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# **INTER-ORGANISATIONAL COLLABORATION – IN THEORY AND PRACTICE:**

**A case-study in the telecom industry**

Master's thesis in the master programs *Management and Economics of Innovation and Supply Chain Management*

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MASTER'S THESIS E2017:004

# INTER-ORGANISATIONAL COLLABORATION - IN THEORY AND PRACTICE: A case-study in the telecom industry

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# Abstract

Open innovation is frequently used and a topical concept among firms that today are facing turbulence and changes. Although, the concept needs to be tightened, especially regarding how it can be performed in collaboration settings between firms. This is why the researchers of this master's thesis have studied how the theoretical fields of *open innovation*, *inter-organisational collaboration* and *collaborative innovation* can be related. As the telecom industry has a high technological development pace and the industry is facing a changing era nowadays, it makes the industry suitable for the study. The aim of the study is to increase the understanding of how inter-organisational collaboration and innovation is managed and organised in practice at the telecom company Ericsson Gothenburg, in Sweden.

Based on a literature review, a theoretical framework was created and was further developed by combining the three main theoretical fields. This resulted in six aspects that are affecting the collaboration performance, especially in innovation contexts; *partner selection*, *knowledge and knowledge exchange*, *openness*, *legal mechanisms*, *compatibility* and *uncertainty*. Further, twelve semi-structured interviews with representatives from the Ericsson Gothenburg were conducted regarding two innovation projects and a general view of inter-organisational collaboration and innovation at the site. The literature combination, in form of the aspects, and the empirical findings were combined and analysed in order to fulfil the aim.

The concluding remarks show that that collaborations in the context of open innovation are complex due to such collaborations being very dependent on their circumstances making it hard to generalise. Yet, what has been found as important when collaborating across boundaries in the studies projects are to have a distinct communication in order to reach an open culture that favours innovation and knowledge exchange. It is essential to communicate objectives, ambitions, expectations of performance and result in order to avoid disappointments and conflicts. Trust is essential in order to communicate and reach an openness between companies. Furthermore, leadership was found to be a common denominator in all aspects, as it can guide members through uncertain times but it also has an impact on the collaborative characteristics. In sum, these findings are considered as important when working with inter-organisational collaborations and innovation in projects in line with the studied ones.

Keywords: Inter-organisational collaboration, external collaboration, collaboration, and open innovation.

# Acknowledgement

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The thesis would not have been possible to realise without any help from several people who have guided us along the way, we are very thankful and would like to express our gratitude to you. First of all, we would like to thank our supervisor at Ericsson Gothenburg B-O Hertz who have guided us throughout the study and helped us find appropriate interviewees to include in the study. We would also like to thank Annika Aldius who have been very helpful in organising and booking interviews, which has really facilitated our work. We are also very thankful to all interviewees who have participated and shared their thoughts and contributed to the study by giving us a good insight in the company as well as the industry.

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## List of abbreviations

CI	Collaborative innovation
KF	Knowledge flow
ICT	Information and communication technology
IOC	Inter-organisational collaboration
IP	Intellectual property
IPR	Intellectual property rights
LTE	Long term evolution
MVP	Minimum viable product
NDA	Non-disclosure agreements
NIH	Not invented here
OI	Open innovation
R&D	Research and development
SaO	Steering and operational
WP	Workpackage



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# 1. Introduction

*This chapter is an introduction to the study, starting with a background of the research, followed by problem description and aim. Thereafter, research questions are presented to clarify the aim and delimitations specifies the areas examined. Finally, an outline of the study is included that describes the structure of the report.*

## 1.1 Background

The ability to innovate is important for companies in order to differentiate themselves and to gain competitive advantages (Grant, 1996). Closed innovation is the traditional way of working with development, and a strategy focusing on internal knowledge and R&D processes (Chesbrough, 2003). However, Chesbrough (2003) states that this strategy tends to be replaced by a new paradigm, called *open innovation*. Open innovation is a managerial strategy that has gained more attention lately, both in literature and by performance (Alexy and Dahlander, 2014). The idea is, according to Chesbrough (2006), that companies should include both internal and external knowledge when innovating, implying that it occurs in contexts with more than one actor i.e. companies. The main advantages with the new paradigm are, according to Chesbrough (2003), that it creates revenue opportunities and potentially new business platforms. Therefore, the concept of open innovation has become central among leading companies that want to advance their businesses and be competitive.

As open innovation constitutes exchanges across company borders to favour innovation (Eriksson Lundström *et al.*, 2013), it is possible to relate this field to inter-organisational collaboration. Tidd (2014) express that the field of open innovation is wide and need to be tightened as it consists of authors with various perspectives. This makes it interesting to study inter-organisational collaboration in an innovation context, since such collaborations can be seen as central in the concept open innovation. This is because inter-organisational collaboration contains perspectives of collaborations, complementary to the concept of open innovation, making this the theoretical contribution of this study. By collaborating across company borders, it is possible to gain more perspectives and influences which can be beneficial for innovation, and thereby giving firms improved innovation abilities (Dodgson, 2014).

One industry constantly exposed for changes and developments is the telecom industry, in which digitalisation is believed to be a big topic (Ericsson, 2015). This obligates the industry to adapt to and manage such changes. Telecommunication treats wireless communication between technical devices (Stone, 2015) and in comparison to other industries, telecom has a quick innovation rate (Bakhit, 2016). Due to this high pace of technological development, companies within the telecom industry are assumed to need new perspectives and possibilities to innovate in new settings. This is why inter-organisational collaboration, between companies in the telecom industry and other actors, is understood to be of importance in order to create open innovation. This makes it a reason to why the execution of this study has been performed in the telecom industry. To concretise the study, it was executed at Ericsson, a globally leading company in the telecom industry. The performance of the study has focused on Ericsson's site in Gothenburg, resulting in a site perspective. Ericsson Gothenburg is a site focusing on innovation for people, business and society, aiming to create connection to everything that can benefit from it (Ericsson, 2015). Therefore, technological development is a central part of Ericsson Gothenburg's business making the site suitable for this study.

## 1.2 Problem description

Dodgson (2014) claims that inter-organisational collaborations are of great importance for development of businesses, but it takes a lot of effort to make such collaborations successful. In the same time, dealing with innovation is considered to be even harder due to innovation having very uncertain characteristics and complexity. The overall problem was that the researchers did not find any concrete ways in the studied literature of how inter-organisational collaborations can be performed in practice to reach innovation. This constitutes the ground of the study from which the researchers have designed the research. Open innovation is an important method for companies to be able to innovate in new ways (Chesbrough, 2006). Also, as the telecom industry is facing changes due to digitalisation, it would be interesting to examine this phenomenon by studying what role inter-organisational collaboration has for telecom companies and what is affecting such collaborations. The site that was studied aimed to be in forefront of innovation, making it important for the firm to develop the ability to work externally.

In this thesis, two external innovation projects have been studied at Ericsson's site in Gothenburg. The first project, *the Manufacturing project*, treated the site's intention to search for possibilities to enter new markets, particularly within the manufacturing industry. It has been analysed how collaboration in this project was performed, as the Manufacturing project had been going on for approximately one year before this study. The collaboration in this project was between the site, one leading manufacturing firm and one technology university. The second project, *the Garage project*, was characterised as an innovation initiative as was dealing with an innovation incubator for the site in Gothenburg. The Garage initiative aimed to deal with innovation projects accessible for internal employees and external companies, yet it was still in its beginning during the execution of the study. Therefore, the study has examined how the incubator was supposed to collaborate toward innovation. Additionally, the study also brings up general perspectives of how the site views and performs inter-organisational collaborations while working with innovation, as a supplement to the two projects examined.

## 1.3 Aim

The aim of this study is to increase the understanding of how inter-organisational collaboration and innovation is managed and organised in practice at Ericsson Gothenburg. It also aims to increase the understanding of the reasons why such collaborations are managed within the telecom industry and at the site in Gothenburg. Lastly, the study aims to present important aspects that are affecting inter-organisational collaborations and how. This will be done by studying three different forms of inter-organisational collaboration at Ericsson Gothenburg, in which two of them contain external projects and the third a more general view of how the site usually work externally with innovation.

## 1.4 Research questions

The research questions constitute a base for the study to answer the aim. Two questions have been defined, which are presented and clarified below. These questions also contribute with the purpose of complementing the theoretical concept of open innovation with collaborating aspects.

1. *What does inter-organisational collaboration and innovation mean for Ericsson Gothenburg and the telecom industry?*

The first question has a general approach and aims to clarify what inter-organisational collaboration means in general for the site and the telecom industry, but also in what ways such collaborations are of importance for these. The question elaborates on what inter-organisational collaboration means for the site while focusing on innovation. By examine this question, the researches can deepen the

understanding of the reasons why Ericsson Gothenburg manage and organise inter-organisational collaboration in their business.

2. *What kind of collaboration aspects are there, and how do these affect inter-organisational collaboration and innovation in the two projects and at the site?*

Through studying the two collaborating projects and apply general perspectives of inter-organisational collaboration and innovation, the second question can be answered. This question has a more specific approach towards the projects and general external collaborations at the site. It aims to identify aspects that are affecting inter-organisational collaborations at the site during their initiation and performance. By identifying such aspects, it can be examined how they are affecting the collaborating performance of the three forms studied.

## 1.5 Delimitations

Ericsson Gothenburg is not an own legal entity but included in Ericsson AB and the report will further refer to Ericsson when discussing the site in Gothenburg. The site has approximately 2.100 employees and due to the size of the site, the study had to be narrowed which is why two projects have been examined and why only some general insights have been included. This means that the entire site has not been studied and the result of the study cannot be applied in general, but rather specific to the examined collaboration forms. There are limitations in the study regarding the collaboration processes, the research has not included the idea generation nor the finalisation of inter-organisational collaborations. Instead focus has lied on the phases of initiation and performance of such collaborations. The Manufacturing project was ongoing during the study, meaning that the initiation phase was examined retrospectively, while the performance phases were studied in present time. The Garage project, on the other hand, was in an early stage during the study, which means that focus of the study has been on future planned execution. Yet, the Garage project itself has had an initiating phase, though the innovation projects supposed to be running there had not been started when the study was performed.

Much literature about inter-organisational collaboration originates from areas of supply chain management, however most literature included in this study has elements of innovation. Moreover, when the word *collaboration* is mentioned in the report, it refers to inter-organisational collaboration with focus on innovation. This means that it treats collaborations between firms and not internal collaborations at the site.

## 1.6 Thesis outline

The thesis is divided into eight chapters which are briefly described below in order to provide an overview of the structure and what to expect from each chapter.

**Introduction:** describes the background of the study and the aim which is divided into two research questions. Delimitations are also described in order to inform the reader what the study is focusing on.

**Theoretical framework:** the theories used in the study are presented in this chapter to give the reader the literature frame of the report. Three theoretical areas have been used; inter-organisational collaboration, open innovation, and collaborative innovation. The chapter ends with a synthesis that presents a table developed by the researchers, showing how the theoretical areas have been combined and complement the concept open innovation.

**Methodology:** describes how the study was performed and its research design. This includes different methods used for the literature review, data collection, and analysis. Quality and validity of the study as well as ethical consideration are further presented to provide a critical perspective of the performance.

**Description of the case study:** presents Ericsson as a company and the site in Gothenburg. Further, the projects that have been studied are also presented to give an understanding of their context.

**Empirical findings:** include the findings from the data collection and starts with a presentation of the interviewees. Thereafter four parts follow, the first describes the importance of inter-organisational collaborations for the telecom industry and the site. The second and third present how inter-organisational collaboration was performed in the projects that were studied. The fourth part describes additional findings of how such collaborations are commonly performed at the site.

**Analysis:** this chapter presents the analysis made, based on the theoretical framework and the empirical findings. It is divided upon the research questions where each part starts with a presentation of the main empirical and analysis findings, followed by the analysis. Additionally, the analysis of second research question is based on the developed table in the synthesis and the structure follows the developed aspects from the table.

**Discussion:** presents the discussion of the analysis regarding uncertainties in the findings. This chapter is, as the analysis, divided upon the research questions.

**Conclusion:** is the final chapter and summarises the major findings in the study and suggests future research areas.

## 2. Theoretical framework

*This chapter presents the theoretical framework and is divided into three related areas; inter-organisational collaboration, open innovation, and collaborative innovation. The first section is introduced by broad and general perspectives of inter-organisational collaboration followed by a section about open innovation highlighting a relatively new concept of innovation. The third section narrows open innovation into collaborative innovation. The chapter ends with a synthesis showing how the theoretical areas are complementing each other in a table developed by the researchers.*

### 2.1 Inter-organisational collaboration

When studying inter-organisational collaboration, further called IOC, it is common to use literature in the fields of supply chain management with a perspective of buyer supplier relations. However, this section mainly includes collaborative and innovative views, although some references have a supply chain background. Literature fields that have been used are for example; management, business, innovation, collaboration, inter-organisational collaboration and organisational dynamics. These fields are also embedded in all subsectors of IOC.

A business relationship is any kind of transaction that occurs between firms (Ford *et al.*, 2011) but also the foundation which external collaborations are built upon. There are many definitions of collaboration and similar words such as cooperation, yet they have different meanings. Järrehult (2011) claims that cooperation is a simple process where actors are working or acting together, indicating a lighter form of relations. Collaboration, on the other hand, can be seen as a deeper level of cooperation with the following definition by Thomson *et al.* (2009);

*“Collaboration is a process in which autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions.”*

IOC refers to collaboration between firms on an external level (Cropper *et al.*, 2008). It can exist between two or multiple firms, as well as in complex networks of actors. IOC has become increasingly essential during the last decades because the work is experiencing an increased interdependency, due to globalisation for example (Lewis, 1991). Looking at IOC from an innovative perspective, the rapid pace of innovation makes organisations dependent on each other, requiring mutual interactions (Nooteboom, 2008). Lewis (1991) claims that the level of competition has increased and thousands of companies are striving in the development of new products, larger scale economies but also towards new markets and technologies. This forces organisations to interact in wider extents in order to survive and grow in uncertain and miscellaneous environments. According to Dodgson (2014), IOC can be managed in different forms and divided in vertical and horizontal arrangements where vertical arrangements indicate that firms are partnering with other firms in their value chains. Horizontal arrangements, on the other hand, indicate collaboration across supply chains, and it could be between different industries. Yet, even though collaborations only can occur differently, one conclusion can be drawn that it is only collaboration when parties allocate resources to one mutual purpose. Dodgson (2014) also claims that collaboration can be seen as something that forces complementary partners together in terms of platforms and ecosystems. One example in the telecom industry is the consumers’ constant expectation of mobile phones being able to communicate with other technologies and other devices. This forces firms within this industry to collaborate in order to create technology standards.



