER are seen as an important part of the idea support. They enable a person to take a small amount of time to further investigate an idea, sometimes together with another partner. This possibility does probably not exist at other organizations, according to one interviewee.

5.2.8 Different perspectives on SAFER

Almost every interviewee said that many of the things that the creative climate questionnaire investigates depend on you as an individual and the people you work in projects with, and not SAFER. One interviewee said that *"a creative climate is not that you come here and sit down in a corner and wait to be challenged"*, the interviewee meant that you have to create your own challenge and contribute to be benefited by SAFER. Two interviewees said that the amount of ideas that you come up with depends on for how long you have been here and how well you know people. Another interviewee said that the trust between people does not depend on SAFER but on whom you work with and for how long you have been at SAFER. One person said that you make your own challenge whereas another person said that the challenge depends on your project co-workers. If SAFER is going to be beneficial for you as a person depends fully on how you contribute and participate, according to one interviewee.

All interviewees mentioned in some way that SAFER cannot be described as one thing or be generalized. It all depends on which project you are in and who you work with. Several persons mentioned that they did not know how to answer the CCQ as they do not have a clear view on what SAFER is. On the issue of understanding who people represent when you meet them at SAFER one interviewee said; *"You don´t know, is people representing themselves, or are they representing their company or are they representing SAFER"*. Another issue that has to do with what SAFER is, is that a person from an associated project said that he did not identify himself with SAFER. An interviewee concluded by saying that *"it is hard to understand how the SAFER organization works because the information dissemination is a bit different, so is the coordination between projects and people.* Another person said, on the same theme, that *"…it is also difficult to address SAFER as one organization. Because it is one, but then there is so many different projects inside it. And organizations within somehow"*.

5.2.9 Financing and research funding

Most of the interviewees discussed research funding. The issue of getting financing is seen as a core operation at SAFER, as in other research facilities outside of industry. It is common to adjust the projects in order to suit a specific target, such as a call for proposals to fund. This limits the possibility to be creative, according to several of the interviewees. According to one interviewee, *"The projects that are being formed depend to a certain extent on the parties that finance them, Vinnova to a large extent. So they pass through the eye of a needle, which*

is the group who grant projects, so the freedom at SAFER is partly controlled by the councils who grant projects."

The limitation is two-fold; it is both before starting the project, when designing the project goals, and during the project, when delivering reports on how the project is doing. One interviewee state: *"In these kinds of projects we are controlled of the application that was done a couple of years ago, when we stated what we wanted to do with the money. I have experienced that it is very difficult to get more money when doing additional applications."* The interviewees state that the need for funding can sometimes be quite stressful, and one person says that people have a lot of ideas, but that a usual comment is that *"now I just need to get funding for it"*.

The research applications have a rather long lead time, compared to industry, according to several interviewees. *"When you work at a company there is always money somewhere, if you know how to get them. It is not the same here [at SAFER]. You need to apply, which causes long lead times on everything. If you compare [SAFER] with a company, they [a company] can switch from one approach to another when they realize the potential. Here you have to apply for money and it [the application] is being sent here and there. So it can take years, just because you do not have any funding."* Because of this SAFER is not flexible enough and the creativity is dampened, according to some of the interviewees. One state that: *"I think that at this type of organization there should be more freedom and more flexibility. But at the same time everything is controlled by what money you have and what you have to deliver. And it is almost more controlled here than at a company."*

Many of the interviewees express a desire for a pot of funding, that SAFER could use for less specified projects. The pilot projects are appreciated, but not seen as enough to achieve the desired freedom. However, the interviewees also agree on that it would be difficult to achieve such a pot, and in deciding who should put funding in there. The majority of the interviewees say that more freedom would make them more creative. Some make suggestions on adding a funding dimension to the CCQ, in order to get a better view of SAFER's creative climate.

The issue of funding applications is mentioned as a cause of conflict at SAFER. It is not uncommon that two different subspaces of SAFER apply for the same money, without being able to cooperate in one project. The interviewees do not see this as a major problem, more like a natural competition among scientists. However, one person expressed that more communication regarding what funding different projects are aiming at would be beneficial.

One interviewee mentioned the difference between industry compared to society and academia. When applying for funding from an institute, the money granted normally has to be co-founded by industry. This makes representatives for society and academia think about which partners to involve in a project, and which to not. It is bad for a project to have too many members who are not from industry, funding wise, according to the same person.

The fact that SAFER has limited resources on its own reduces the possible risks, according to two of the interviewees. The only risk you can take is to not get any money, which is a rather small risk compared to developing a product that might not be successful in the market.

6 Analysis and discussion

In this chapter the empirical findings are analyzed together with theoretical perspectives. When studying all empirical findings, five topics were found to be the most important when discussing SAFER's creative climate and were hence chosen to be analysis topics.

6.1 SAFER's creative climate over time

SAFER was seen as a meeting place, providing contacts, possibilities and inspiration, both in 2009 and 2012. In 2009 a lack of dynamism, playfulness, and motivation was reported (Balta and Zwick, 2009). In 2012, the values on dynamism and playfulness have not increased according to the p-test, even though the mean values are slightly higher. This is somewhat reflected in the interviews, were some thought there were too few social events at SAFER. However, there is an inconsistency in whether SAFER should provide more events or not. All people did not have the time for more, according to the empirical data. This seems related to the differences in how often people are present at SAFER. If they have their permanent work station at SAFER, it seems reasonable to think that they would want more social activities. Therefore, we suggest that SAFER should reflect on whether there should be different "levels" of activities for different SAFER people. Maybe some more activities could be proposed for the people who sit there very often, with the purpose of team building the people who often meet in the facilities. As for motivation, the fact that many people report that the projects are bigger and more people are involved now compared with 2009 indicate that the motivation has increased, but we have not investigated that aspect.

The highly creative climate can partly depend on some factors inhibiting the prerequisites of SAFER. As a part of a researcher's job, a certain level of creativity is needed. The work tasks can be argued to contain a high degree of innovation and challenge, as the researcher is trying to solve a problem or come up with something new. The nature of this work also implies that the management of such work need a high level of creativity, as it can be argued that the outcome is more uncertain than in traditional companies. Also, to be able to hold an open innovation arena together might demand a very high level of flexibility from the management, as suggested by van der Meer (2007). Although sometimes challenging, this flexibility can be argued to be a factor that facilitate a creative climate.

SAFER was created in order to foster innovation and creativity, and thus have a much more outspoken focus on these factors, compared to many other organizations. This is in line with Amabile's (1996) argument that organizational motivation to innovate is an important factor

when trying to achieve an innovative organization. Amabile's third factor (1996) supports the result further, as the work teams at SAFER are composed of diverse individuals which can be said to facilitate creative climate. In line with Hunter et al. (2007), it can be argued that an open innovation arena might be extra suitable in turbulent and competitive environments. However, as stated by du Chatenier (2009) open innovation can sometimes obstruct creativity, when not handled the proper way. It can therefore be suggested that an open innovation arena is a well suited way to organize when aiming for highly creative and innovative outcomes, and to achieve a highly creative climate, but it is important to keep in mind that open innovation initiatives has other difficulties than regular organizations.