Ford et al. (2011) argue that in order for actors to be able to operate, resources and skills must be shared and exchanged and this can be explained to depend several reasons. Firstly, offerings from firms must include a wide range of technology which are costly to develop, forcing firms to interact in order to take part of each other's resources. Secondly, firms' core competencies can be found outside firm boundaries nowadays, creating interdependencies among parties. Lastly, technological development occurs between firms, making them share investments. This goes in line with Ataee et al. (2011) who claim that some motivators to move toward IOC are the increased access of resources, shared beliefs, wider bases of knowledge and skills, more innovation, risk reduction, exchange of resources, and cost savings. These motivators can also be related to the outcome of IOC as it generates labour improvement and specialisation as well as increased flexibility and learning, favouring innovation processes. As can be seen, IOC creates many possibilities. However, one must not forget the complexity of managing such collaborations (Dodgson, 2014) as they can become costly if the costs become higher than the benefits (Ataee, Memarzade and Alvani, 2011). Dodgson (2014) stresses the importance of IOC for innovation and its management since it can improve the performance of the innovation itself. His definition of collaboration is; *the shared commitment of resources to the mutually agreed aims of a number of partners*. The challenge with innovation activities is that it is nearly impossible to predict the future, which is why collaborations play such a huge role for these kinds of innovation processes. Firms can reduce uncertainties by sharing and building expectations and understand rapid changes.

### 2.1.1 Resources

Resources constitute the actual exchange between actors and the literature fields in this report are mainly based on the knowledge based theories of resources. Ricceri (2008) claims that there are different kinds of resources, which can be classified in two extensive categories; tangible and knowledge resources, see figure 1. Tangible resources consist of financial and physical resources such as; monetary funds, facilities, and equipment. Knowledge resources, on the other hand, are assets that are less measurable and these can be divided into three classifications: human, structural, and relational resources. Human resources represent the employees and their knowledge, skills, abilities, experience and innovativeness. Structural resources are funds like intellectual properties and infrastructural resources, methods and procedures of organisations, controlled and owned by the organisation. These resources include routines, information systems and networks. Lastly, relational resources represent engagements with external actors, brands and markets. (Ricceri, 2008)

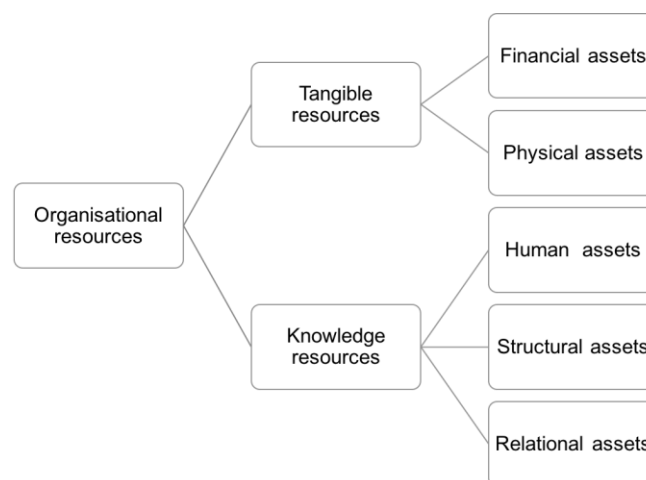


Figure 1. Organisational resources. (developed from Ricceri 2008)

Focus in this study has been on knowledge resources because these resources are, according to Neto et al. (2009), critical factors for innovation to take place. Innovation is created by complex processes where organisational knowledge is combined and disseminated in order to generate new knowledge. According to Grant (1996), knowledge as a resource can be classified as the most important one from a strategic perspective. Knowledge exists in different kinds and Grant (1996) states that there is a knowledge based view where knowledge can be defined as *knowing how* and *knowing about*. Grant (1996) relates this knowing how and knowing about to tacit and explicit knowledge, which is further explained in the section regarding open innovation.

### 2.1.2 Advantages of inter-organisational collaboration in development projects

Companies involved in IOC have higher certainty to achieve more developments in quicker rate compared to solo-companies only working with R&D internally (Schilling, 2010). Benefits with IOC are that such collaborations contribute to cost savings and risk reduction. This can be of sufficient interest for companies engaged in expansive projects as costs and risks are shared between the collaborating parties, according to both Schilling (2010) and Grant (1996). This can be compelling reasons for firms to collaborate externally. As aforementioned, organisations can access resources and skills faster by IOC, which can lead to faster introduction of the innovations on markets (Grant, 1996; Todeva and Knoke, 2002). By getting faster access of resources, organisations can improve their flexibility (Schilling, 2010). For sectors with rapid technological development, this is a great deal since such sectors usually fight against high competition in terms of shorter product life-cycles forcing firms toward innovation improvements.

By exchange knowledge while collaborating, it is possible to widening the knowledge base making learning an important advantage (Schilling, 2010). This means that IOC affects peoples' abilities to learn new things. However, if the learning should be feasible, the degree of technological overlap between firms must be low enough, since a high degree of overlap does not contribute to any new learning (Mowery, Oxley and Silverman, 1998). In other words, this implies that companies acting in the industry working with the same technologies, will most likely learn less compared to collaborating firms involved in unfamiliar industries. Furthermore, in terms of sharing and developing new standards, IOC can benefit firms involved in such activities (Schilling, 2010). A standard could be a new product or process that two or several firms have developed together. Lastly, Grant (1996) argues that IOC can improve the market positions and increase the chance of reaching new opportunities as firms can gain improved positions due to increased knowledge, making them more competitive.

### 2.1.3 Aspects affecting inter-organisational collaboration

Several intangible aspects are of importance when considering IOC in general as well as making such collaborations possible practically. The aspects that are considered important for this study will further be presented and have been found in literature fields of; organisational communication, organisational behaviour, leadership, quality, product development, R&D, globalisation, motivation, culture, and learning. It was found that some authors had different opinions regarding the importance of the following aspects while collaborating externally.

#### ***Trust***

Sherman (1992) classifies trust as one of the biggest barrier in the success for a collaboration and Forsström (2005) claims that trust plays a central role when building collaborations. Businesses are done by either formal agreements or trust among collaborating firms in which emotions play a critical role depending on the relationship (Håkansson *et al.*, 2009). Formalised agreements are more common in

short-term relationships with a lower level of involvement while trust, on the other hand, are more common for high involved relations. Nooteboom (2008) argues that personal trust is of greater importance when collaborating under rapid uncertain conditions since formal agreements can be hard to specify in these situations. This goes in line with Ford *et al.* (2011) who claim that technological collaborations among firms, are more likely to take place without formalised agreements and instead rely on trust and confidence. The reason why high involvement firms are more relied on trust is because these kinds of interactions come with many parameters and uncertainties, making it hard to work in formal ways. However, Håkansson *et al.* (2009) stress that contracts have wider limitations than emotions which means that it is easier to deal with uncertainties, crises and conflicts when having contracts than it would have been if the collaboration was built upon trust. Furthermore, it is more likely that high involvement collaborations will encounter more conflicts since these relations are more influenced by emotions and trust (Forsström, 2005). This is because companies face more conflicts the more they try to get involved with each other whereas Gadde and Håkansson (1993) state that trust enables companies to be honest and express themselves when having contrary perspectives.

Geddes (2008) states that actors involved in IOC must understand each other, otherwise trust will be difficult to achieve. Many factors are affecting trustworthiness and some of these are differences in working objectives and cultures, both in terms of social and organisational. To be able to build trust, there are other things that must correspond such as; strong leadership, develop and share visions, have common basis of knowledge, willingness to recognise differences, and treat all individuals equally (Sullivan and Skelcher, 2002). Lack of trust can lead to misunderstandings, decreased performance of the collaboration as well as unfulfilled capabilities (Bachmann and Zaheer, 2008). Also, trust generates commitment among firms which is of importance when talking about the future and its uncertain outcome of innovation (Håkansson *et al.*, 2009). Furthermore, Tomkins (2001) brings up an interesting relation between trust and information, indicating that these are interdependent of each other. He claims that trust is built between parties over time by repeating interactions and passing information between actors. Firms are making decisions dependent on information received and firms with higher trust passes on more information. This means that it is not possible to increase the trustworthiness without sharing information with each other, but also that the trustworthiness will decrease if the exchange of information decreases.

### ***Skilled leadership***

In order to reach organisational goals, the leadership must be efficient since it affects the performance and productivity of collaborations (Nanjundeswaras and Swamy, 2014). Vangen and Huxham (2000) state that leaders must be able to find concrete problems and inspire participants to overcome them while collaborating. Also, it is important with social skills in order to deal with frustrating employees, promote interactions between people and groups, and to have the ability to formulate visions that everyone strives toward. According to Berson and Linton (2005), leaderships within organisations have social influences on organisational performance but also on organisational culture since the culture includes beliefs, norms, and values of employees. Also, the level of trust and job satisfaction are highly affected by leadership (Podsakoff *et al.*, 1990).

According to Bass *et al.* (2003), leaders do usually influence or delegate the participants in their performance, meaning that leadership can either be transformational or transactional. Transactional leadership is based upon contracts between leaders and their employees, focusing on external demands and predetermined work roles in order to reach organisational goals. Transformational leaders, on the other hand, are based on individual influences and spiritual encouragements meaning that focus is on the participants and their needs. These leaders want to reach each individual's potential and create an

open culture based on trusting the participants. Bass and Avolio (1992) argue that transformational leaders are not afraid of changes as they create changes while leading, and these leaders strive for inspiring and supporting their participants to deal with problems from different perspectives. Due to changes in businesses nowadays, in terms of more demanding customers and users, make information flows between and within firms more complex. This requires leaders that can handle such circumstances and that are able to follow changes in technologies, resources, marketing, and different systems. Schruijer (2008) claims that the leadership in IOC must be able to get the most out of resources, competences, and perspectives that are brought to the table, but also to help each actor to realise its intentions. Furthermore, the characteristics of leaders are also influencing the collaboration result and the successfulness. Leaders must be able to listen to the members, convince them if needed, and have perseverance. Moreover, it is also important to understand dynamics both from a psychological and a social way while collaborating. From an innovation perspective, a less important characteristic is to stick to predetermined principles as it is important to be flexible. It also important to develop a powerbase by the parties involved, as well as promote and support ideas.

### ***Partner selection***

It is not only about organising IOC in the right and appropriate way but also to choose right partners to collaborate with. Dodgson (2014) claims that the selection of partners is the most important issue when talking about IOC, since it constitutes the collaboration base. In terms of innovation, a competitor in one area could end up as a partner in another, indicating the importance of understanding when it is about competition or collaboration. The actual selection of partners depends first and foremost on collaboration objectives, yet the resources are also essential. In terms of resources, Schilling (2010) claims that partner selection is tough to do because it is hard to know whether the other firm's resources are significant or not, and it is even harder when it regards knowledge resources such as skills or experiences. Therefore, the success of collaborations can only be reached by choosing partners prudently (Williamson, 1985; Schilling, 2010).

A number of factors must be taken into consideration, according to Bleeke and Ernst (1995), in order for firms to be able to select appropriate partners. This is because partners can be suited for each other differently and different factors are affecting the degree of suitability. The factors are for instance; size of the collaborating firms, complementary resources, alignments of collaborative objectives, as well as similarity of values, cultures and traditions (Bleeke and Ernst, 1995; Dodgson, 2014). Das and Teng (1999) claim that there are some risks when selecting partners and it is important to find a fit between the collaborating partners in terms of strategies and resources. The resource fit dimension implies that partners are selected if they have compatible resources with each other and if these can be effectively integrated in strategies that create value. Strategic fit, on the contrary, means that collaborating partners know each other's goals, and that these goals can be housed without harming the other firm. In other words, the goals must also be complementary. Das and Teng (1999) claim that firms usually worry about having different goals but normally, it is about finding complementary ones that can be reached simultaneously to be able to succeed. Furthermore, resources can be either complementary or supplementary to each other. Complementary is of importance for companies that want to chase a market opportunity by combining resources effectively, while supplementary means for instance that companies are using similar resources to gain first mover advantage.

### ***Open and frequent communication***

Open and frequent communication improves IOC as it favours exchange of knowledge and information (Tomkins, 2001). Efficient communication and flows of information can generate benefits for high-involvement collaborations in terms of increased predictability and reduced risks of misunderstandings

(Forsström, 2005). Also, activities and resources, both tangible and intangible, can be more efficiently divided and shared by an open communication between organisations. Furthermore, such communication favours the respective and supportive atmosphere between partners because it makes the collaboration run smoother, it helps collaborative process, and it shows the other actor signs of intentions to interact (Blomqvist and Levy, 2006). Rapid growth of information communication technology (ICT), new medias, and globalisation (Gassmann and Enkel, 2004) have helped to facilitate communication between firms which have led to new opportunities to interact. ICT have helped to improve firm's openness toward external sources, but also in the search for new sources more efficiently and online possibilities have helped firms to communicate over geographical distances (Dodgson, Gann and Salter, 2006). However, there are also challenges with online communication which must be understood (Antikainen, Mäkipää and Ahonen, 2010). In order for organisations to be able to communicate easier they must know each other, which is harder to achieve by using online technologies.

### ***Organisational culture***

Culture is something that holds a group or organisation together and distinguishes groups from each other (O'Toole, 1979). Organisational culture emphasis thoughts, feelings, beliefs, behaviours, and symbols which are shared and accepted by the members (Schein, 2010). Knoben and Oerlemans (2006) describe that collaborating firms that have similar organisational cultures are more likely to succeed in their IOC, and can therefore develop the collaboration more quickly. Important factors are to share, accept, and understand the other firm's attitude towards the collaboration for the success of an IOC. From an innovative perspective, IOC is much about learning about other organisations and when applying this on organisational culture, it is important to strive for reduction in the cognitive distance in order to reach common goals (Nooteboom, 2008). This means that the less cognitive distance, the easier it is to understand each other but also to utilise complementary capabilities favouring the outcome of the collaboration. However, when the collaboration fails due to cultural differences, it might be hard to recognise it because such factors are usually hard to notice (Schein, 2010). Moreover, it is also important to stress that the culture has an effect on several more factors such as; firms' attitudes toward risks, whether knowledge is objective or constructed, or if the employees are loyal or selfish (Nooteboom, 2008).

#### **2.1.4 Strong and weak ties when collaborating**

Dodgson (2014) shows many different views of collaborations in relation to innovation and he describes them as strong and weak ties between firms. Weak ties emphasis novel information while strong ties rely on trust and exchange of more fine-grained information. Therefore, these can be related to low and high involvement in collaborations. According to Dodgson (2014), researchers are not united whether management of innovation should consist of either many short-term collaborations or a few ones with a long-term character. On the other hand, Rowley, Dean and Krackhardt (2000) state that both strong and weak ties can facilitate the result of collaborations depending on the conditions taking place, what purpose the collaboration has, and depending on the time the parties involved are collaborating.

An organisation with few strong ties is assumed to have a thinner assortment of information compared to one with many weak ones, according to Granovetter (1973). This means that strong ties contribute to limited variety of information that is communicated between collaborating firms. However, strong ties imply that each firm know each other. By having many weak ties one firm can have a greater base of knowledge and this is especially favourable for rapid innovations (Elfring and Hulsink, 2007). From this, it sounds like weak ties are more favourable, however there are some drawbacks with weak ties that strong ties can overcome. Firstly, weak ties are not preferable for mobilisation of resources between firms, and secondly they do not benefit the sharing of tacit knowledge. Drawbacks with strong ties are

that they can lead to inertia or relational and cognitive lock-in which means that it can be hard to adapt to fluctuating environments (Maurer and Ebers, 2016). Strong ties can lead to inertia because the ability to create new ties with other firms decrease due to constraints in the member's capacity, incentive, and competence. Regarding the search process, Hansen (1999) claims that weak ties are good for collaborations when searching for innovation opportunities in the phase of new product development because it increases the collaboration pace. However, strong ties help to transfer and communicate complex knowledge, meaning that weak ties would slow down the collaboration. Also, strong ties are more helpful in the search for resources and when conflict-solving are needed (Rosenkopf, Metiu and George, 2001).

### 2.1.5 Risks with inter-organisational collaboration

The references used in this section covers, for example, problem solving, organisational behaviour, and knowledge management. There are of course a lot of things that can affect collaboration outcome and performance negatively. The abovementioned theories must be considered to have a functioning IOC, however there are some commonly known risks with IOC. When focusing on people's competence in relation to innovation and learning, Nooteboom (2008) claims that there are two essential kinds of risks; hold-up and spillover. Risks of hold-ups occur because companies are dependent on switching costs, that are costs occurring when a collaboration is not working. This means that costs have to be incurred once again in the collaboration due to hold-ups in processes. The main reason why switching costs arise is that firms are investing in particular relationships since they might want to change. Risks with spillovers, on the other hand, occur if one collaborative partner use the received knowledge of its own interest which in turn affects the other firm (Nooteboom, 2008). There are always risks of not getting the knowledge that were expected from beginning. When sharing knowledge with collaborative partners it is important to balance the exchange since knowledge must be shared in order for firms to receive knowledge. Furthermore, Dodgson (2014) states that collaborations can only occur if firms and teams are working effectively together. This means that it does not matter whether one firm got the right resources or expertise as another party wants nor if they share the collaborative goals. The collaboration itself must be managed effectively in order to generate a successful result. However, processes related to collaboration can be extremely unstable and troublesome, making the management of the collaboration challenging itself, but also disagreements about the ownership can affect the result of the collaboration.

## 2.2 Open innovation

The references used in the section of open innovation are in broad terms classified into the literature fields of; management, business, strategic management, collaboration, innovation, technology, leadership, R&D, and business networks. This section demonstrates what the new management paradigm; *open innovation* (OI) is and how it affects companies. During the past decades, the awareness and use of openness regarding the innovation process has increased, both academically and practically (Alexy and Dahlander, 2014). A shift from the traditional way of approaching innovation to the collaborative approach, has resulted in companies experiencing challenges and positive outcomes of OI. Henry Chesbrough coined OI in his book *Open Innovation: the new imperative for creating and profiting from technology* from 2003. In his perspective, sources of knowledge are distributed among people and organisations (Chesbrough and Bogers, 2014). Chesbrough's description of OI is that it is a phenomenon that makes companies gain use of external ideas and technologies in their existing businesses. The other side of OI constitutes of companies allowing their unused internal ideas, to become adequate in other businesses. Even though, Chesbrough coined open innovation in 2003, the definition

has been developed throughout the years and in 2014 Chesbrough and Bogers presented the following definition of OI.

*“We define OI as distributed innovation process based on purposively managed knowledge flows across organisational boundaries, using pecuniary and nonpecuniary mechanisms in line with the business model. These flows of knowledge may involve knowledge inflows to the focal organisation (leveraging external knowledge sources through internal process), knowledge outflows from a focal organisation (leveraging internal knowledge through external commercialisation process) or both (coupling external knowledge sources and commercialisation activities)”*

Chesbrough and Bogers (2014) develop their definition by explaining what they mean with the different terms that are included in the definition. Development and commercialisation of new or improved products, processes, or services are what Chesbrough and Bogers (2014) mean with innovation. The openness aspect is represented by the knowledge flows across firm borders. One firm's business model, can be either implicit or explicit, and it puts the innovation process into the organisational framework, describing how value is created and gathered. These authors also characterise OI as very unpredictable because it is uncertain who to collaborate with and what this could result in.

Changes in the business environment in the early twenty first century made Chesbrough talk about a paradigm shift based on OI (Chesbrough and Bogers, 2014). Reason for this paradigm shift is; the increased mobility of workers, more capable universities, declining US hegemony, start-up companies growing access of venture capital, and changed conditions under which companies innovate. The reason why OI has developed the last decades is, according to Gallaud (2013), that the demand for products has moved towards more customised to satisfy personal needs. Further, Dahlander and Gann (2010) also have an explanation to why OI has emerged. Firstly, peoples' working pattern has changed both socially and economically, instead of having one employer the whole working life, people seek career and are therefore changing jobs more often. This results in companies having to come up with ways to access talent outside their boundaries. Secondly, the globalisation affects the upraise of OI. Thirdly, there are many improved market institutions such as intellectual property rights and technology standards making it impossible for companies to seek knowledge outside their boundaries. Lastly, new technologies such as the Internet result in collaborations that earlier were impossible (Dahlander and Gann, 2010). According to Andersson and Berggren (2015), one of the reasons among others to the increased interest in openness is the higher specialisation among people, resulting in companies wanting to be able to gain access of technologies, products and knowledge outside firms' boundaries. The firm's intentions of opening processes are the possibility to share risks and costs related to the development of new innovations. As well as getting a stronger innovative ability while the globalised competition rapidly increases (Andersson and Berggren, 2015). Yet, there are limitations regarding the openness in OI and a big question is how open a company actually should be with their innovation and R&D processes.

Even though this study mainly focuses on Chesbrough's contribution of OI, there are other academic contributors in this area. Chesbrough was the first one to express this terminology, however the concept is argued to have existed for a long time (Tidd, 2014; Lakemond and Tell, 2016). Other concepts regarding innovation have been precursors of OI, for example von Hippel's (2005) *user innovation*. Woodward (1958) is an even earlier author from whom the idea of complex technological development involving interactions with distribution actors, also comes from. These academics have all contributed to the R&D of OI, even though their perspectives differ (Alexy and Dahlander, 2014). What is worth to mention is that OI is a relatively new academic concept and Tidd (2014) argues that the research regarding OI needs to become more specific. It is argued that the supporters of OI claim that it brings

only positive solutions, whereas other researchers state that OI is very sensitive when it comes to context and contingency.

## 2.2.1 Circumstances regarding open innovation

Except from the previous mentioned literature fields regarding OI, this part involves references that use fields such as; organisational dynamics, organisational communication, information management, organisational behaviour, knowledge management, and openness. To understand when OI can be beneficial, it is of importance to focus on the circumstances a company is surrounded by before judging the outcome of OI (Alexy and Dahlander, 2014). Schweitzer, Gassmann and Gaubinger (2011) present the role of dynamics on relationships of OI, and that OI strategies can assist companies to steer through turbulent times. Their research show that OI is important in turbulent markets. However, they also present that the collaboration with suppliers are beneficial in different circumstances than involvement with customers. Supplier integration is of importance when there is a high technological turbulence, at the same time customer involvement is of importance when there is a high market turbulence (Schweitzer, Gassmann and Gaubinger, 2011). Alexy and Dahlander (2014) continued this argument by presenting several contingency factors which influence the performance and outcome of OI. To be able to answer the question when OI can be beneficial, one can ask an even more precise question, which is; under what circumstances OI is worth pursuing. This is what the contingency factors by Alexy and Dahlander (2014) are trying to illustrate. The aspects that these contingency factors address are for example; perspectives on inbound and outbound OI in relation to transaction costs, individual assumptions and willingness to work in an open environment, and the role that intellectual property can plays in these matters. The factors are divided into internal and external contingencies, in which the researchers of the study have summarised in two tables, see table 1 and table 2 below.

*Table 1. Internal contingency factors.*

Internal contingency factors	Description
The not invited here syndrome	OI is not an one-dimensional issue; the many human aspects of the performance can be assumed to affect the outcome of the IOC. The not invented here (NIH) syndrome is a well-known pattern that can occur when teams are collaborating across company borders. This happens when groups are rejecting other firms ideas because they possess knowledge power. (Katz and Allen, 1982)
Individual skillset	This factor goes down to individual levels of collaborations in OI and relates to how the roles change inside a company and in R&D teams (Alexy, Henkel, and Wallin, 2013). Companies engaging in OI need to manage concerns of employees that may arise due to changes. The skillset is also about managing different capabilities to make the OI as beneficial as possible (Alexy and Dahlander, 2014).
Search channels	The OI search process is through which companies can understand what possible innovations they can be inspired by or involved in. Companies that use many search channels can be more innovative, yet there must be a reliance on top management and experts in R&D, otherwise the innovativeness will decrease. (Laursen and Salter, 2006)
Compatibility	Collaboration depends on how compatible companies are with each other. If companies are not compatible there will most likely be coordination costs affecting the outcome of the collaboration. Compatibility are divided into content and structural ways of being compatible, the better the content computability is, the more companies can learn from each other. This means that there is a gap between collaborating companies knowledge bases. The bigger the structural compatibility is between firms, the easier the coordination gets since language and internal structures are similar. (Alexy and Dahlander, 2014)
Organisational boundaries	To communicate over organisational boundaries is not an easy task but it can lead to new insights through the communication with the outside. Yet, having a deep understanding of the inside organisation, leads to new ideas. These activities can be time consuming and the focal company need to ensure that knowledge and partnerships that are identified by outside scouts are harnessed by the internal organisation, to later be able to build necessary absorptive capacity. (Cohen & Levinthal, 1990)
Complementary assets	Regarding outbound innovation, if a firm reveals internal knowledge related to complementary assets it can lead to profits in the long run. If a firm does not have complementary assets, the company might has to enter relationships with players that have assets that can be complementing. In the inbound innovation aspect, companies with strong complementary assets can systematically identify partners outside the company borders that need to collaborate with the focal company. (Dahlander and Gann, 2010)



Table 2. External contingency factors.

External contingency factors	Description
Legal mechanisms	Regarding IPR, there are several issues in relation to collaboration between companies. When it exists strong legal mechanisms it is easier for companies to engage in contracts regarding exchange of innovation. A clear documentation and IPR make negotiations smoother because then the ownership of the innovation is established. However, when boundaries or documentation are not clear, many companies find it difficult to engage in collaborations, because it is hard to understand who has the ownership of the potential IP. Some even refuse to involve in collaboration with other companies without documentation of their IPR, because then legal conflicts may emerge. (Alexy and Dahlander, 2014)
The nature of knowledge	Current knowledge is always build on previous, meaning that new technology is based on current knowledge when progress is made. When the knowledge frontiers are less understood, it is more difficult to divide tasks, resulting in significant coordination problems. In turbulent technology environments, companies will often struggle to identify partners. When the environment is more calm, recognising suitable collaborators and establishing mutually beneficial partners will be relatively easy. (Dahlander and Gann, 2010)
New technologies	Existing and established companies are often very specialised in improving the technology they already are working with, a few companies have the skill to explore to innovate. OI can therefore be a useful pathway to allow companies to continuously renew themselves through new technologies. (Alexy and Dahlander, 2014)

## 2.2.2 Knowledge flows

The main focus of this part is knowledge management, however this part also treats literature fields such as openness, collaboration, organisational dynamics, and markets. The openness in OI can help firms to gain access to new areas of knowledge, manage capacity problems, concentrate on core competencies, reach a higher speed to the market, and share risks and costs (Lazzarotti and Manzini, 2009). Yet, at the bottom of openness lies the actual spread and sharing of knowledge. The creation and use of knowledge is an aspect that is covered in the innovation process (Wallin and Von Krogh, 2010). Nonaka (2014) connects the knowledge creation theory to OI, meaning that tacit knowledge is changed to explicit, and vice versa. A central challenge in managing OI is controlling the ability to gain advantages of activities that lie outside the own organisation boundaries and control. This can be done through knowledge flow, further referred to as KF, over the organisational boundaries (Lakemond and Tell, 2016). Furthermore, Tidd (2014) describes six principles in which one have been considered as relevant for this study. This is that potential benefits of companies that are tapping into external knowledge are the ability to increase the pool of knowledge and reducing the reliance on limited internal knowledge. The challenges related to this principle are the difficulty in searching and identifying relevant knowledge sources and the difficulty in sharing tacit knowledge in a systematic way.

OI can, according to (Lazzarotti and Manzini, 2009), be performed in different ways and constellations. It can be an organisational form of acquisition or exploitation with a defined time limit, or it can be a collaboration that appears in different phases of the innovation process. The amount of partners and their relations can also differ; from a traditional supply chain relationship to collaboration with universities, technical service companies, competitors, or firms operating in different industries. (Lazzarotti and Manzini, 2009)

A traditional way of describing the innovation process is by a funnel, through which ideas are generated into becoming functioning products. Chesbrough (2003) evolved this funnel by poking holes into it, see figure 2. By doing so, he illustrated OI and how knowledge is supposed to flow either from the inside to the outside of the company, or the other way. This enable companies to reach other markets, create new markets, or to increase competitiveness at current markets (Lakemond and Tell, 2016).