In 2009, the environment was considered to provide the means for people to be creative. However, there was much insecurity and debate regarding the goals of SAFER, who were SAFER people, and what SAFER was supposed to be, in line with Fredberg et al.'s tensions (2011). Today, that insecurity and uncertainty is still there, but it has decreased. This could be due to the fact that more people have been at SAFER for a longer time, which have made them establish a relationship with the arena. Still, people are not identifying themselves as SAFER people, but as representatives of their home organizations, causing confusion about motives and information sharing. There seems to be an uncertainty regarding the borders between their different work identities, and this implies that open innovation arenas have an inherent level of identity issues that can potentially obstruct the creative climate. To lie on the border between organizations could be discomforting for the individual and might raise uncertainties related to the job. Because of this, an open innovation arena needs to be able to handle these uncertainties and help individuals to feel more comfortable and secure in their shifting roles. People involved in an open innovation arena might experience a sense of borderlessness, and the arena should be aware of this notion and accept it as a natural part of the work. If the arena is not aware of this, there might be a risk that people cannot utilize their full potential due to confusion regarding their identity. One way of handling the uncertainties might be to be open about the issue, and clearly state that people at an open innovation arena have different work identities, something that is normal and desirable in order to achieve the cultural and creative meetings indented.

The fact that people are not at SAFER very often was considered a problem in 2009, and is still in 2012. This causes information delays, which sometimes hamper creativity, in line with Lichtenthaler and Lichtenthaler (2009). There is limited transparency between the different projects, decreasing the possibility to start unexpected collaborations or get ideas. This might

lower the amount of learning and creative potential within the arena, and diminish the creative possibilities. However, the purpose of having people from different fields and organizations is that they can contribute with different views and knowledge, and if they sit too much together the benefit from diversity might be lost. Thus, open innovation arenas could benefit from discussing how to achieve good communication but keep their diversity.

6.2 The relation between SAFER and partners

It seems like the SAFER partners that have been involved in SAFER for some time has learned to appreciate the inputs that the cross-functional climate can give, which have made them more prone to be open. Then again there still seem to remain some fear of being too open and who to share information with. This fear is in line with Dahlander and Gann's (2010) reasoning about costs of being open. A challenge when applying the creative climate model could be to interpret the results in an open innovation context, where some of the dimensions should not cross a certain limit, like being too open. However, if the partners should benefit from open innovation, openness is crucial and to hold back information from others could harm the creativity and innovative process, in line with Amabile (1998), which could lead to that the arena partners do not benefit from the arena to the full extent. Any open innovation initiative depends on sharing, but in this case people are getting affected by the knowledge sharing uncertainties to a large extent, which implies that actors within open innovation arenas need to take this issue very seriously in order to benefit from the arena. Creative ideas and cross-functional collaborations between different organizations need a high amount of trust in order to be successful, and even though SAFER scores rather high on the trust dimension, people need to feel secure, trustful, and trustworthy in their every day work, especially if they do not meet very often, in order for SAFER to become even more creative and innovative. It seems reasonable that an open innovation arena should have higher goals and standards in that aspect than other types of organizations.

The interviewees felt that SAFER has improved in the information sharing aspects over the years, but there is no reflection of this in the CCQ. That implies that studies of creativity within open innovation context could benefit from having a dimension corresponding to the degree of openness and trust between the partners, and not only between people. Some interviewees' reasoning about who to share information with and who to do a project with implies that there are still some problems within this issue at SAFER. If project partners are chosen not because their knowledge is best suited for the project aim, but with a political agenda, it could be implied that the outcome of the project will not be as good as it could be.

As Drazin et al. (1999) described, different stakeholder groups, in this case SAFER partners, might have different opinions on what is useful. This could make them inclined to be more or less open and willing to engage in different projects, which might cause some partners to think that they are very open whereas some other partner think that they do not reveal anything. The differences in perception from different actors in organizational issues is well-known, but it is important to remember that new types of organizations might suffer from old types of problems. Open innovation arenas should consider continious follow-ups on perceptions from different partners, for instance in terms of openness. Such reviews might themselves be a valuable source for creative suggestions, as they intend to give an alteration of the schema, which correponds with the definition of organizational creativity (Stacey, 1996).

The empirical findings emphasize the importance that people at SAFER bring ideas from their home organization to the arena and vice versa. This implies that a well constructed open innovation arena in itself is not sufficient but needs to be in constant contact with knowledge outside its borders. The arena's innovative performance depends to a high extent on such contact, and raises the question of who is involved in an arena, and who should benefit from it. The importance of idea sharing is supported by Fey and Birkinshaw (2005), implying that the SAFER partners could benefit from SAFER even if no products have come out of the cooperation, if they are open to the learning that can occur. However, it could be problematic to know how an open innovation arena should manage the contact with outside actors, both inside and outside the partner organizations. In line with Hunter et al. (2007), external pressure can appear to obstruct a creative climate. The issue of balancing demands is problematic, as a too open approach might seriously harm the trust within the arena to protect valuable data from competitors. In the case of SAFER, new partners are introduced continiously. This could be a way to try to have all the necessary competence within the arena partners, even though the reasoning has similarities to Chesbroughs principles of closed innovation (2004). The issue is then how to involve competence from the arena partners that is not within the arena right now. Basically, it can be seen as an issue of marketing within the partner organizations. If the aim is to get a knowledge and idea sharing flow between the arena and its external partner parts, people have to know about the existance of the arena. A desireable goal would be that people at the partner organizations want to be a part of the arena, not simply get a SAFER project assigned. However, this is not unproblematic as

SAFER is an actual competitor to some of its partner organizations, and there could be a limit in how much the partners are willing to engage because of that.

6.3 Limitations of an open innovation arena

What the people at SAFER can do and how free they feel etc. was said by many interviewees to depend on the home organization and not SAFER. So the home organization sets the limits, not SAFER, which is a challenge associated with the creative climate. People simply need to get their work done independent on where they are. This raises the issue of what an open innovation arena actually can do to affect the creative climate for those who work in it. By using Moultrie and Young's (2009) division, it might be that the dimensions connected to work atmosphere are more possible to affect than those who has to do with attitude to work. The dimensions of work atmosphere; conflicts, debates, playfulness, trust, and dynamism (Moultrie and Young, 2009) could thus be the goal of more improvement initiatives and attention than the other ones. The empirical data supports that this division might be relevant for SAFER, stating that the factors SAFER can affect less are idea time, risk taking, and freedom, which all are a part of attitude to work. This does not mean that SAFER cannot affect attitude to work at all, just maybe not as much as work atmosphere. For instance, the high score in the challenge dimension imply that SAFER can affect such matters by designing the projects in a challenging way.

There is a question of how much SAFER should affect the key people. As of now, SAFER has very little influence on a person's career. This means that SAFER projects might have lower priority than other projects, for the individual. To avoid that problem, it could be argued that SAFER should have more influence on the individuals, and more power to ensure that the projects are given enough priority. On the other hand, it might not be desirable that SAFER act as a second employer, as the key people already experience some conflicting demands from SAFER in relation to their home organization, and vice versa. Also, the fact that all these organizations work together is unique, and if the delicate structure is starting to crack, there is a risk that some of the partners feel threatened. Thus, there are uncertainties and challenges in how an open innovation arena could and should affect the people working in it, and how that can be handled.

For any actors trying to compete today, the use of human resources and competence as a strategic resource is important. It is thus interesting to discuss how SAFER could utilize that resource without owning it, and whether an open innovation arena can make demands on how

the different partners handle their human resources. The lending of competence from the home organizations to SAFER is a possibility to achieve highly creative outcomes, but as we have seen this is not without challenges. However, if the arena is confident in implementing their own vision and competitiveness, the human resources could be used in a more strategic way, supporting the arena's goals.

6.4 Organizing an open innovation arena

In 2009, SAFER's hierarchical structure was criticized and people requested a more clear managing structure. We have not seen any such requests in our study, even though people express some confusion regarding the managerial structure. SAFER could thus be seen as being organized in an organic way with a flat structure and a large network that stimulate and support creativity, in line with Cummings recommendation (1965). That organizational form is further supported by Hunter et al.'s (2007) notion of that horizontal organizations benefit more from creative climate than vertical organizations. It seems like an open innovation arena gives the possibility to have a flat way of organizing, which is positively associated with creativity.

Instead, we found that people do not use the organizational structure, in terms of reference groups and different areas, to a large extent. The idea generation and debates are performed between individuals or within projects, and people generally consider their home organization manager the person who decides whether or not they will pursue a certain track. Thus, it can be argued that the arena organization, a part from the projects, is not seen as a part of the individuals work situation. If the arena is aiming to have some sort of organizational structure, there need to be clear rationales behind that structure. As of now, when key people do not seem to use the programs and reference groups to a large extent, the organizational structure plays a limited part to the individual at SAFER. Thus, the possibility to for instance take ideas to the reference groups is lost, and the arena seems to be purely project oriented. Thus, a challenge associated with creative climate within an open innovation arena is to get participants to recognize the organizational structure.

The empirical findings question whether a strict project organization is the most suitable one for SAFER. Although there were various views on the subject, these might depend on the different individuals backgrounds, and SAFER seem to suffer from some disadvantages of this organization form. The research funding issues also correspond to the project orientation, which might make the difficulties larger than they would have been in another open

innovation arena, which is not financed by research funding to such a large extent. Something that many interviewees mentioned was how financial issues affected their ability to be creative and how they acted in projects. This might obstruct creativity as Hunter et al. (2007) wrote that organizational wealth and sufficient resources was associated with a creative climate. The stress of always having to search for funding might also affect the creative climate negatively as people have to lay valuable time on this, instead of for example coming up with and testing new ideas. Interviewees mentioned that who to include in the project did not only depend on who was best suited, but also on who could give enough funding and this is probably not good for creativity. The issues with the long lead times on funding of projects at SAFER prevent SAFER from being flexible and the slow processes could dampen people's creativity. Thus, a challenge within SAFER is to manage the limited resources in a way that allows people to feel creative, and not to controlled.

Some of the interviewees wanted to create a pot for funding of less specified projects. The question is who should finance the pot and who decides who gets funding from this pot. The partner organizations might not want to "waste" important human resources on something with an unsecure outcome. Then again one has to consider the fact that many interviewees say they would be more creative if they had more freedom, and a pot with funding for less specified projects might be valuable in order to achieve that. It seems that SAFER's own capital is not enough to meet the need for freedom.

Herzog's (2008) finding that open innovation units have a smaller tendency to experience the NIH syndrome is interesting to relate to an open innovation arena. The fact that open innovation initiatives need to have a lower degree of suspicion towards outside contribution is in line with Herzog's finding, but an interesting subject for discussion is how low that degree should be. If an open innovation arena is not suspicious at all towards external initiatives, there is a risk that it might accept contribution or ideas that are of very low value, or even harmful. On the other hand, learning to be open is very important, especially as the participants in an open innovation arena come from different backgrounds. Thus, it seems that open innovation initiatives have a challenge in balancing these two demands. It can therefore be argued that different open initiatives need to make a conscious decision regarding where between these two they want to place themselves.

6.5 One creative climate?

In general, people at SAFER are unwilling to make general comments about SAFER. The impression given is that the SAFER experience differs from individual to individual, depending on project type, invested time, agenda of the home organization, and project colleagues. People express a certain amount of insecurity around SAFER, what it is and who is involved. Although those discussions are fewer than in 2009, the issues are still present. Therefore, it can be questioned whether SAFER has one creative climate. If many of the questionnaire questions refer to "people" and the respondents can only answer based on project colleagues, this might simply indicate the creative climate within a project, rather than SAFER. It is then interesting to reflect on what constitutes an organization in this case. SAFER is organized in projects, and it could be argued that these projects together accumulate to some sort of overall creative climate. However, the projects vary in their connection to SAFER, and in some projects the participants do not identify themselves as SAFER people at all. The borders of an open innovation arena can thus be seen as rather vague. This implies that the creative climate of the home organizations could be rather important and somewhat included in creative climate aspects of the arena, making it difficult to find one specific creative climate. The empirical data supports this, stating that it is difficult to talk about SAFER as one organization. Thus, we conclude that SAFER cannot be said to have one specific creative climate, although the CCQ has given valuable information about the different creative climates at SAFER.

Digging deeper, organizational culture is seen as more deeply rooted than climate (Denison, 1996). If no specific creative climate can be distinguished at SAFER, could there possibly be one SAFER culture? According to our study, SAFER has no specific organizational culture at this point. Herzog's levels of the innovation culture (Herzog, 2008) does not seem to be very visible at SAFER, since for instance organization-wide values cannot be distinguished.

Furthermore, it can be questioned whether open innovation initiatives could and should not necessarily aim for one specific innovation culture, or creative climate. When cross-functional and cross-organizational meeting are intended, it can be argued that too much of a uniform culture might even be harmful. However, a more uniform structure can be beneficial in the areas of information and knowledge sharing. Therefore, it seems that an important challenge when working with open innovation is to balance the needs of communication and diversity.

We conclude that open innovation arenas can benefit from trying to establish some shared ways of working, but we do not recommend them aiming towards achieving one creative climate or organizational culture, since that would undermine the point and benefits of working with open innovation.

7 Reflections on the CCQ

Many of the respondents in the CCQ stated that it was difficult to answer some of the questions as they lacked knowledge about SAFER. They expressed that they could only answers for their project, and that they on many occasions would have wanted to answer “I don’t know” or some other neutral alternative. Some made comments that their answers should be overlooked because of that. They also stated that the object they addressed were different in different questions; in some cases they based their answer on an overall view of SAFER, and other cases they only based them on a specific project. This is again due to the lack of overall knowledge about SAFER. There was one person that contacted us who had started to fill out the questionnaire but stopped as he felt that he could not answer the questions truthfully, due to his limited knowledge. Quite many people expressed concern about this matter in the comment field of the questionnaire, but this was not reflected in the interviews. Some people, both interviewees and respondents, commented on that the questionnaire was designed more for a traditional organization, and that it was difficult to apply and compare such an instrument at SAFER. Some of the questions were too general, according to some respondents. The fact that the questions often were formulated as “people at SAFER” and similar made it difficult for some respondents, as they did not feel that they could express such notion due to their limited knowledge about SAFER.

There seems to be diversity in how people thought it was to answer the questionnaire. The ones who felt that it was easy tended to be people who are present at SAFER quite often and some had even thought about these issues before. The ones who felt that it was difficult were generally people who did not participate as frequently at SAFER and had problems identifying what SAFER is and what perspective to take when answering questions about SAFER. This seems to be the main issue for those who thought that the questionnaire did not suit SAFERs organization so well. They meant that al lot of things depended on what project you were in and who you worked with and that it could not be generalized.

The work performed at SAFER can be characterized with a high degree of creativity and innovation, and in line with Hunter et al's (2007) notion, there should be a strong relationship between the creative climate measure and innovative performance. However, the comments above question the validity of the CCQ in this context. This raises the question of assessment of looser organizations, can and should they be measured in the same way as traditional organizations? The comments above can be made to argue against that, but in the interviews, the results of the CCQ were seen as reasonable. This implies that the CCQ has a successful

application in an open innovation arena, but should be handled and interpreted with care and preferably combined with interviews.