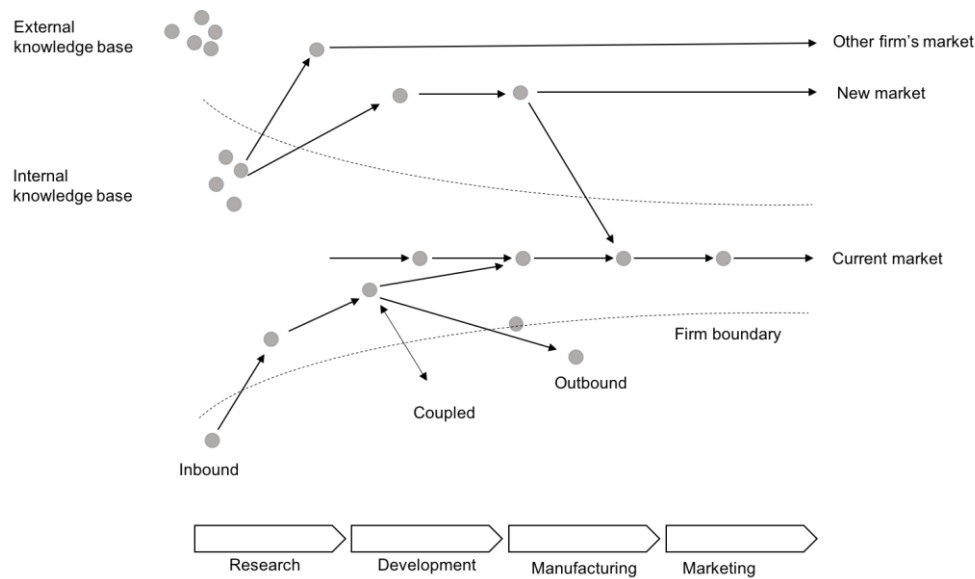


Figure 2. An illustration of the funnel of open innovation. (Vanhaverbeke, Chesbrough and West, 2014)

How knowledge is shared and what kind of goals that are related are also of importance (Lakemond and Tell, 2016). A central discussion amongst academics regarding OI is what kind of knowledge flow organisations should engage in. Inbound KF means that the company focuses on for example R&D collaborations or licensing, while outbound KF implies the sales of patents. These KFs can in practice be combined with each other into a mixture, both from and into the company, and it is natural to discuss different kind of knowledge when talking about KFs (Alexy and Dahlander, 2014). Wallin and Von Krogh (2010) claim that it is necessary that different knowledge types are integrated into the innovation process. Nonaka (1991) also explains that there are different knowledge types, and that knowledge can be looked upon as a spectrum that is stretched between tacit and explicit. The explicit knowledge can be manifested and therefore be found in for example formulated sentences, mathematical formulas, written or drawn data. On the other hand, tacit knowledge cannot be manifested and is therefore more subtitle, in for example skills, bodily movement, senses, and what exists in cognition (Wallin and Von Krogh, 2010). Von Hippel (1994) claims that explicit knowledge more easily can become spillover compared to tacit knowledge. However, this does not mean that tacit knowledge cannot become spillover. What is crucial is if the competitor understand the spillover knowledge and can use it in a competitive way. Furthermore, the categorisation of KFs into inbound and outbound is connected to what kind of knowledge that is exchanged, in forms of tacit or explicit, and how the KF is performed. These categories can be related to either pecuniary or non-pecuniary transactions leading to the discussion of what extent of openness that KFs result in. This will be presented more deeply in the next section.

### 2.2.3 Openness

Openness is a central part of OI and most literature deals with the concept openness between companies, such as openness, spillovers, knowledge management, and IP. The aforementioned different kind of KFs in OI processes, lead to the discussion of the degree of openness. Whether the KF is of financial or non-financial character, it gives an implication of companies' degrees of openness (Alexy and Dahlander, 2014). These aspects have been put together into a two-by-two matrix to illustrate different types of openness in OI processes, see table 3 (Dahlander and Gann, 2010).

Table 3. A table describing different types of openness. (Dahlander and Gann, 2010)

	Inbound innovation	Outbound innovation
<b>Pecuniary</b>	<i>Acquiring</i> Acquiring inventions and input to the innovation process through informal and formal relationships	<i>Selling</i> Our-licensing of selling products in the market place
<b>Non-pecuniary</b>	<i>Sourcing</i> Sourcing external ideas and knowledge from suppliers, customers, competitors, consultants, universities, public research and organisations	<i>Revealing</i> Revealing internal resources to external environment

In relation to transaction costs economics, companies realise that it sometimes is cheaper to license an existing technology developed outside of the company, than it is to develop it on their own (Dahlander and Gann, 2010). In this case, *acquiring* is the first kind of openness that drives the innovation process. The second kind of openness, *selling* is almost the opposite but it includes how firms are commercialising their inventions and technologies, by selling or licensing out their resources and knowledge. *Sourcing* is the third way of approaching the OI process, and it is about studying one's environment to be able to find complementary resources to include in the innovation process (Alexy and Dahlander, 2014). Yet, there has to be a balance when it comes to sourcing as both too little and too much sourcing from the outside can be harmful for the company (Laursen and Salter, 2006). The fourth kind of openness is *revealing* and it relates to what knowledge companies are willing to share, as companies are only revealing information or knowledge that they imagine will generate beneficial results (Henkel, 2006). In sum, different kinds of actions when it comes to openness and innovation are dependent on the strategies and situations that the companies are in. In reality, companies are often using a combination of the different types of openness, resulting in them gaining benefits from different perspectives.

Firms can open their innovation processes in various phases, from idea generation to commercialisation, regarding knowledge, technologies, products, and processes. However, there is a backside to openness and limitations which Andersson and Berggren (2015) are presenting three. The limitations related to openness is firstly, problems regarding the own base of knowledge. For instance, companies that have become too dependent on technology consultants working for them, that such firms have to keep these people in-house to not lose their specific knowledge. Secondly, problems regarding the costs of openness, in reality there are costs that are limiting the possibilities of collaboration. The challenge is to understand when specialised knowledge is beneficial for collaborations. Thirdly, the integration of knowledge across company borders requires that companies are revealing certain information to each other, to combine different bases of knowledge. By doing so, the companies are facing risks of knowledge spillover to other parts of the markets. (Andersson and Berggren, 2015)

## 2.2.4 Intellectual property

The literature fields studied in this part includes both literature from the fields of innovation and OI, but mainly literature about intellectual property. Intellectual property, further called IP, has a special relation to traditional innovation and therefore also OI. However, there are different opinions regarding IP's role regarding OI and one viewpoint is that IP constitutes a barrier for OI. IP can be toxic and permeate the introduction of a new innovative collaboration, by having a mind-set of "no patent, no talk" (Alexy, Criscuolo and Salter, 2009). In this way, the collaboration might never be introduced and therefore IP can be related as a barrier for innovation and collaboration.

When examining OI, the knowledge based economy is constantly present. The technology market is a space where knowledge is transferred between knowledge sellers and knowledge seekers (Andersson and Tell, 2016). These transfers of knowledge are manifested mainly in IPR, however in different kinds. Chesbrough and Ghafele (2014) have different perspectives of IO and claim that it can both inhibit OI as well as enhance its effectiveness. Looking at IP from a positive point of viewpoint, IP can be equal to knowledge and the procedure of reaching the external source of knowledge may accelerate time to market, fill technological gaps in internal R&D, or reduce the total cost of innovation for a firm. It is of importance to understand that OI is not promoting an economy where values are handed over as gifts between companies, but rather exchanged as valuable assets (Chesbrough and Ghafele, 2014).

One of the most critical limiting factors for IP in OI is lack of information about the extent and terms of trade in secondary markets for innovations (Chesbrough and Ghafele, 2014). This mean that it hard to predict the value of the innovation. Another challenge lies within the issue of knowing how to value available technologies once they have been located. Furthermore, the perception of IP as a defensive legal tool sometimes stands in the way of the positive perspective of IP. (Chesbrough & Ghafele, 2014)

## 2.3 Collaborative innovation

The third section is an extension from the previous one regarding OI as it treats collaborative innovation (CI). In comparison to OI, this part focus more on collaborative and practical leadership in terms of IOC. The literature used is broadly classified as management, business, strategic management, innovation, collaboration, technology, R&D, and leadership. Additionally, literature fields such as; economics, IP, IOC, and organisational behaviour have also been used. OI and CI are closely related and it is difficult to separate them (Gallaud, 2013). The aforementioned OI, consists of various ways for companies to be open and gain advantages from other organisations' knowledge. CI, on the other hand, only fits in one of the approaches of openness in OI. When companies organise themselves in CI, they seek a symbiotic collaboration, in which all parties both give to and benefit from the collaboration (Davis and Eisenhardt, 2011). The following is an explanation by Gallaud (2013) about the concept CI;

*“Collaborative innovation is the fact that organisations cooperate with other firms or other organisations to develop or commercialise a new innovation. The organisations agree to pool their resources or to share information and knowledge to develop one project, at the end of the project, they keep independent from the legal point of view”*

Accordingly, OI can be seen as a wider concept than CI and therefore the two times two matrix by Dahlander and Gann (2010) is in this part evolved by Gallaud (2013). In this evolved matrix, CI has got a spot of its own, see table 4. As can be seen in the figure, CI got a non-pecuniary and inbound innovation approach. On the right side of CI *collective invention* is presented, which is a term coined by Allen (1983). CI has also a non-pecuniary character, however it has more of an inbound innovation approach (Gallaud, 2013).

Table 4. Placement of collaborative innovation in the table by Dahlander and Gann. (Gallaud, 2013)

	Inbound innovation	Outbound innovation
<b>Pecuniary</b>	<i>Acquiring</i> Acquiring inventions and input to the innovation process trough informal and formal relationships	<i>Selling</i> Our-licensing of selling products in the market place
<b>Non-pecuniary</b>	<i>Sourcing</i> Sourcing external ideas and knowledge from suppliers, customers, competitors, consultants, universities, public research, and organisations  <i>Collaborative innovation</i>	<i>Revealing</i> Revealing internal resources to external environment.  <i>Collective innovation</i>

One similarity between OI and CI is the knowledge exchange that occurs among organisations who collaborates. The main goal in CI is to gain access to the other organisations' knowledge and competence, in particular tacit knowledge (Gallaud, 2013). However, companies and organisations have different approaches when it comes to CI since their goals differ depending on company size, their internal competencies, and to what extent they are established on their markets. Differences in the performance of CIs can, according to Gallaud (2013), be expressed in for example; one organisation sending staff to the plant of the other organisation that is participating in the project or face-to-face meetings. The collaboration can also happen at various times in the innovation process, from idea generation to commercialisation. These settings can either be of formal or informal character resulting in the creation of common structures. However, in most cases tasks and goals are forming the performance of collaborations. (Gallaud, 2013)

### 2.3.1 Management of collaborative innovation

Unstable processes and troublesome situations can make collaborations a challenging experience for organisations, which is why the way that collaborations are managed is very critical for the success (Dodgson, 2014). Either, collaborations can be viewed from the individuals' or the team's perspective, or have an organisational point of view. As have been mentioned, collaborations cannot occur unless individuals and teams are working effectively together (Dodgson, 2014). Yet, in the perspective of Vangen and Huxham (2000) there are organisations rather than individuals that are collaborating with each other, entailing that organisational culture, languages, and geographical distances are included in the interaction. Moreover, leadership plays a central role in any collaboration (Vangen and Huxham, 2000). There are many leadership theories applied on organisations, ranging from successful leadership personalities, via the leader-member exchange theory, to transformational, visionary or charismatic leadership approaches. However, such theories are difficult to use while discussing collaborations. Firstly, the hierarchical implications of having a leader with followers, does not fit with collaboration because the individuals that are involved in CI have different organisational backgrounds. Secondly, it can be extremely difficult agreeing upon collaborative goals, because the different perspectives members contribute with to the setting. This results in the people involved must take actions without shared goals or visions of the results.

Vangen and Huxham (2000) studied both informal and formal leaders in collaborations. However, the collaborative setting opens the discussion of having an organisation instead of an individual as leader namely a lead organisation. Legitimacy can be given to a lead organisation if the other organisations are aware of the role the lead organisation is designated. There is often a wish from policy makers or funders to have a lead organisation. Yet, in a new constellation it can be assumed that the lead organisation is

the one that initiated the collaboration or the organisation that is housing the practical meetings of the collaboration. In many cases, with or without a lead organisation, the role of positional leaders is handed to some kind of management group that are representing the organisations gathered in the collaboration. Furthermore, Vangen and Huxham (2000) argue that leaderships in collaborations are not only authorised through the behaviour of individual leaders, but also through the context of the collaborations. The authors point out that there are three leadership media; structures, processes, and participants, that are outside the control of leaders;

- *Structure* of the collaboration affects the leadership role as it determines who has power to act, which resources will be selected and who has got the power to influence the agenda. Even if parties are planning on how to design collaborations, structures normally emerge when collaborations are facing the practical reality.
- *Processes* are formed in different ways in collaborations. Some processes encourage members to share knowledge and information and by doing so develop common understandings of issues. Other processes can, on the contrary, hinder the openness and frequency in communication resulting in processes having the ability to empower members' access to debate concerning partnership agenda or, on the other hand, strip power from them.
- *Participants* have a powerful role in influencing agendas in collaborations. Any participant that is joining or associated with the collaboration and has the power and know-how to influence a partnership agenda might take lead in the collaboration process.

### 2.3.2 Three mechanisms of collaborative innovation and rotating leadership

The literature that Davis and Eisenhardt (2011) studied suggests three mechanisms that underlies successful CI and these are further connected to, what is called *rotating leadership*. Rotating leadership means that all parties of CI should transfer and rotate the power to decide and act between themselves. The result and goal of rotating the leadership for companies is, according to Davis and Eisenhardt (2011), to become successful in innovation. However, measurements of innovation and how to decide whether or not a collaboration is innovative can be questioned. The three mechanisms are; activation of relevant capabilities, deep and broad search for innovation, and mobilisation of participants over time. These are further presented together with their relation to rotating leadership.