Some comments were made about the design of the questionnaire. Some interviewees and respondents stated that they chose what they saw as the standard alternative – agree (or disagree) – in order to avoid drastic answers. One interviewee stated that: *"I think that the questionnaire in itself doesn't promote any other type of answer, it is difficult to find what you should say instead, and as there is no neutral option you chose one of the less extreme, and then it is more one [agree] than the other [disagree]."* Another one state that *"I would expect everyone putting agree"*. Some of the interviewees state that a bigger scale would have given more spread in the results, which would have been more accurate. They also see this as an underlying cause of the lack of difference between SAFER 2012 and 2009, for instance one interviewee state: "*It [the scale] was a bit too narrow in my opinion, if you had broadened it I think you could have gotten more shades. It is a little too narrow."*

This is supported by what Moultrie and Young found in their study in 2009, that the CCQ categories are too broad and that they do not describe the organization in enough detail. However, the comparison between SAFER and the technology company mentioned in chapter 5.1.2., implies that the instrument is sensitive enough to capture small differences in dynamic. Also, the CCQ results should be seen as a simplified model and not the exact current situation. The possible lack of precision in this aspect could be handled by the use of interviews as a complement when using the CCQ. In that fashion, the CCQ could be used to identify potential problem areas, as well as successful areas, and the meaning behind the results could be further interpreted. It is our opinion that even though a CCQ assessment might benefit from a broader scale, it would benefit more from a mixed method design. With such complements, it would not be necessary to improve the scale of the instrument.

8 Conclusions

SAFER has a highly creative climate. It has similarities to that of innovative organizations, according to Ekvall's reference data, but not the stagnated ones. SAFER also has a higher creative climate than the technology company that it was compared to, at least according to the 20 items used. SAFER has improved in the area of sharing information, and even though improvements are still possible SAFER seems to be able to keep the focus on research issues rather than political issues, a possibility associated with creative climate. Some people requested more debates at SAFER and clearer forums for debating ideas. The fact that people are spending various amounts of time at SAFER is seen as a communication problem, which was also the case in 2009. The organization of SAFER seems to be clearer now, but it is difficult to say whether it has improved or if people have gotten more used to it. SAFER is expanding, both in associated people and types of research areas. This is viewed as a positive development by the interviewees. The researchers get inspiration from the work performed at SAFER, both in their own projects and other projects.

It appears that the highly creative climate have been stable over time, according to the empirical data. The trust between the different partners appears to have increased over time according to the interviewees, but this was not captured in the CCQ. We therefore conclude that studies of creativity within open innovation contexts should include the degree of openness between the participating organizations.

The highly creative climate could partly be due to some of the prerequisites at SAFER, as work with research for instance imply a high degree of freedom and idea time. However, key people that are working with research in their home organizations still imply that SAFER provides a more creative climate. The cross-functional and –organizational meetings that are taking place at an open innovation arena, both formal and informal, are beneficial in order to stimulate creativity and innovation, and these types of meetings and cross-fertilizations are possibilities associated with creative climate in an open innovation context.

Apart from the seminars, this open innovation arena do not seem to take specific measures to ensure a high rate of innovation and creativity, but the design of the arena contain elements that could stimulate the creative climate. It can therefore be argued that an open innovation arena facilitates creative climate by being organized in a cross functional way. However, this way of organizing also has some disadvantages. The strong project orientation, with somewhat insufficient attention to knowledge sharing, lowers transparency and narrows the

learning possibilities between projects. SAFER is also much dependent on research funding, which slows down the creative processes. Forums for taking advantage of creative ideas are lacking, or are not clearly identified by the key people. Much of the creative work is done in closed rooms, by individuals talking to each other, and not in brainstorming sessions or similar. However, this might also be due the fact that the key people are not taking advantages of the existing possibilities, for instance the reference groups. Thus we conclude that open innovation facilitates a highly creative climate, but simply working with open innovation is not enough to gain a creative outcome.

The arena is dependent on the partner organizations in many ways. Even though an open innovation arena provides the means for creative and innovative outcomes, it cannot provide such outcomes by itself, a challenge associated with the creative climate. It is important that the partner organizations are devoted to the work, and that there is a flow of knowledge and ideas between the arena and the partners. This implies that the success of open innovation initiatives, even competitive actors such as open innovation arenas, is very much dependent on their surrounding organizations and actors. One challenge when managing or working within open innovation is thus to achieve successful communication with the external environment.

People at SAFER seem to have problems with how they should identify themselves and other, causing confusion about motives and information sharing, examples of challenges associated with creative climate within an open innovation arena. There seems to be a fragmented view of SAFER, and it is difficult to see how the different projects correspond to SAFER as a whole. This fragmentation is reflected in the reactions to the CCQ, and its application in the context. Some people had problems answering the CCQ, as they felt that they had a limited knowledge about SAFER, and some did not think that the CCQ was sensitive enough to capture dynamics in such a complex environment. However, the interviewees agreed with the result of the CCQ. Thus, we conclude that the CCQ can be applied in open innovation contexts, but should be handled with care and preferably combined with interviews. The CCQ can identify interesting areas, and the qualitative inquiry can give further knowledge of underlying themes behind the CCQ results.

This study has found that SAFER does not seem to have one specific creative climate. The CCQ have instead given valuable information regarding the different creative climates at SAFER. Furthermore, the issues with identity and project dependence imply that SAFER has

multiple organizational cultures. We argue that open innovation arenas should not strive towards achieving one single climate or culture, since the purpose of open innovation is to generate meetings between different people and cultures, and the plurality of cultures might actually be a key factor for an arena. However, there is a challenge in how to ensure a suitable level of communication when working with multiple cultures. Therefore, we recommend open innovation arenas to try to establish some shared ways of working, but not try to achieve a singular creative climate or organizational culture.

To summarize, the following conclusions have been drawn from the study:

- SAFER has a highly creative climate, which appears to have been stable over time.
- Studies of creative climate within open innovation contexts should include the degree of openness between the participating organizations.
- Cross-functional meetings between people with diverse backgrounds, idea and data sharing, application of a method in a new field, and building and nurturing extensive contact networks are all possibilities associated with creative climate in an open innovation arena.
- The following challenges are associated with creative climate in an open innovation arena: role confusion, complicated information sharing, non-transparent project orientation, and unclear relations with the external environment.
- Open innovation initiatives should not strive to achieve one singular creative climate or organizational culture, since that might undermine the purpose of open innovation.

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9 Limitations and future research

The CCQ had a rather low response rate. This could probably be due to the loose organization form that SAFER has. Nevertheless, the low response rate decreases the trustworthiness of the CCQ result. Thus, having a second data source was very valuable to further substantiate the findings. The interviews were partly designed to follow up the quantitative data, with questions regarding the CCQ results and reasoning about the conceptual model of creative climate.

The research design, a single case, has limitations in generalizability. However, a case study is a useful starting point in a field which is rather small, and as SAFER is unique it is difficult to make a more quantitative study.

This study has had an inside perspective from within the arena. It would be interesting for future research to investigate how outside actors look upon the arena, both parts of the partner organizations and other organizations. As open initiatives increase in popularity it is important not to lose sight on what the participating organizations actually gain from open innovation, in terms of learning and creativity, but also hard values.

As organizations become larger and the boundaries become more porous, it might become difficult to keep one organizational culture or climate together. Instead the fragmented, complex environments that we have seen in this study might be the reality for many companies of tomorrow. It would be interesting for future research to look upon how organizations can handle issues related to culture and climate, in order to promote and enhance the openness and diversity that is necessary for creativity and innovation.

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Appendix A

Mean values of the creative climate of innovative and stagnated organizations

Dimension	Innovative	Stagnated
Challenge	2,38	1,63
Conflicts	0,78	1,4
Debates	1,58	1,05
Dynamism	2,2	1,4
Freedom	2,1	1,53
Idea support	1,83	1,08
Idea time	1,48	0,97
Playfulness	2,3	1,4
Risk-taking	1,95	0,53
Trust	1,78	1,28

A high value on each dimension corresponds to a higly creative climate, except for the dimension conflicts which is inversley correlated.