The first mechanism is the activation of relevant capabilities. To combine competencies from different companies is, according to Davis and Eisenhardt (2011), a tricky task because it is hard to access capabilities that are embedded in different organisations having their own culture, unique personalities, and structures. The decision-making pattern is very relevant regarding the access of capabilities and can either facilitate or hamper the accessibility. Collaborations are either dominated by decision control by one partner, mutually among partners, or by alternating decision control between parties during specific phases. Alternating decision control is what Davis and Eisenhardt (2011) connect with rotating leadership. They mention that alternating decision control is likely to improve innovation performance because it helps partners to access their complementary capabilities. By controlling decisions at various times, each partner is able to make crucial choices that bring in desired capabilities to the collaboration. Alternating decision control overcomes the tendency of partners to only rely on their own resources. (Davis and Eisenhardt, 2011)

The second mechanism is that successful innovations are dependent on both deep and broad innovation search trajectories. The definition of a search trajectory is a series of combinations of existing

knowledge, technologies, and other resources (Davis and Eisenhardt, 2011). Deep search trajectories stimulate innovation, at least until the limit of useful combinations are reached. Broad search areas are, on the other hand, stimulating innovation through novelty. The measurement of innovation outcome is difficult and the literature mainly tracks patent citations and product outcomes, which makes the process through which partners might actually blend deep and broad when they seek in collaborations unclear. Furthermore, it is not obvious how partners who have different objectives actually coordinate these searches. Once again are Davis and Eisenhardt (2011) pointing in the direction of rotating leadership in order to overcome this. One way to do this is by zig-zagging objectives between the collaborating parties which emerge partners frequently alternate control during the collaboration stages. If companies are switching whose goals and objectives that are in focus, the search depth can become deeper as the companies let go of their self-interest. Additionally, companies that are zig-zagging objectives between themselves, will also increase the search breadth. One can say that companies that are zig-zagging objectives enable them and their partners to search for innovation possibilities both deeply within phases and broadly across phases. This method often defines new technical problems and results in search for new ways to solve them, leading to broader search and improved innovations. (Davis and Eisenhardt, 2011)

The third mechanism that underlies successful innovation through collaboration is the capability to mobilise participants over time (David and Eisenhardt, 2011). Mobilisation requires active support by leaders and stable roles, who bring together participants. The cascade pattern, related to rotating leadership, means that there are fluctuating cascades in which leaders are mobilise different, often new participants across phases and encourage others to involve different as well as new participants. Fluctuating cascades can enable perspectives and resources applied to collaborations to vary over time. By initiating cascades with different individuals and then encouraging them to continue mobilising new and relevant people, the executive who indicate fluctuating cascades enhance the range of knowledge and perspectives without wearing down the participants. This in turn results in better innovation performance. (David and Eisenhardt, 2011)

## 2.4 Synthesis

The study is based on the theoretical areas about OI which mainly focuses on knowledge flows and exchange between collaborating firms. Though, there are some gaps in the literature of OI (Tidd, 2014) and especially regarding the actual collaboration between firms. Therefore, areas about IOC and CI have been included as well as these are assumed to complement relational aspects of OI. When studying the three theoretical areas the researchers discovered that all areas are treated by many literature fields and the ones that are most frequently occurring are; management, business, strategic management, innovation, collaboration and cooperation, technology and technological change, R&D, leadership management, business networks, open innovation, and inter-organisational collaboration. Appendix *i* shows other literature fields that have been included, however these are only a selection. The researchers conclude that because of the broad theoretical background it can be ambiguous to sort IOC, OI and CI into any specific field. Appendix *ii* shows the references used in the theoretical framework and the most frequently used literature fields just mentioned. The dots indicate which of the main fields that the references are represented in and one can see that the references are found in both similar and different fields. The fact that the theories of IOC, OI and CI actually can be found in some similar fields enable the researchers to use and combine these areas in this study.

Lazzarotti and Manzini (2009) claimed that OI treats collaborations in some wide spectra; from traditional supply chain relations to collaboration with universities and competitors. Therefore, it is

assumed that general theories from IOC can be used to increase the understanding of important aspects for collaborations. Furthermore, the theories used in IOC include literature about innovation management, just as the OI theories do, which also implies that these theoretical areas can be combined. Theories about CI are, on the other hand, considered to have a more practical approach compared to OI, since this literature explains different roles of leadership and its impact on the outcome. Yet, CI literature is a supplement for OI, which also make them compatible. In order to show how the theoretical areas have been combined, a table have been created by the researchers, see table 5. The *developed aspects* to the left in the table are based on the OI literature, and the literature of IOC and CI have been applied to these areas. The table does not only provide an overview of how the theoretical areas are connected to each other but it also functions as a structure for the researchers in the analysis process as it helps to reach the theoretical contribution. The subsequent parts describe more in detail how the literature areas are related to each other, following the same sequence as the developed aspects in the table.



Table 5. A developed table of the literature.

Developed aspect	IOC	OI	CI
<b>Partner selection</b> Refers to how partners are found and selected. Relational aspects are involvement, goals, and complementing capabilities.	<ul style="list-style-type: none"> <li>Strong and weak ties relate to degree of involvement</li> <li>The importance of understanding goals</li> <li>Complementing resources</li> </ul>	<ul style="list-style-type: none"> <li>Must know what to look for in partner selection</li> <li>Search externally favours innovation</li> <li>Capabilities can be found externally</li> </ul>	<ul style="list-style-type: none"> <li>Broad and deep search are important when looking for partners</li> </ul>
<b>Knowledge &amp; knowledge exchange</b> Constitute the communication between firms and the importance of balancing the knowledge exchange. Relational aspects are the impact of trust, cultures, and the ability to understand each other.	<ul style="list-style-type: none"> <li>Communication facilitates knowledge exchange</li> <li>Trust and culture are affecting knowledge exchange</li> <li>Knowledge can be divided into knowing how or knowing about</li> <li>Importance of balancing the exchange between firms</li> </ul>	<ul style="list-style-type: none"> <li>Different forms of knowledge</li> <li>The importance of sharing knowledge and goals</li> <li>Understand how to manage received knowledge</li> <li>NIH syndrome as a resistance</li> </ul>	<ul style="list-style-type: none"> <li>Gain access of tacit knowledge</li> <li>Access relevant capabilities through rotating decision control</li> </ul>
<b>Openness</b> Knowledge exchange is related to openness, since increased knowledge exchange increases openness and in turn the innovativeness. Important aspects affecting openness are time, patience, and trust.	<ul style="list-style-type: none"> <li>Open and frequent communication and leadership affect openness</li> <li>High involvement is related to openness</li> <li>Trust is important but time consuming</li> <li>Openness implies a risk of knowledge spillover</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge exchange affects openness</li> <li>Openness implies a risk of knowledge spillover</li> <li>Different types of KFs</li> </ul>	<ul style="list-style-type: none"> <li>Focus on inbound KFs and non-pecuniary compensations</li> <li>Mobilisation of participants as a way to increase the frequency of knowledge exchange</li> </ul>
<b>Legal mechanisms</b> Refers to how legal aspects affect collaborations.	<ul style="list-style-type: none"> <li>Collaborations are based either on trust or formal contracts</li> </ul>	<ul style="list-style-type: none"> <li>There are different impacts on collaborations, that either facilitate or inhibit them</li> <li>Legal mechanisms affect negotiations between firms</li> <li>A risk of resistance to collaborate without legal considerations</li> </ul>	<ul style="list-style-type: none"> <li>Legal mechanisms are not included in collaborative innovations</li> </ul>
<b>Compatibility</b> Implies the suitability while collaborating. There must be a balanced overlap between firms in terms of technology, structure, and content.	<ul style="list-style-type: none"> <li>Culture as one aspect affecting compatibility</li> <li>Technological overlap affecting the outcome of collaborations</li> </ul>	<ul style="list-style-type: none"> <li>Compatibility depends on structure and content. The more similar these are, the more compatible collaborations will be</li> </ul>	<ul style="list-style-type: none"> <li>Different perspectives between firms make it difficult to set common goals</li> </ul>
<b>Uncertainty</b> Occurs in companies' contexts and in collaborations. Leadership, individual skillset, and trust between firms are ways to handle uncertainty.	<ul style="list-style-type: none"> <li>Leadership, trust, and culture impact the ability to handle uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>Working with OI can be beneficial in turbulent times</li> <li>Individual skillset as a way to handle uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>Rotating leadership as a way to handle uncertainty</li> </ul>

From an OI perspective, the choice of partner is important because the partner selection affects the result and the performance of collaborations. The choice of partners depends on what a firm is looking for, which can be related to the theories of IOC since it can be related to the focal firm's goals and objectives but also desired resources (Dodgson, 2014; Schilling, 2010). Firms must understand their goals and objectives in order for the partner selection and the collaboration itself to be feasible. For companies to be able to engage in OI they need to have knowledge about whom they are going to collaborate with and why the collaboration should occur. Therefore, companies need to search for innovation partners

with capabilities they desire (Dahlander and Gann, 2010), and this is comparable to the importance of finding resources from an IOC perspective. It also goes hand in hand with CI theories about rotating leadership and the importance of both broad and deep search, as companies have to both dig deep and search broad in order to find partners with suitable capabilities and knowledge (Davis and Eisenhardt, 2011). What kind of collaborations a company have can, from an IOC perspective, be related to the theories of strong and weak ties (Dodgson, 2014; Rowley, Dean and Krackhardt 2000)).

Knowledge exchange is, from an OI perspective, important since it increase firm's learning and innovative ability (Gallaud, 2013). Knowledge has different implications depending on from which theoretical area one is looking, however it is a central part in all theories used in this study. IOC theories classify knowledge as an intangible resource, exchanged between firms (Ricceri, 2008), while CI describes knowledge as a capability that can be managed through alternating decision control (Davis and Eisenhardt, 2011). Theories of knowledge claim that knowledge can be either tacit or explicit, where tacit is the most wanted to access according to the CI literature (Gallaud, 2013), yet the OI literature claim such knowledge is more difficult to exchange (Tidd, 2014). According to OI and IOC theories, knowledge must be shared between partners, and the collaborating goals understood, but firms must also know how to manage received knowledge. IOC suggests that open and frequent communication should take place during the entire collaboration in order to exchange knowledge and experience, and that it must be a balance of what is exchanged between firms (Nooteboom, 2008). The sharing of knowledge must be built on trust. Furthermore, a common pattern that can affect the knowledge sharing is the, OI originating, NIH syndrome (Katz and Allen, 1982). This syndrome is much attached to culture, which has an impact on individuals' attitudes, beliefs, and values. Further, culture is a reflection of the leadership, according to IOC theories (Berson and Linton, 2005). This implies that the leadership may also affect the NIH syndrome and other cultural expressions, connecting it further to the CI theories which points out the important role leadership has in collaborations.

Openness is, in the OI literature, dealing with knowledge exchange because the more knowledge that is shared between firms the more open a collaboration can be, which can lead to an increased innovativeness (Dahlander and Gann, 2010). The OI literature describes a model of openness, which the CI literature further developed (Gallaud, 2013). These models include inbound and outbound KFs, with either pecuniary or non-pecuniary elements. From an IOC perspective, it is believed that strong and weak ties can have an effect on the openness since high involved collaborations are more likely to share more knowledge (Dodgson, 2014). Furthermore, in order to have high involved collaborations, trust must be strong. Creating trust is time consuming, indicating that time and patience is required in order to reach openness. Communication affects openness when collaborating, since it is one way to share knowledge. In addition, the communication should be open and frequent in order to increase the trust (Tomkins, 2001). CI literature talks about the concept of rotating leadership in order to mobilise participants over time (Davis and Eisenhardt, 2011), and this is assumed to be one way for firms to become more open because knowledge can then be more frequently exposed. Moreover, IOC theories emphasise the importance of leadership for controlling the performance of collaborations (Schruijer, 2008), which could have an effect on the openness. What is common within both OI and IOC is that both raise the risk with knowledge spillover, when firms open their businesses for collaborations (Nooteboom, 2008; Andersson and Berggren, 2015).

Legal mechanisms are mentioned in the OI theories in terms of IPR, and they are affecting the negotiation processes between firms (Chesbrough and Ghafele, 2014). This can be put in relation to IOC where negotiations are based on either formal contracts or trust (Håkansson *et al.*, 2009). IPR can be seen as both a facilitator and a barrier to openness in collaborations dependent on what kind of openness

one is discussing (Chesbrough and Ghafele, 2014). The pecuniary kind of OI is more related to the exchange of legal documents, compared to the non-pecuniary. Therefore, non-pecuniary OI is more reliant on trust, which can be related to IOC where this is described in detail. Legal mechanisms play a central role when it comes to collaborations between companies, and are found in all theories used in this study, yet in the CI theories legal mechanisms are less central (Gallaud, 2013).

Compatibility in OI theories concerns how suitable firms are to each other, affecting the outcome of the collaborations themselves (Alexy and Dahlander, 2014). Regarding knowledge content, collaborating firms should have a big enough difference in order to gain value from the collaboration. However, big structural differences make the collaboration harder, since coordination issues most likely will occur due to language differences, for instance. From an IOC perspective, compatibility is assumed to be how similar firms' cultures are, since it is more likely that firms with similar cultures are able to collaborate and to understand each other easy (Knoben and Oerlemans, 2006). Though, IOC theories also claim that firms should not be too similar, because there must be a big enough difference in technology in order to learn and gain value (Mowery, Oxley and Silverman, 1998). Theories of CI are connected to compatibility since these advocate that firms must be similar to some extent, to set up common goals for the collaboration since different perspectives can make it hard to understand each other (Vangen and Huxham, 2000).

Lastly, OI is beneficial in turbulent environments and markets, where the future is unknown (Schweitzer, Gassmann and Gaubinger, 2011). However, it is important to understand that it can be hard for employees to work with OI and therefore, it is of importance to involve participants with the right set of skills (Alexy, Henkel and Wallin, 2013). This is because skills make them able to work in changing and uncertain environments. IOC theories present some aspects assumed as helpful in handling uncertainty while collaborating, for instance; trust between firms, leadership in order to develop the employees and the culture, and forming the firm's receptivity toward changes (Bass *et al.*, 2003; Forsström, 2005). CI theories focus on the leadership ability to manage collaboration across organisational borders, which in turn can be connected to the elimination of uncertainty. Since CI often occurs between two companies, one perspective is that a company is the lead organisation rather than having an individual as a leader (Vangen and Huxham, 2000). However, there are external circumstances that also affect the leadership, no matter the leader style or personality such as; the structure of the collaboration, the collaboration processes, and the participants themselves. This literature presents a leadership that can be applied to companies collaborating, for example during uncertain circumstances, called rotating leadership.

## 3. Methodology

*The third chapter presents the methodology used during the research period and how the researchers arrived at the conclusion. It starts with research strategy, followed by research design and an overview of the process. Thereafter follows a description of the literature review, data collection as well as data analysis. The chapter ends with a section targeting issues that are questioning the quality and validity of the research and an ethical reflection of the performance.*

### 3.1 Research strategy

This study is a master's thesis and took place during the autumn of 2016 in Gothenburg, Sweden. One of the research objectives was to contribute to the theoretical concept of OI, with how collaborations between companies can be managed in practice. The research was practically performed by studying IOC with innovation elements within the telecom sector in which the Swedish telecom company Ericsson was selected as object for the execution. To specify and limit the research area, two collaborating projects at Ericsson Gothenburg was chosen for the study.

A research can be performed in several different ways and the strategy used in relation to theory is affecting the research and its results (Esterby-Smith, Thorpe and Jackson, 2015). According to Bradford (2015), it is possible to have either *deductive*, *inductive* or *abductive* research logics and reasoning. Bradford (2015) explains deductive approaches as going from theory to observations, making it possible to try theories in reality. In general, a deductive method starts with theory that leads to new hypotheses (Collis and Hussey, 2014). Further, these hypotheses are confronted with observations of the reality leading to a confirmation or a rejection of the hypothesis. Deductive research has a top-down approach, starting with a general and theoretical perspective, followed by studying how valid the theories and literature are in real situations. An inductive reasoning is, on the other hand, somewhat the opposite to deductive, and in this strategy generalisations are made from specific observations that are related to theory afterwards. Bradford (2015) describes that inductive reasoning is how new theory materials or hypothesis are developed. The third perspective is abductive reasoning, which is initiated by using available but often limited information and testing hypotheses upon that. In this study, a deductive research approach has been used. Even though this study has not focused on confirmation or rejection of hypotheses, it can still be characterised as a deductive research approach. This is because the study initiated in current theories in order to study whether these were valid or not in reality, and since the study did not aim for the inductive creation of new theories, the deductive reasoning was suitable. In sum, by reasoning of how theoretical models and concepts are constituted and expressed, the research has a deductive reasoning while studied how IOC was performed at Ericsson Gothenburg within innovation contexts.

### 3.2 Research design

The research is designed as a case study and according to Yin (2014), case studies are appropriate when the research questions include words like *how* and *why*. As the research has aimed to study how the concepts of IOC and innovation are managed in practice at Ericsson, using a case study approach was suitable, but also since the research questions contained the words stated above. Also, as the theoretical contribution with this research has been to complement theories of OI with relational aspects from theories of IOC as well as CI, a case study was appropriate. Doing a case study has made it possible to show how collaboration aspects fit within the context of OI. Yin (2014) strengthens the researchers' decision with a case study, as the thesis studied a current phenomenon in reality, making a case study

even more suitable since the phenomenon was not concrete. Yet, there are also challenges with this kind of research design and Yin (2014) states several common concerns while using case studies. The biggest challenge is whether the research is rigorous enough or not, as there can be possible tendencies that researchers might influence the result. Another challenge is the difficulty in generalising results from case studies, as generalisations can only be done after multiple case studies or when multiple examples have been collected. In addition, Esterby-Smith, Thorpe and Jackson (2015) state that a case-study is one kind of research design that is performed during a limited timeframe, mainly focusing on a limited number of organisations, events, and individuals. Bryman and Bell (2011) define case-studies as;

*“[...] particularly appropriate for individual researchers because it gives an opportunity for one aspect of a problem to be studied in some depth within a limited time scale.”*

The projects that was studied at Ericsson were selected in consultation with a representative from the site and the thesis examiner. The first project was a collaboration that Ericsson had with a manufacturing company and a technical university. This project aimed to both implement a high technological network at a manufacturing facility as well as create a win-win situation of increased learning regarding the next manufacturing generation, meaning that all parties intended to learn how the telecom and the manufacturing industry can be combined. The second project was an innovation initiative that aimed to implement an innovation concept at the site, consisted of an area dedicated to innovation projects called the Ericsson Garage Gothenburg. Furthermore, the researchers did also include how Ericsson conducted IOC s in general at the site. The company and the projects are further described in chapter 4, Description of the case study.

Further on, a case study is a research design that can be applied in either *qualitative* or *quantitative* settings (Yin, 2014). When choosing between qualitative and quantitative approaches researchers must consider both advantages and disadvantages of the settings. A quantitative research is numerical and describes reality via statistical findings, whereas a qualitative strategy implies more difficulties in determine data since it is of non-numerical kind, rather in words (Bryman and Bell, 2011). Data collection strategies in qualitative researches are, in general, more time consuming compared to quantitative approaches. Therefore, qualitative approaches often result in smaller samples of data, which has to do with the scope of qualitative researches as such tend to be very wide. Case studies are, according to Eisenhardt (1989), often combining data from several sources, such as observations, interviews, and archives. The data can be, as mentioned, either qualitative or quantitative, but also both. However, researches with qualitative approaches can result in information and knowledge with deeper insight to situations and phenomenon with their contexts, as background studies (Baxter and Jack, 2008). Since it is difficult to measure IOC or innovation with numbers, a quantitative study is rather irrelevant. As the study examined a phenomenon in a real setting, a qualitative data collection approach was therefore preferred.

### 3.2.1 Performance overview

The research performance is illustrated in figure 3 below and further described. The research first phase was initiated with the creation of a general plan for the performance of the study. In this phase, the researchers gained an overview of the possible theoretical areas to immerse themselves in but also a brief understanding of the main theoretical concepts.

The second phase was introduced by a broad literature review, in which the researchers spent several weeks reading and sorting out what could be of interest to include in the study. This was followed by a deeper literature review and creation of the theoretical framework. The extensive literature review

facilitated the writing of the theoretical framework, due to the depth and breadth in the theoretical understanding that the researchers gained. Even though the literature review was introduced in this phase, it was an iterative process that continued throughout the rest of the study. As the theoretical framework of the study has been based on three literature areas; inter-organisational collaboration, open innovation and collaborative innovation, the researchers aimed to be able to use all fields when the findings were combined and analysed.

During the third phase, the studied projects were determined. The aim of the study was also specified at this point as well as the research questions, although they were refined throughout the study. The aim was constructed in order to provide the theoretical contribution of extending the perspective of collaborations in OI, as well as practical contributions since it studied how IOC with innovation elements was performed in reality at Ericsson, within the telecom industry. This was also the phase in which the methodology of the study was determined upon, due to the possibility of performing a case study and interviews at Ericsson. In addition, the researchers signed NDA and read Ericsson's code of conduct in order to create an ethical basis of the research.

The fourth phase includes the main part of the performed data collection. The data base of this study mainly originated from interviews conducted during this phase but also through internal documents and observations. The researchers performed twelve interviews with representatives from Ericsson in which the interviewees were divided into three groups. The groups constituted the Manufacturing project, the Garage project, as well as general findings regarding IOC and innovation at the site. As the interviewees were divided into these groups, the interview form was slightly tailored to fit each interview group.

The fifth and last phase of the research included the analysis, which was based on both the empirical findings as well as the theoretical framework. In order to sufficiently analyse the findings, the researchers based the analysis on the developed table in the syntheses. Further, all meaningful quotations from the transcripts were sorted and translated into English, and coded based on the two research questions. This phase also included the finalisation of the report, in which all chapters included in the thesis were refined and finalised.

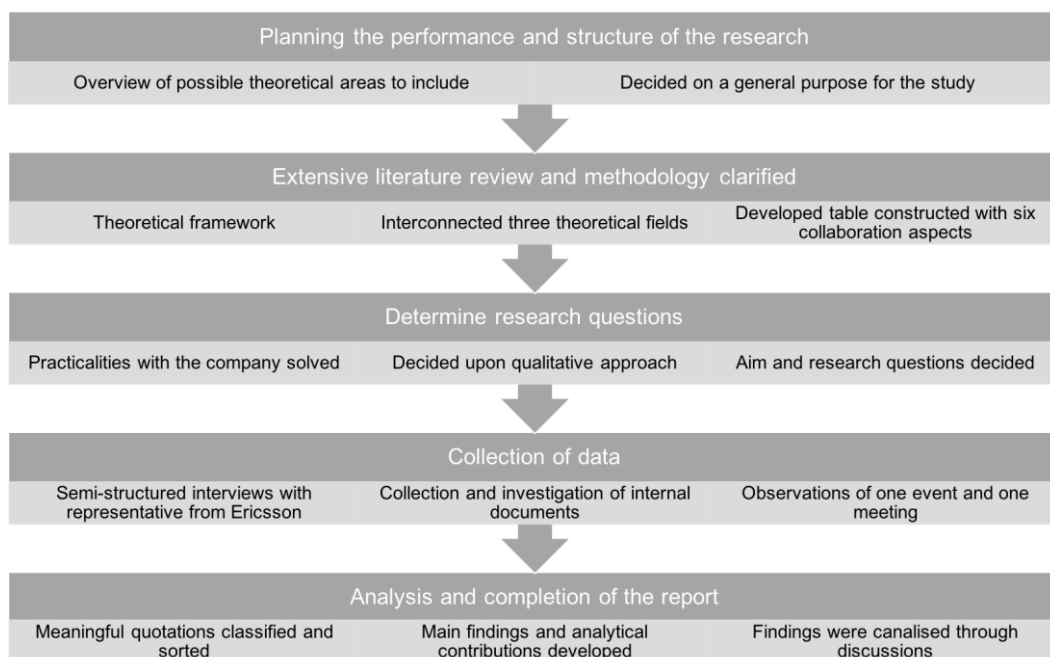


Figure 3. An overview of the research performance.

### 3.3 Literature review

The literature review intended to provide a background and deeper understanding of the research area, to problematize around central concepts, and to carve out possible gaps within the area of inter-organisational collaboration, open innovation, and collaborative innovation (Bryman and Bell, 2011). It also intended to create a frame of references to use during the analysis and the literature used in the study can be found in chapter 2, Theoretical framework. By writing a literature review, the researchers made sure that they did not invent the wheel again, as they understood what was already known in this area. (Bryman and Bell, 2011)

As this literature review treats subjects that can be seen as tangible and with the possibility to change over time, a narrative approach to the literature review, is according to Bryman and Bell (2011), more appropriate than a systematic. A systematic approach makes the review both transparent and replicable, since it involves a broad range of sources that includes several disciplinary areas (Esterby-Smith, Thorpe and Jackson, 2015). Thus, it limits the creativity and intuition of the researchers and is restricted by the accessibility of sources. However, the qualitative nature of the study implies that the literature review should have a narrative approach (Bryman and Bell, 2011).

To organise the literature review and references, a software tool called Mendeley was used. This software tool created conditions for the researchers to share literature and references between each other through an online function. This constituted a base for the theoretical framework, which has a structure of a mental funnel, from broad to more narrow, as can be seen in figure 4 below. It starts with a general explanation about *inter-organisational collaboration* from an innovative perspective. Thereafter follows the concept of *open innovation*, focusing on the revealing and sourcing part of this concept, as collaboration provides a basis for this study. The framework ends with the concept *collaborative innovation*, an extension of OI, in order to narrow the theoretical area and to create a detailed level of collaboration related to innovation.

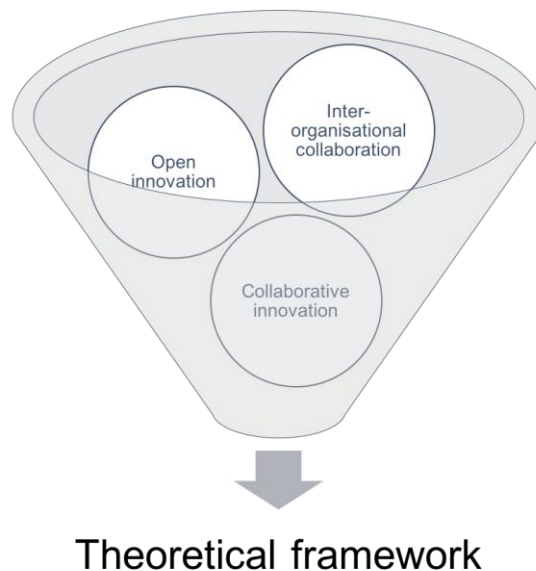


Figure 4. The structure of the theoretical framework.

To access literature, the researchers used online search engines such as *Summon* at Chalmers Library webpage and *Google Scholar*, but also academic libraries at Chalmers University of Technology and the University of Gothenburg. The literature review mainly comprised peer reviewed articles in

scientific journals, accredited books and up-to-date online sources. Search terms that have been used are for instance; *innovation, open innovation, collaboration, inter-organisational collaboration, organisational collaboration, collaborative innovation, telecom, telecommunication and telecom industry*.

### ***Combination of the literature fields***

Since the theoretical framework is separated into three theoretical fields, the researchers intended to illustrate how these fields are combined and how they complement OI. Firstly, every reference used was categorised based on the subjects that were presented in relation to the sources at different search engines, mainly found at Summon. Secondly, all references and subjects were mapped in relation to each other, in order to find out the most frequently occurred subjects. Though, some subjects were neglected as they were considered as irrelevant for the study. The literature subjects can be found in appendix *i* and the most occurring one in appendix *ii*, which also includes the references used in the theoretical framework. The dots in appendix *ii* indicate the subjects which each reference includes.

As can be seen in Appendix *i*, a lot of different literature fields have been covered in this study. This implies, together with what several references state about the shallowness in these theories, that it is very hard to sort any of the theoretical areas into definite fields. Although, it is possible to see in Appendix *ii* that many references cover the same literature fields, implying that it is possible to use literature from the fields of IOC and CI to complement OI. The most commonly occurring literature fields were; *management, business, strategic management, innovation, collaboration, leadership, technology, network, and R&D*. Though these areas are broad and general in their nature, the connection between them and the three theoretical fields opened the possibility to develop a synthesis about the theoretical framework and to argue for how the different areas was combined in the analysis. In other words, it helped to concretise the theoretical contribution of the study.

### ***Theoretical synthesis***

The synthesis of the report was created in order for the researchers to summarise the theoretical framework and highlight what theoretical aspects that are mainly used in the analysis. The synthesis was also an important step in the illustration of how the literature of OI was supported by the other two fields, in the collaborations aspects of innovation. The main part of the synthesis constitutes a table that shows how the three theoretical areas have been combined, while the rest of the synthesis section describes of the underlying arguments of the combinations. The developed table was created by starting in the OI section of OI in the theoretical framework, from which six central *developed aspects* were determined; *partner selection, knowledge and knowledge exchange, openness, legal mechanisms, compatibility and uncertainty*. Further, what was stated regarding these aspects in the sections of IOC and CI was sorted as well. The six developed aspects were central and important aspects found as frequently occurring in the theoretical framework.