Appendix B - CCQ 2009 results

Question 1	3	2	3	3	2	3	2	3
Question 2	2	1	3	3	2	2	3	2
Question 3	2	2	2	2	1		3	2
Question 4	2	2	1	2	1		3	3
Question 5	2	1	2	1	0	0	3	1
Question 6	3	3	3	2	2	3	3	2
Question 7	0	1	1	2	2	2	0	1
Question 8	3	2	2	1	1	3	2	2
Question 9	2	1	2	2	1	1	1	2
Question 10	1	1	2	1	2	2	2	2
Question 11	2	2	3	2	3	2	3	3
Question 12	1	1	3	2	2	2	3	2
Question 13	2	2	2	2	3	3	2	2
Question 14	2	1	2	1	2	2	3	2
Question 15	2	1	1	2	1	1	2	3
Question 16	1	2		2	0	1	2	1
Question 17	2	2		2	1	2	2	2
Question 18	1	1	2	1	1	1	0	1
Question 19	0	1	1	1	1	2	1	0
Question 20	2	1	1	1	1	2	0	2
Question 21	3	2	3	2	2	2	3	2
Question 22	2	1	3	2	2	1	2	2
Question 23	2	1	3	1	2	2	2	2
Question 24	2	1	3	2	2	1	2	2
Question 25	2	2	3	2	1	1	2	2
Question 26	2	2	3	2	1	1	3	2
Question 27	2	1	2	2	0	2	2	3
Question 28	3	2	3	2	2	2	3	3
Question 29	1	2	2	1	2	2	3	2
Question 30	1	1	0	1	3	1	1	1
Question 31	2	1	2	1	1	1	2	0
Question 32	3	2	3	2	2	2	2	2
Question 33	2	1	3	1	1	1	2	2
Question 34	3	2	3	1	0	2	2	3
Question 35	1	2	2	2	1	2	1	3
Question 36	3	1	3	2	0	3	2	2
Question 37	3	2	2	1	1	1	2	1
Question 38	3	2	2	2	1	2	2	3
Question 39	1	3	1	1	1	2	3	2
Question 40	0	2	0	2	0	2	3	0
Question 41	3	2	3	2	2	2	2	2
Question 42	2	1	3	1	1	0	2	0
Question 43	3	2	3	1	2	2	3	2
Question 44	2	1	3	1	2	2	2	2
Question 45	1	2	2	2	1	1	2	2
Question 46	3	2	3	1	1	2	3	2
Question 47	2	2	2	2	1	2	3	2
Question 48	1	1	2	1	1	1	2	1
Question 49	0	1	1	2	3	2	2	0
Question 50	2	1	2	1	2	1	2	2

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3	2	2	1	2	1	2
3	2	2	1	2	1	2
3		2	2	2	2	2
3		2	1	2	2	2
2	2	2	2	2	2	2
2	1	1	1	1	2	2
2	2	3	2	2	2	2
1	2	2	1	1	2	2
2	2	2	2	2	2	2
2	2	3	3	2	2	2
2	3	1	1	1	1	1
1	1	2	1	1	1	2
3	2	3	3	2	2	2
3	2	2	2	2	2	2
2	2	3	2	2	2	2
1	1	2	2	1	2	
2	2	3	1	2	2	2
1	2	2	2	1	2	
3	2	2	2	2	2	2
3	3	3	3	2	2	
1	1	0	1	1	2	1
2	2	2	2	2	2	2
2	1	1	1	1	1	
3	2	2	2	2	2	2
2	2	2	2	1	2	2
2	2	2	2	2	2	2
2	2	2	2	2	2	2
2	2	2	2	2	2	2
2	1	2	1	2	2	2
1	2	0	0	1	1	
1	1	2	1	2	2	2

Appendix C - CCQ 2012 results

What kind of employer do you have?	Academia (eg Chalmers)	Academia (eg Chalmers)	Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)	Academia (eg Chalmers)	Academia (eg Chalmers)
How often are you present at the SAFER office?	A couple of times a year	Almost daily	Almost daily	Almost daily	A couple of times a month	Almost daily	Almost daily
Question 1	3	2	3	2	2	2	2
Question 2	2	2	1	2	2	2	2
Question 3	2	2	2	2	2	2	2
Question 4	3	3	2	2	1	3	2
Question 5	2	1	3	1	2	1	1
Question 6	3	2	2	2	2	2	1
Question 7	1	0	0	2	2	0	0
Question 8	3	1	3	2	3	3	2
Question 9	3	1	2	2	2	2	2
Question 10	2	2	2	2	2	1	1
Question 11	2	2	2	2	2	2	3
Question 12	2	1	2	1	2	2	2
Question 13	2	3	1	2	2	3	3
Question 14	3	2	2	2	2	2	2
Question 15	2	2	2	2	1	1	2
Question 16	3	2	2	2	2	3	2
Question 17	2	3	2	2	2	2	2
Question 18	2	1	2	2	2	2	0
Question 19	1	0	1	1	1	0	0
Question 20	2	2	2	1	2	1	2
Question 21	2	3	2	2	2	3	3
Question 22	2	2	2	2	2	2	3
Question 23	3	2	2	2	2	2	2
Question 24	3	1	2	2	2	2	2
Question 25	3	2	3	1	2	2	2
Question 26	3	2	3	2	2	2	2
Question 27	3	2	2	2	2	2	2
Question 28	3	2	2	2	2	2	2
Question 29	3	2	2	2	3	2	3
Question 30	0	0	1	2	2	0	1
Question 31	2	1	2	1	2	1	1
Question 32	2	3	2	2	2	3	3
Question 33	3	2	2	2	2	2	2
Question 34	3	2	2	2	2	2	3
Question 35	2	2	2	2	2	0	1
Question 36	3	1	2	2	2	2	1
Question 37	3	2	2	2	2	2	2
Question 38	2	3	2	2	2	2	2
Question 39	2	2	2	2	2	2	2
Question 40	1	0	0	1	1	0	1
Question 41	2	2	2	2	2	2	3
Question 42	2	1	2	1	1	1	2
Question 43	2	2	3	2	2	2	3
Question 44	3	2	3	2	2	2	2
Question 45	3	1	2	2	2	1	2
Question 46	3	2	2	2	3	3	3
Question 47	2	3	2	2	3	2	2
Question 48	3	2	2	2	3	2	2
Question 49	1	0	2	1	1	2	1
Question 50	2	1	1	2	2	1	1

Academia (eg Chalmers)	Academia (eg Chalmers)	Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)	Academia (eg Chalmers)	Industry (eg Scania)	Industry (eg Scania)	Industry (eg Scania)
No longer employed by SAFER	Almost daily	At least once a week	Almost daily	At least once a week	At least once a week	At least once a week	Almost daily	A couple of times a month
2	3	3	3	2	2	2	2	3
2	2	3	2	2	1	2	2	2
2	2	3	2	2	2	2	2	2
2	3	2	2	2	1	2	1	2
2	2	2	2	2	3	2	2	1
1	3	3	3	1	1	3	2	3
1	1	1	1	1	3	1	2	1
2	2	3	2	2	2	2	3	2
	1	3	2	2	2	2	2	2
2	2	2	3	2	2	2	1	1
2	2	3	2	2	3	3	2	2
2	2	2	3	2	2	2	2	2
2	2	2	3	2	3	2	2	2
2	2	2	3	2	2	2	2	2
2	2	2	2	2	0	2	2	2
	1	2	2	2	1	2	2	2
2	2	2	3	2	2	2	2	2
2	2	3	2	2	2	2	1	2
2	1	1	1	1	1	1	1	1
2	1	2	2	1	2	1	2	2
2	2	2	2	2	3	3	2	3
2	2	2	2	2	3	2	2	2
1	2	2	2	1	2	2	2	2
2	3	2	3	2	2	2	2	1
2	2	2	3	2	2	2	2	2
1	3	2	3	2	1	2	2	2
2	1	3	2	2	2	2	2	2
2	3	3	3	2	2	2	3	2
2	3	2	3	2	2	2	2	2
1	1	1	2	1	2	1	2	1
2	2	2	2	1	3	2	3	2
2	3	3	3	2	3	2	2	2
2	3	2	3	2	3	2	2	2
2	2	3	3	2	2	3	3	3
2	3	2	1	2	2	2	2	1
2	2	2	2	1	2	2	2	2
2	2	2	2	2	2	2	2	2
2	2	2	3	2	1	2	3	2
2	3	2	3	2	2	2	3	2
1	1	1	1	1	1	2	1	2
2	2	3	3	2	2	2	2	2
2	2	2	2	1	3	2	2	1
2	3	3	2	1	3	3	3	2
2	2	2	3	2	2	2	3	2
2	3	2	2	2	1	2	3	2
2	2	3	2	1	2	2	3	2
2	2	2	3	2	0	2	2	2
2	3	2	2	1	1	1	2	2
1	1	1	1	1	1	2	2	2
2	2	2	2	2	1	2	2	2

Academia (eg Chalmers)	Industry (eg Scania)	Academia (eg Chalmers)	Academia (eg Chalmers)	Academia (eg Chalmers)	Industry (eg Scania)	Industry (eg Scania)	Academia (eg Chalmers)
A couple of times a month	A couple of times a month	Almost daily	A few days a week during our master thesis project (jan-may)	Almost daily	At least once a week	Almost daily	At least once a week
2	2	3	2	3	2	2	2
3	2	2	2	2	2	2	2
2	1	3	2	2	2	2	2
2	1	3	2	2	2	2	3
3	2	3	3	3	1	2	3
3	3	2	2	2	2	2	2
1	2	1	0	1	1	1	1
3	2	3	2	2	2	2	2
3	1	2	2	2	2	1	3
2	2	2	2	2	1	2	2
3	2	2	2	2	2	2	3
3	1	3	2	2	1	2	3
2	2	2	2	2	1	2	2
3	2	2	2	2	2	2	3
2	2	2	2	2	1	2	3
2	1	3	2	2	2	2	3
2	1	2	2	2	2	2	2
2	1	2	2	1	3	2	1
1	1	0	0	1	1	1	0
1	1	2	1	2	1	2	1
2	3	2	2	2	2	2	3
2	2	2	2	2	3	2	2
2	1	2	2	1	2	2	3
2	1	2	2	2	1	2	2
2	2	2	2	1	2	2	3
2	1	2	3	2	2	2	2
2	1	2	2	2	2	2	3
2	1	3	2	3	2	2	3
3	1	3	2	1	3	2	3
1	2	0	1	0	2	1	0
2	1	3	2	2	1	2	3
2	2	2	2	2	2	2	3
2	1	2	2	2	2	2	3
2	1	2	2	3	2	2	2
2	1	2	2	2	1	2	2
3	2	3	2	2	2	2	2
3	1	2	2	2	2	2	3
1	2	2	2	1	3	2	2
2	1	2	2	1	2	2	2
1	1	0	1	1	1	2	3
2	3	2	2	2	2	2	3
2	1	2	2	2	1	2	2
3	2	2	2	3	2	2	2
3	1	3	2	2	2	2	2
2	2	2	2	2	2	2	2
3	2	3	2	3	2	2	3
2	2	2	2	2	2	2	3
3	1	2	2	2	2	1	2
2	2	0	1	2	2	2	2
2	1	2	2	2	1	2	2

Academia (eg Chalmers)	Academia (eg Chalmers)	Industry (eg Scania)	Academia (eg Chalmers)	Industry (eg Scania)	Academia (eg Chalmers)	Industry (eg Scania)	Institute (eg VTI)	Academia (eg Chalmers)
A couple of times a month	A couple of times a month	A couple of times a month	A couple of times a month	A couple of times a month	Almost daily	At least once a week	At least once a week	Almost daily
2	2	3	2	3	2	3	2	3
3	2	2	2	2	2	3	3	1
2	3	2	2	2	2	2	2	2
2	2	2	1	2	2	2	2	2
3	1	2	2	1	2	2	2	1
3	2	2	2	2	3	1	2	3
0	0	1	1	1	1	0	1	1
2	1	2	2	2	2	2	1	3
2	2	2	2	2	2	1	2	2
2	1	2	2	1	2	2	2	2
2	2	3	2	2	2	3	2	2
3	2	2	2	2	2	2	2	2
2	3	2	2	3	2	2	2	1
2	3	2	2	2	2	2	1	2
2	3	2	1	2	2	2	1	2
2	3	2	2	3	2	2	2	2
2	3	2	2	3	2	2	2	2
0	3	2	1	0	2	2	2	3
1	0	1	1	1	1	0	1	2
1	1		1	1	1	1	2	1
2	2	2	2	2	2	3	2	3
2	2		2	2	2	2	2	0
2	2	2	2	2	2	2	2	1
2	3	2	2	2	2	2	2	2
2	3	2	2		2	2	1	1
2	3	2		3	2	2	1	2
2	2	2	2	3	2	3	2	2
3	3	2	2	2	2	3	2	2
2	2	2	2	2	1	3	2	3
0	0	1	1	2	1	0	1	3
2	1	2	2	1	1	2	2	0
2	3	2	2	2	2	3	2	3
2	2	2	2	2	2	2	1	2
2	3	2	3	3	2	2	2	2
2	3	2	2	2		1	1	1
2	3	2	2	2		2	2	2
2	1	2	2	2	1	2	2	2
2	2		2	3	2	2	2	1
2	1			2	2	3	2	3
2	0		2	1	1	0	0	2
2	2	2	2	2		2	2	3
2	1		2	1	2	2	1	0
3	2	2	2	2	2	3	2	2
3	3	2	2	2	2	2	2	1
2	3	2	2	2	2	2	2	2
2	3	2	2	2		2	2	2
2	2	2	2	2	2	2	2	2
1	2	2		1		2	1	2
2	3		2	2	1	0	1	2
2	2	2	2	1		2	1	2

Institute (eg VTI)	Institute (eg VTI)	Academia (eg Chalmers)	Academia (eg Chalmers)	Academia (eg Chalmers)	Academia (eg Chalmers)	Society (eg Trafikverket)	Academia (eg Chalmers)	Academia (eg Chalmers)
Almost daily	A couple of times a month	Almost daily	A couple of times a year	At least once a week	A couple of times a month	Almost daily	Almost daily	A couple of times a year
3	2	3	3	2	3	2	2	1
3	2	2	2	2	3	0	2	2
3	2	2	2	3	2	3	2	2
2	3	2	3	2	2	2	2	1
2	2	1	1	1	2	3	2	2
2	2	3	3	1	2	2	2	0
0	0	1	0	0	0	1	2	1
3	3	3	2	3	2	2	2	0
2	2	1	2	3	2	1	2	1
3	2	2	2	2	2	3	2	1
3	2	3	3	3	2	3	3	2
3	2	2	3	2	2	3	2	2
3	2	2	2	2	2	1	2	1
3	2	2	2	2	2	3	2	1
2	2	2	3	2	2	3	2	1
2	2	2	3	1	2	2	2	1
3	2	2	3	2	2	3	2	1
3	2	2	2	2	2	3	1	1
0	0	1	0	0	0	0	1	1
1	2	2	2	1	2	2	1	3
3	3	3	3	3	2	3	2	2
3	2	2	2	3	2	3	2	2
2	2	2	2	3	2	3	2	1
3	2	2	3	2	2	3	2	1
2	2	2	2	2	2	2	2	2
2	2	2	2	3	2	3	2	1
3	2	2		3	2	2	2	0
3	2	2	2	2	2	3	2	1
2	2	2	3	2	2	3	2	0
1	1	1	1	0	1	1	2	2
2	2	2	2	1	2	2	2	2
3	3	3	3	3	2	3	2	2
3	3	2	2	3	2	3	2	2
3	3	3	3	3	3	3	2	2
2	2	2	2	2	2	3	2	2
3	3	3	2	2	2	3	2	2
2	2	2	2	3	2	2	2	2
2	2	2	1	1	2	3	2	1
2	2	2	2	2	2	3	2	3
1	0	1	0	0	1	0	1	2
3	3	3	3	3	2	3	2	2
2	3	2	2	2	1	1	2	2
3	3	2	3	3	2	3	2	2
3	2	2	2	3	2	3	2	2
2	2	2	2	3	2	3	2	0
3	2	2	2	3	2	3	3	2
2	3	2	2	2	2	3	2	2
2	2	2	2	1	2	2	2	2
0	1	1	3	0	2	0	2	1
3	2	2	2	2	1	2	2	2