## **3.4 Data collection**

The main method for the data collection was semi-structured interviews with employees at Ericsson that had experiences of innovation characterised IOC. The other methods used for collecting data was through internal documents and observations. The documents studied mainly contained descriptions of how the Ericsson Garage in Gothenburg is supposed to be managed and organised from an overall perspective of the Garage program. These contributed to a wider perspective of the organisation of the collaboration. The observations conducted an increased understanding about how Ericsson's collaborations work in practice. Using several sources for collecting data makes the research a multiple collecting approach, which is characterised by data taken from two or more qualitative methods



(Creswell *et al.*, 2007). This generated a deeper picture and understanding for the researchers of this report.

### 3.4.1 Interviews

Twelve semi-structured interviews were held with employees from Ericsson, see table 6 in chapter 5 regarding empirical findings for details of the participants. Semi-structured interviewees are beneficial since such interview technique allows follow up questions that support the researchers of having open minds about what data should be collected (Bryman and Bell, 2011). The qualitative research design of this study aims to gather in depth answers in order to be able to track underlying reasoning behind them, which also implies that semi-structured interviews are suitable. There is, according to Yin (2014), important to interview well informed participants, and interviews can help researchers to smoothly understand the core of issues or events. Yet, there is always the risk with bias, poor recalls or limited articulations when using answers from interviewees. The interview persons were all well informed of the study, had experiences of external collaborations and innovation, and were gathered with help from the researchers' supervisor at Ericsson. This makes the selection of the participants valid.

The interviews were performed during a period of five weeks, in which each interview was transcribed after its performance. Bryman and Bell (2011) claim that transcription is a time-consuming process and therefore it was done by the researchers collaborating in order to speed up the process. The transcriptions resulted in 127 transcribed pages. After each transcript was finished, it was sent to each interviewee for approval of the researchers' interpretation of increasing the transparency of the study. Further on, the interviews were held in Swedish, in order for the interviewees and researchers to be as comfortable as possible, making sure that as much information as possible were gained from each interview since it was held in the majorities mother tongue. Each interview took approximately 60 minutes and each transcription took four to six hours to complete. According to Bryman and Bell (2011), interviews can be either structured or unstructured, where structured emphasis to use predetermined questions asked in the same way to all participants to receive comparable answers. Unstructured interviews, on the other hand, enable the direction of the interviews to vary dependent on the answers, and is therefore seen as more flexible. However, these kinds of answers can be harder to compare with each other as they might differ. Although, even if this study was based on semi-structured interviews it has used a mix of both structured and unstructured interview methods, meaning that predetermined guidelines were used but questions were adapted during each occasion based on how each interview progressed (Bryman and Bell, 2011). The main advantage of a semi-structured approach is that each interviewee has a greater freedom to design the answers. Furthermore, the interviews were conducted face-to-face with the participants. Conducting the interviews face-to-face is the most common qualitative technique and it favours social cues, meaning that extra information can be gained by body language, voice, and intonation for instance (Opdenakker, 2006). However, it is quite likely that the researchers might affect the participants' answers as the interviews were seen as discussions between the researchers and the participants than only a time for asking questions.

The interview questions were based on the research questions as well as the theoretical framework. As the interviewees were categorised in three groups, the interview questions were slightly adapted to fit each interviewee group, see appendix *iii*, *iv* and *v* for the outlines. To create as good basis as possible for the result of the study the interviewees were chosen by the researchers' mentor at Ericsson, yet the interviewees were also asked to participate voluntarily. Both researchers were present during the interview occasions which took place at the site in order to use a familiar environment that was comfortable and available for the participants. Each occasion was introduced with a presentation of the research to give the interviewees a deeper understanding of the study followed by a presentation of the

researchers. One researcher was responsible for asking questions while the other one took notes and asked supplementary questions, and these roles were exchanged between the interview sessions. Moreover, the interviews were also recorded in order to not distort or miss any vital information. In order to conduct the interviews as good as possible, techniques such as pausing for reflection time was given, follow-up and clarification questions were asked to make sure the participants gave as deep answers as possible, and neutral voices were used.

### 3.4.2 Internal documents and observations

Two other data collections methods were used, in order to support the empirical findings as well as deepen the analysis. Internal documents mainly regarding the Garage program and documents regarding Ericsson organisation structure were examined. To support the other findings and to have the possibility to compare the reality, empirical findings from the interviews were connected with what was actually stated in the documents. Further, two observation occasions were also conducted, the first was an inauguration of the Garage and the second was a meeting that the steering and operational group of the Garage had. During these observations, it was possible for the researchers to intercept moods and discrepancies between the reality and what was stated in the interviews. No internal documents were examined nor any observations were conducted regarding the Manufacturing project or the other IOC settings at the site, because no such documents or meetings were accessible for the researchers during their limited period of time when conducting the study.

## 3.5 Data analysis

The data analysis intends to answer the research questions presented in the introduction, and dig deeper into the area of future research. It connects the theoretical framework, by the synthesis, with the empirical findings collected. The data that has been analysed can be found in chapter 6, Analysis, and it contributes with an illustration of how the theoretical fields have been applied to the empirical findings, and vice versa. The analysis also visualise how the fields of IOC and CI are supporting OI by the developed aspects, contributing in a theoretical matter.

To describe how the analysis was done in practice, all quotations from the transcriptions were cut out and sorted into categories based on the research questions and the developed aspects from the synthesis. Quotations that did not fit into any particular category were sorted into a group called *other*, which afterwards was analysed and sorted into the other categories. When all quotations were categorised, each category's quotations were sorted into even more specific subcategories depending on their contexts. The practical classification was performed manually, in which the researchers used large paper sheets to attach the quotations. This did, according to the researchers, create a good visibility. The choice of analysing the empirical findings in this manually way can be questioned. Esterby-Smith, Thorpe and Jackson (2015) claim that there are a lot of benefits by coding findings via software tools, since it makes it possible to more easily process large amount of data and be able to correct mistakes easily throughout the process. At the same time, all coding or classification were based on the researchers' judgements and in this study it was more appropriate to do it with paper and pens, which was considered to be of greater importance than choosing a software tool for the sake of itself. When the classification was made, the meaningful quotations were analysed relative the theoretical framework, in order to illustrate similarities, differences, and gaps in both the findings and the literature. Furthermore, to follow an accordance though the analysis, discussion and conclusion, main empirical and analytical findings were highlighted in the analysis and further discussed in chapter 7 and 8, Discussion and Conclusion.

### 3.6 Quality and validity of the study

When discussing the quality of researches, the terms reliability and variability are commonly used, however this is not the case in qualitative studies as measurements of amounts are not used (Riege, 2003). Instead, Bryman and Bell (2011) describe four alternative criteria that can be used in qualitative studies; credibility, transferability, dependability, and conformability. Credibility indicates the importance of trustworthiness in research and this can be increased by respondent validation and triangulation (William, 2006). In this study, mainly primary references have been used which have been found at reliable sources. In majority, the references that were used had gone through peer-reviewing. Also, the interviewees had the opportunity to approve or disapprove the transcripts, yet respondent validations include the risk of the interviewees trying to steer the research in favourable directions.

To what extent qualitative research findings can be generalised and used in another situation is referred to as transferability (William, 2006). Reinecker and Jørgensen (2013) argue that it is not possible to generalise results from a small base of cases and that research with a limited amount of cases must be narrow to be able to use the results. This means that the result from this study cannot be generalised, neither at the focal company nor at others companies. Though, the result can be of interest for future research in the area of IOC and OI. At the same time, conclusions can be drawn regarding the particularly studied projects at the site.

Dependability questions whether one finding will end up the same if it is observed once again but at another time (William, 2006). This study has increased its dependability through keeping records and notes during the data collection, making sure that all data can be found later. By transcribing the interviews, the researchers created a more detailed view of the phases of the study, as the transcripts reflect features in a certain time and situation. However, since the study has a qualitative approach it is commonly assumed that it is not possible to get the exact same results twice.

Finally, conformability refers to the degree of objectiveness and to what extent other researchers can gain the same findings and result (William, 2006). This means that the researchers do not include their own values or steer the research in favourable directions. The researchers had a neutral approach during the entire research process without trying to imprint the result. For instance, the researchers were open minded during the literature review before excluding topics, the interview occasions took place at the interviewees' site, and the researchers tried to be as neutral as possible during the interviews regarding all questions and in the way they were asked. Yet, Esterby-Smith, Thorpe and Jackson (2015) claim it is not possible to be totally objective.

Moreover, other aspects that could have been considered as relevant for the quality of the research were time and number of interviews, language, and whether or not the transcripts were presented to the interviewees. Regarding the time and the number of interviews, if more than twelve interviews would have been performed, a deeper data collection and a more extensive analysis could have been conducted. Additionally, if each interview would have been longer than 60 minutes, deeper reflections regarding both questions and answers could have been captured. This is believed to be the case, since time favour trust, this could also have been accomplished by a larger number of interviews with each participant. Though, since this is a master's thesis, the time was limited. Furthermore, the interviews were held in Swedish, which resulted in translation work when the material was included in the report. The translation can result in difficulties when quoting the interviewees in explaining the result of the data collection. As the report based a lot of analysis on quotations the language became a barrier, though the participants had the opportunity to correct inaccuracies, it is considered as trustworthy.

### 3.7 Ethical consideration

When conducting a research, it is always of importance to enlighten ethical issues related to the performance. According to Bryman and Bell (2011), there are ethical principles that should be taken into consideration namely; harm to participants, lack of informed consent, invasion of privacy, and deception. In order to meet these principles, an ethical guideline was set and followed through the research. Firstly, all interviewees participated voluntarily, resulting in commitments to share information and knowledge. Secondly, at the beginning of each interview sessions, the research presented themselves and the aim of the thesis, in order to give the interviewees an understanding of the study. Also, the contribution of the participants was explained to make sure that they understood how their answers would be used. This created a consent between the researchers and the participants, which hopefully reduced misunderstandings. Thirdly, all interviewees participated anonymously, which secured the possibility for tracking and tracing participations. Finally, since the interviews were recorded, the interviewees had the possibility to pause the recording whenever they wanted and the researchers signed non-disclosure agreements to make sure the interviewees felt comfortable. Since the quotations with meaningful content were translated, there was a risk that inherent nuances might get lost. To inhibit this, the researchers discussed each quote before deciding on translation with wording that was considered to bring out as much as possible from what the interviewees meant and said.

## 4. Description of the case-study

*This chapter describes the case study, starting with a presentation of Ericsson as a company followed by its site in Gothenburg. The projects that have been studied are further presented in order to give the reader an understanding of these before reading the empirical findings.*

### 4.1 The company

Ericsson is a 140 years old world leading global company active in the telecommunication industry and is the world's largest constructor of infrastructure and network for mobile communication with customers in over 180 countries. The company is mainly delivering ICT solutions such as cloud services, mobile broadband, as well as design and optimisation of networks. Ericsson's services, software and infrastructure are enabling the communication industry and other sectors to do better business, increase efficiency, improve user experience, and capture new opportunities. The company possess 40 percent of the world's infrastructure of telecommunication, showing the size of the firm. One of Ericsson's strongest advantages is their patent portfolio, implying that the company is focused on R&D in their business. Ericsson's ambition is to transform their core business with the mobile connectivity, and to enter new and adjacent industries. By doing so, the company believes that they are going to be able to create more value to their users in the future. (Ericsson, 2015)

Ericsson's site in Gothenburg mainly focuses on R&D as it is considered to be the heart of their operations, in order to strive towards their vision for a Network Society where connectivity is going to function in real time for everyone and everything. The goal for the site is to improve the business for the whole Ericsson group. The site is approximately employing 2,100 individuals and has an organisational structure that can be characterised as flat with few hierarchy levels. The structure can be seen in figure 5 describing the different units operating at the site. *Business units* are divided into two areas which are products and services, yet these are collaborating with each other either regarding network products or IT and cloud services. Ericsson research is also included in the business units, and responsible for research at the site. *Group functions* include units working within specific areas such as customer groups and industry and society. These units treat collaborations with the automobile industry for example, and are searching for new customer segments. Moreover, group functions include units that are supporting the business like finance, human resources, and legal affairs. (Ericsson, 2015)

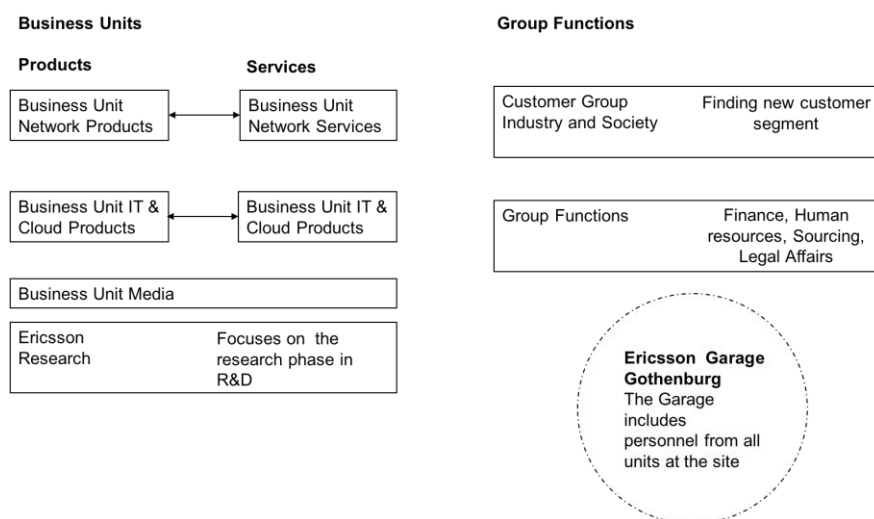


Figure 5. The organisational structure of Ericsson. (Ericsson, 2015)

The projects that have been examined in the study represent two different forms and characteristics of IOC at the site. The Garage project can be found in the organisational structure as this project is treated as a central side business at the site aiming to involve employees from all units. The Manufacturing project, on the other hand, does not have any specific place in the structure as it involves employees from different units all over the site. These projects are further presented.

## 4.2 The Manufacturing project

The Manufacturing project was a project that comprised a collaboration the site had together with a global firm active within the manufacturing industry and a technical university located in Gothenburg. Main focus in studying this project was the IOC between the site and the manufacturing firm, yet the university is also mentioned in some cases. The collaboration between the parties aimed to create and develop a connected factory enabled for ICT and 5G technology, in order to find potential future areas to work with. From Ericsson's perspective, this means that the site examined if their telecommunication technology can be used within the manufacturing industry and if so, also how it could be used. Formally, the project started in the beginning of 2016 and was expected to be finished in the end of 2017. This shows that the project was in the middle of the collaboration and execution at the time for this study, but no implementation had been started. The project could be defined as a research project because it was partially governmental financed in which the financial support mainly went to the university. Ericsson and the manufacturing company were partly supported by this financing, but they were also financing their own amount of spent hours in the project. Furthermore, it was found from the interviews that the site had never done any similar collaborations before, making this a challenging task as it was a new way of collaborating.