Industry (eg Scania)	Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)	Institute (eg VTI)	Industry (eg Scania)	Institute (eg VTI)	Institute (eg VTI)	Academia (eg Chalmers)
A couple of times a month	A couple of times a month	Almost daily	A couple of times a month	At least once a week	At least once a week	A couple of times a year	A couple of times a month	Almost daily
3	3	3	2	2	2	1	3	3
2	3	2	2	2	1	1	3	0
2	3	2	2	2	0	0	2	2
3	2	3	2	3	2	0	2	2
2	2	3	2	2	2	2	2	3
2	2	3	2	2	2	2	2	3
0	1	2	1	0	2	3	1	1
1	2	2	2	2	2	1	2	2
2	2	2	2	2	2	1	1	3
2	1	2	2	2	1	0	2	2
2	2	3	2	3	2	2	3	3
2	2	3	2	2	2	2	2	2
2	2	2	2	1	2	3	2	2
2	2	2	2	2	2	2	1	3
3	2	2	2	2	2	0	2	3
2	2	2	2	2	2	2	1	3
3	1	2	2	2	1	2	2	2
1	2	2	1	1	1	1	2	3
0	1	1	0	1	1	1	1	0
2	1	1	2	2	2	1	1	1
2	2	2	2	2	2	3	3	2
2	2	2	2	2	2	1	1	0
2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2
2	1	2	2	2	1	2	2	1
3	2	2	2	2	2		2	2
2	2		2	2	1	0	1	2
3	2	3	2	2	2	2	2	2
3	1		2	2	2	2	2	2
0	1	1	1	1	1	3	1	0
2	1	2	2	2	2	2	2	1
2	2	3	2	2	2	3	3	2
2	2	2	2	2	2	1	3	1
3	2	1	2	2	2	2	2	3
2	2	2	2	2	2	1	2	1
2	1	2	2	2	2	3	2	3
2	1	2	2	2	2	2	2	2
2	1	1	2	2	2	2	2	1
2	2	2	2	2	2	2	2	1
0	2	1	1	1	1	2	1	2
2	1	2	2	2	2	2	3	1
2	1	2	2	2	2	2	2	1
2	2	2	2	2	2	2	2	3
3	2	1	2	2	2	2	2	3
3	2	2	2	2	2		2	3
2	1	2	2	2	2	2	2	2
2	2	2	2	2	2		2	2
0	2	2	2	2	2	1	2	1
2	2	1	1	1	1	2	2	3
2	2	2	2	1	1	2	2	2

Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)	Industry (eg Scania)
Almost daily	A couple of times a month	At least once a week	A couple of times a month
2	3	2	2
2	3	2	1
2	3	2	2
2	2	2	2
2	3	2	2
2	3	3	3
2	1	1	1
3	3	2	2
2	2	2	1
1	2	2	2
2	2	3	2
2	3		2
2	3	2	2
2	3	2	2
2	2	2	2
2	3	2	1
2	3	2	1
2	2	2	1
1	0	0	1
2	2	2	2
2	2	2	2
2	3	2	2
2	2	2	2
2	2	2	2
1	2	2	2
2	3	2	2
2	3	2	2
2	3	2	2
2	3	2	2
2	1	0	1
1	2	2	2
2	2	3	2
2	2	2	2
2	2	2	2
1	2	2	2
2	3	1	2
2	3	2	2
2	2	1	1
2	3	2	2
2	0	1	1
2	3	2	2
1	2	2	2
2	3	2	2
2	3	2	2
2	3	2	2
2	3	2	2
2	2	2	2
2	3	1	1
2	1	1	1
1	2	1	2

Appendix D - Interview guide

We would like to start by telling you a little about our project, so you know why we want to interview you. We are doing our master thesis at Chalmers, as a part of the MOI project. Are you familiar with that project? If no, it is a collaborative research project between SAFER and Chalmers, that started in 2008. It is about open innovation, which is the kind of innovation done here, and how it can be managed. What kind of advantages and disadvantages there are with open innovation, what is important when conducting open innovation collaboration and so on.

What we do is measuring something that is called creative climate. It is about behaviors, attitudes, feelings and such within the organization. A lot of studies regarding creative climate has been done, but mostly on "regular firms", and we are interested in finding out whether it is possible to measure creative climate in the same way at SAFER, which is a little special, as you know. So, we are basically investigating the creative aspects of this kind of open innovation collaboration.

Background

- Can you tell us a little about your background and how you ended up here at SAFER?
- How long have you been active in SAFER?
- How often are you present at SAFER?
- Describe your work at SAFER!

Creative climate

- Would you describe SAFER as a creative environment?
    - Why/why not?
- What does creativity mean to you?
    - Is creativity important to you, in your work tasks or work environment?
        - Do you want it to be creative?
        - Why/why not?
- During the time you have been at SAFER; do you feel that the creative climate has changed in any way? In that case, how?
- How do you think other people feel and think about the creative climate?
- If you compare SAFER and your home organization, do you think the creative climate is different? If so, how?
    - How are your expectations on creativity at SAFER, compared to the expectations on your home organization?

Dimensions of creativity

- Organizational creativity can be divided into ten dimensions, which together constitute a creative climate. The dimensions are Challenge, Freedom, Idea support, Trust, Dynamism, Playfulness, Debates, Conflicts, Risk taking, and idea time. [*Here the interviewees were given an explanation of the dimensions; some got it on paper and*

some in wording. The early interviewees were given the dimensions on paper, but after a few interviews we discovered that the interview ran smoother if we instead explained the meaning of the dimensions. The names of the dimensions were also written on a white board.]. The scores should be as high as possible in the dimensions, except in conflicts, which should be as low as possible.

- Do you feel that you are being challenged in your work at SAFER?
- How do you think other people here feel?

The survey

- How did it feel to fill out the survey?
  - How do you think the survey fits in this environment, keeping the ten dimensions in mind?
    - Why/why not?
    - Is there something extra important?
    - Do you think something is missing in order to get a complete picture of the creative climate at SAFER?
  - How do you think this survey would work in your home organization?

Results of the survey

- Here is a picture of the results from the survey. The maximum value is 3, and the minimum is zero. That corresponds to the answers agree completely and disagree completely. As you can see, SAFER scores rather high, especially in challenge and idea support.
  - Does this reflect how you feel about SAFER?
    - Why/why not?
  - We have reference data of two types of organizations, innovative and stagnated. This data has been collected during studies of organizations that have been characterized as innovative or stagnated, and then their creative climates have been tested. If you compare it with SAFER, it looks like this: [*Show picture*]
    - Why do you think it looks like this?
    - We can see that SAFER scores high in idea support, trust, debates, and idea time. Why do you think that is?
    - SAFER scores a little low in dynamism, playfulness and risk taking, and a little high in conflicts. Why do you think that is?
  - This image of SAFER that the survey shows, do you think it is correct?
  - Here is a picture of the results from this year, compared to the results from 2009. As you can see, they are almost identical, even though a lot has happened during the time. Why do you think that is?
  - Do you have any ideas or suggestions for how to improve the creative climate at SAFER?

Appendix E - Wilcoxon test on 2012 and 2009

Dimension	P-value
Challenge	0,0511
Conflicts	0,4579
Debates	0,0129*
Dynamism	0,0148*
Freedom	0,9265
Idea support	0,3009
Idea time	0,0218*
Playfulness	0,1035
Risk taking	0,0346*
Trust	0,4974

Appendix F

The respondents' types of home organizations

Academia (eg Chalmers)	Academia (eg Chalmers)	Industry (eg Scania)
Academia (eg Chalmers)	Academia (eg Chalmers)	Industry (eg Scania)
Academia (eg Chalmers)	Academia (eg Chalmers)	Industry (eg Scania)
Academia (eg Chalmers)	Academia (eg Chalmers)	Industry (eg Scania)
Academia (eg Chalmers)	Academia (eg Chalmers)	Industry (eg Scania)
Academia (eg Chalmers)	Academia (eg Chalmers)	Industry (eg Scania)
Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)
Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)
Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)
Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)
Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)
Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)
Academia (eg Chalmers)	Academia (eg Chalmers)	Institute (eg VTI)
Academia (eg Chalmers)	Industry (eg Scania)	Institute (eg VTI)
Academia (eg Chalmers)	Industry (eg Scania)	Institute (eg VTI)
Academia (eg Chalmers)	Industry (eg Scania)	Institute (eg VTI)
Academia (eg Chalmers)	Industry (eg Scania)	Society (eg Trafikverket)
Academia (eg Chalmers)	Industry (eg Scania)	
Academia (eg Chalmers)	Industry (eg Scania)	

Appendix G

How often the respondents are present at SAFER

A couple of times a month	A couple of times a year	Almost daily
A couple of times a month	A couple of times a year	Almost daily
A couple of times a month	A few days a week during our master thesis project (jan-may)	Almost daily
A couple of times a month	Almost daily	Almost daily
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	At least once a week
A couple of times a month	Almost daily	No longer employed by SAFER
A couple of times a year	Almost daily	
A couple of times a year	Almost daily	

Appendix H

The responses from the technology company.

The question number is the same number that question has in the original CCQ.

Question 1	3	2	2	3	2	2	2	2
Question 2	2	1	2	2	2	2	1	1
Question 3	2	1	3	3	2	2	2	2
Question 7	1	1	1	1	0	1	2	0
Question 8	2	2	2	2	3	2	2	2
Question 9	1	1	2	1	2	1	2	1
Question 12	1	1	2	3	2	1	3	2
Question 15	2	1	1	3	1	1	3	3
Question 16	2	1	2	2	2	2	2	2
Question 20	1	1	1	1	1	1	1	1
Question 23	2	1	1	2	2	2	2	
Question 24	1	2	2	1	2	2	3	2
Question 29	2	2	2	2	3	2	2	2
Question 30	1	2	1	1	0	2	0	1
Question 31	0	1	1	0	1	1	2	1
Question 33	2	1	2	2	2	2	2	2
Question 37	2	2	2	2	1	2	2	2
Question 38	2	2	3	2	3	1	3	2
Question 41	2	2	3	3	2	2	2	2
Question 45	3	2	2	3	2	2	3	2

2	3	2	2	2	3	2	2	3
2	2	1	2	1	2	2	2	2
2	1	1	2	1	2	2	2	3
	2	1	1	1	0	1	1	1
3	2	2	2	1	2	2	2	2
2	1	1	2	1	1	1	1	2
3	2	1	2	2	2	3	2	2
	2	2	2	2	3	1	2	2
2	2	1	2	1	2	2	2	2
2	1	1	2	1	2	3	2	2
	1	2	2	1	2	2	1	1
1	2	1	2	1	2	2	2	2
3	3	2	2	1	2	1	2	2
1	2	1	1	2	0	2	1	1
1	0	0	1	1	0	0	1	1
3	3	1	2	1	2	3	1	2
2	2	2	2	1	2	1	2	2
2	1	2	1	2	2	1	1	2
2	1	2	2	2	2	3	2	2
2	2	2	2	2	2	1	2	2

3	3	3	2	2	2	2	2	2
2	2	2	2	1	1	2	2	2
2	1	2	2	2	2	2	2	2
2	2	1	1	1	1	2	0	1
2	2	2	3	1	1	1	2	2
2	2	2	2	2	2	1	1	2
1	1	2	3	2	2	2	2	2
2	3	2	3	3	2	1	3	2
2	2	2	2	2	2	1	2	2
2	3	2	3	1	0	1	2	2
2	2	2	2	2	1	2	2	2
2	1	3	2	2	2	1	2	2
1	2	2	3	1	1	2	2	2
2	2	1	1	1	1	1	0	1
1	1	2	0	0	0	1	1	1
2	1	3	2	2	2	2	2	2
2	1	2	2	1	1	1	2	2
2	3	2	1	2	2	2	2	2
2	2	2	3	2	2	2	2	2
2	1	2	2	3	2	1	2	2

3	3	2	3	2	3	2	2	1
2	2	2	2	1	2	2	2	1
2	2	1	2	1	2	2	2	1
2	1	1	1	2	0	1	2	2
2	2	1	1	1	1	3	1	1
1	2	1	1	1	1	1	1	1
2	2	2	0	2	2	1	2	1
2	2	2	2	2	3	3	1	2
1	2	1	2	2	2	0	2	2
2	1	0	2	1	1	2	1	1
2	2	1	2	2	2	2	1	1
2	2	1	2	2	2	2	2	1
1	2	2	2	2	1	2	2	1
2	1	2	3	2	0	0	1	2
1	1	0	1	1	1	0	1	0
2	3	2	2	2	2	2	2	2
2	2	2	2	2	2	1		2
1	2	1	0	2	2	0	2	2
2	3	2	3	2	3	2	2	2
2	2	3	2	2	3	1	2	2

3	2	2	2	2	3	2	3	3
2	2	2	2	1	2	1	2	2
3	2	1	2	1	2	2	2	3
0	1	1	1	1	1	1	1	1
1	2	1	2	2	1	2	2	3
1	2	2	2	0	1	1	1	1
2	1	1	3	2	1	2	2	1
2	1	2	2	1	3	2	2	2
3	2	2	2		2	2	2	1
1	2	1	1	0	1	2	1	1
1	1	2	1	0	2	2	2	2
3	2	2	2	1	2	2	2	3
2	1	1	2	2	2	2	3	3
0	1	1	1	1	1	1	1	1
1	0	1	2	0	1	2	1	0
2	2	1	2	2	2	2	2	3
3	2	1	2	1	2	2	2	2
3	2	2	1	2	2	1	1	1
3	2	2	2	2	2	2	2	3
3	2	2	3	1	2	2	2	2

3	2	2	2
1	2	1	3
2	2	1	2
0	1	2	1
2	2	3	2
1	2	2	2
1	2	2	2
2	2	1	2
2	2	2	2
1	2	2	1
1	2	1	2
2	2	2	2
2	1	2	2
1	1	2	1
1	1	2	2
2	2	2	3
1	2	3	2
2	2	2	2
3	2	1	1
2	2	2	2