## 4.3 The Garage project

The site had worked on an innovation initiative in order to be able to facilitate innovation and IOC in an attractive way at the site. This initiative was called Ericsson Garage Gothenburg, and referred to the Garage project in this report. The Garage project was defined as a technology and knowledge incubator, supposed to develop ideas into tangible and minimum viable products, further called MVP, and it constituted a physical area centrally placed in the building at Ericsson. The main idea of the project was that it should be a physical place where Ericsson's employees and external representatives can work on new innovative ideas in mixed and cross-functional teams. This means that, when the Garage is running, there will be different teams working on innovation projects there. Globally, Ericsson has several Garages which all are included in a global Garage program. In Sweden Ericsson had two Garages, one was studied in this project and the other one was located in Stockholm representing the headquarters for the Garage program. The Garage projects examined was the newest as it was inaugurated in October 2016, at the same time as this study was conducted, and a large group of employees and external representatives were gathered to visit the area where current projects at the firm were presented. This shows that the Garage was in its starting point at the moment of the study and the internal employees were introduced to the Garage area. More specifically, no teams had started working in the physical area during the study implying that the actual collaborations for the teams constitute the plan of how the collaborations will be organised. As the Garage was recently implemented one of the biggest challenges was, according to the interviewees, to actually create value for the company in terms of new innovations.

## 5. Empirical findings

*This chapter presents the empirical findings of the research mainly gathered from in-depth interviews. It starts with a description of the participants from the interviews, followed by findings related to the first research question highlighting the importance of IOC from an industry and site perspective. Findings regarding the second research question is further presented in which findings from the projects are described as well as additional findings considered as more general.*

### 5.1 The interviewees

The employees that participated in the interviews are presented in table 6 below. What is notable is that they represented different units at the site and different hierarchical levels, indicating that different perspectives have been given. Furthermore, the table separates the participants into three areas; general, the Manufacturing project, and the Garage project, depending on what they have been interviewed about as the study examined IOC and innovation, from three forms.

Table 6. A list of the interviewed participants in the study.

	Interview alias	Role	Unit	Years at Ericsson
<b>General</b>	A	Head of Systems and Technology	PDU Packet Core	21
	B	Program Director for 5G for Industries	Ericsson Research	18
	C	Intern consultant	Industry and Society	<1
	D	Senior Strategic Marketing Director	Industry and Society	9
	E	Change Manager and Innovation Driver	PDU Transport	16
<b>The Manufacturing project</b>	F	Research Manager	Ericsson Research	16
	G	Researcher	Ericsson Research	17
	H	Solutions Systems Manager	Business Unit Cloud Technology	20
<b>The Garage project</b>	I	Innovation Manager	Business Unit Cloud Technology	20
	J	Resource Manager	Operational Support System	17
	K	Innovation Specialist	Microwaves	10
	L	Business Development Manager	Industry and Society	3

### 5.2 The role of inter-organisational collaboration

During the interviews one main goal was to explore how the participants thought of what impact IOC has on the telecom industry as well as the site. Therefore, this part presents the answers and can be related to the first research question of the study.

#### 5.2.1 An industry perspective

When it was discussed if the telecom industry somewhat is dependent on IOC, many of the interviewees mentioned the current situation as one of the main driver to why Ericsson should engage more in IOC. The industry is, according to person F, facing a paradigm shift where technology is leaving and person to person communication is moving towards for example applications like Internet of things. Person B, complied this argument and added that the telecom sector will not grow on its own, but it is possible to

see many opportunities for the company when the society is becoming digitalised. It will most likely be a huge growth the coming ten years, making IOC important in order for firms to find their new roles.

The reason why IOC and innovation are important, according to person C, can be derived to the shortening of product life cycles and production cycles, making it very important to involve more perspectives into innovation processes. This paradigm shift in the telecom industry was highlighted by several interviewees. Yet, person A described the reason to this in a very good way; as the telecommunication technology has become a commodity and there are no obvious expansion possibilities for Ericsson at the moment.

*“The telecom industry is now experiencing a breaking point, because telecommunication has become what is usually called a commodity. Something that the customers are expecting to exist.” Person A*

It was further found that IOC and innovation are important for the company's future positioning. It was, according to person H, important to find new areas to step into and find new solutions to lead Ericsson to a bright future. Yet, the uncertainty regarding where the telecom industry is heading is not possible to avoid. The Garage was considered as one possible way to solve this uncertainty by coming up with new ideas. Furthermore, even though it was found that the industry is facing a change, some participants claimed that the current partners in the supply chain cannot be forgotten. Ericsson is building a huge part of their business on standardisations, making the company forced to collaborate to understand future needs in the communication infrastructure. This unite firms within the telecom industry and make them create and agree on new systems and standards. Therefore, it was found to be important to have functions that are suited for IOC, because collaborations are so important, especially in this industry. According to person J there it is too much focus on optimising current products and what is already known, and increased use of IOC in the present value chain could results in new innovations in this area. Another person claimed that employees had a negative attitude toward such collaborations in terms of thinking that they already know everything worth knowing.

### 5.2.2 A site perspective

The thoughts regarding the site were considered to be more similar, compared to the telecom perspective since most participants focused on the site's location. Many of the interviewees talked about the possible advantages of being situated in the in the West Swedish automotive cluster, which was described as an ecosystem located in Gothenburg. One of the benefits was that the site has a geographical closeness to the companies involved in this ecosystem. It was argued that the expansion of autonomous and communicating vehicles will probably give the site an ever stronger position in this system. However, person D stated that in order for Ericsson to stay relevant in these matters, the company has to work hard and active in these technology fields.

The site got a favourable location in the city and, according to person K, there are many collaboration opportunities because of universities in the city, the automotive cluster, and other big companies located there. This person believed that the most critical way to understand other industries is by physical meetings. In general, it was believed that competition is getting harder in all industries, and this interviewee, believed that companies in most industries are sensing that it is of importance to get to gather and learn from each other via collaborations.

*“Inter-organisational collaboration is topical today, however open innovation and such have not only to do with trends. For Ericsson this has to do with the survival of the company. We have to think new and we cannot afford to develop everything on our own.*



*We do not have the competences in all areas so we have to include others to help us.”  
Person K*

External collaborations make it possible for Ericsson to include competent personnel, according to person B. Furthermore, it was found that the site also faces turbulent and changeable times where IOC can guide the site towards new industries or areas to get involved in, to overcome the uncertainties. Many interviewees implied that even though there are rough times, the site can be seen as a powerful Ericsson facility of the Swedish sites, due to the closeness to the ecosystem. A benefit of being situated in Gothenburg is, according to person L, the possibility to be a part of a strong network with other industrial companies.

Furthermore, when the participants talked about the importance of the location of the site, they claimed that Gothenburg is a city with growth potential due to future expansion plans by the city. The goal is that the city will grow to double size by year 2040. Also, it was found that IOC can function as a marketing tool, showing that the company is innovative for the rest of the network, but also to become visualised on different markets. This in turn could strengthen the value of the site as well as the brand. Person H had experiences in working with IOC, however this interviewee stated that these collaborations might not always result in anything concrete. On the other hand, they usually get a lot of attention in media, and exhibitions can function as a way to show that the site is a good collaborating partner.

It was stated that the amount of IOC at the site has evolved the past years and that IOC within the area of innovation has become more important. The reasons of this expansion were, according to person F, to find new use-cases and new technologies but also that Ericsson wants to learn from other companies and industries. Many of the interviewees shared the same thoughts, but Manager A illustrated this in a good way as this person reasoned upon collaborations and pointed out that IOC should not be a goal in itself. What IOC does is to give Ericsson a possibility to explore other industries, understand their needs, and innovate in ways that are meeting these particular needs. This person claimed that collaborations are essential for Ericsson, because it can lead them to contribute in other industries or even establish new ones.

*“Inter-organisational collaborations mean that we are getting better located on the map, we get more visual, and it opens up for even more collaborations. However, collaboration should not be seen as a goal in itself, collaborations are a tool for us to understand other businesses better and find innovations that address actual needs on different markets.” Person A*

Moreover, it was stated that it is very hard for sites in Sweden to compete with sites in developing countries, due to wage differentials. This means that Ericsson in Sweden must focus even more on innovation and R&D, rather than optimisation and maintenance in production. Person J visualised the Garage as a mean for strengthening the site’s position, because it was a possibility for the site to work even more with radical innovations. The Garage project was described as a facilitator for IOC and innovation and a way to increase knowledge, placing the site in the frontline of new developments in the future.

### 5.3 The Manufacturing project

In comparison to how employees at Ericsson were used to work regarding structure, the structure of the Manufacturing project was characterised as a production organisation structure, in which the project was divided into four different workpackage, further referred to WP. The WPs were following the life cycle of a production system and the structure is illustrated in figure 6 below. The structure was

hierarchical, with a steering group at the top consisting of one representative from each party involved, and one member from the funder, however this was the only level the funder was involved in. The steering group was responsible for strategic decisions regarding the project. The second hierarchical level consisted of three coordinators, from each party operating in the collaboration. This group managed the communication flows between the steering group and the WPs. These coordinators were also members of the WPs and some were members in the board as well. At the third level are the WPs which consisted of members from all parties in which the amount of members depended on what phase the project was in. Each WP had specific responsibilities, called demonstrators, which divided the WPs in different topics. One package handled preparation and design of the long term evolution-network, called LTE-network, while another one managed the installation of the network. A third WP was responsible for the actual performance of the manufacturing, while the last handled ongoing maintenance supposed to take place after the network was planned to be implemented.

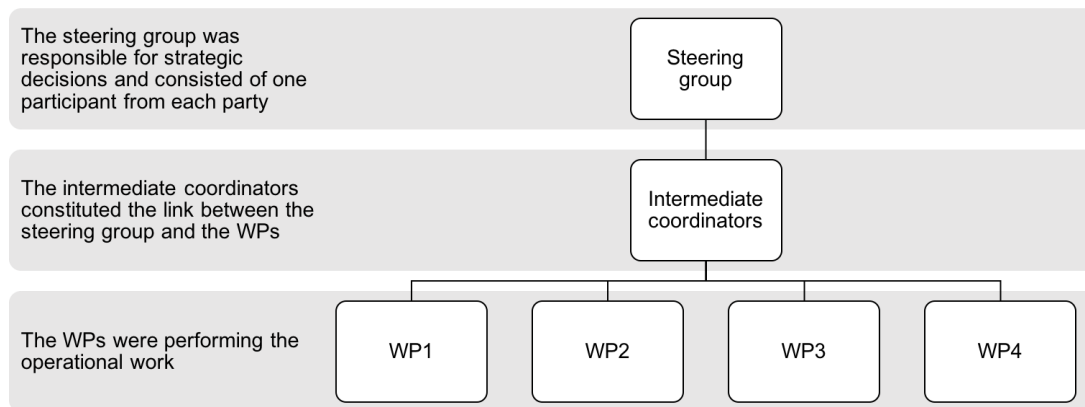


Figure 6. The structure of the Manufacturing project.

The project structure was based on the manufacturing firm and the university's initiative, reflecting their daily functionally based work in the manufacturing industry. The organisational structure at Ericsson was flatter, and employees were rather used to work sequentially. Furthermore, it was found that interviewees believed that a sequential structure probably would have fit Ericsson better as the firm wants to deepen its insight into all parts of the manufacturing industry. The interviewees thought that a flat, sequential structure most likely could facilitate a broader perspective of the manufacturing industry.

### 5.3.1 Initiation and development

This part describes the initiation and development of the IOC in the Manufacturing project. Initiated with the search process followed by collaborating goals.

#### **Search process**

The Manufacturing project was a part of a larger national investment in which the initiation started at a national level as all Swedish sites of Ericsson wanted to evaluate 5G possibilities in different industries. The overall goals for such investments were to examine how the future telecom technology will look like and how it can be applicable in different industries, where manufacturing was one example. One interviewee claimed that it is a good opportunity to invest the technology in Swedish industries because Ericsson has a closeness to many industries and good contacts. The reason why the site in Gothenburg was assigned the manufacturing area from the first point was because this manufacturing firm had just decided to build a new factory as a pilot project in order to learn how future factories could look like. This started an initial dialogue between Ericsson and the manufacturing firm on the site's initiative.

Since both parties saw new opportunities with existing technologies, it was possible to characterise the project itself as innovative as the technology was supposed to be applied in new environments.

It was stated that the initial dialogue resulted in an application to get governmental financial support for the project. The governmental firm approved the application and due to the research potential, a university was also involved and dedicated to lead the project. The university contributed with resources in forms of professors and researchers from the department of production systems as it was considered as suitable for the project's purpose. The manufacturing firm and Ericsson contributed with resources in terms of human knowledge in each technological area. A general finding regarding searching for companies to collaborate with, is that a central goal was to find synergies between different industries, as Ericsson saw in the Manufacturing project. Ericsson does not see any value in discussing collaborations with firms if they do not perceive any value or benefits of doing so.

Regarding suitability, Ericsson and the university have collaborated earlier but never within this particular field of manufacturing, nor have Ericsson ever collaborated with a manufacturing firm in this way. When the researcher asked if the manufacturing firm could be seen as a potential strategic partner for Ericsson, person F answered that it was not considered yet. Ericsson must first examine the communication technology potentials and the manufacturing industry itself before decisions regarding future partnership could be taken into consideration. However, person H expressed a wish that the parties together hopefully will come up with something new, which in turn could result in a strategic partnership in the future, showing a willingness to collaborate.

*"A part of the expectation is that what we are doing right now might not be something new, but I hope we will successfully innovate something new together." Person H*

### **Collaborating goals**

The strategical goal for Ericsson was to increase the understanding and knowledge of how ICT can be applied and used in the manufacturing industry. By doing so, Ericsson must get to know the manufacturing firm and its environment to understand the company and industry's needs. This goal was shared by all participants and is exemplified in the following quote by person F, illustrating the findings;

*"Primarily it is to understand what kind of communication needs that exist within the manufacturing industry. If we understand that, we have a much better basis for deciding internally if this is something worth invest in." Person F*

From the perspective of the manufacturing firm it was understood that their primary goal was to understand how 5G can be used in their factories and in industry 4.0, the next manufacturing generation. The university's goal was also to deepen the understanding about 5G and the next generation communication solutions. In sum, all parties involved in the collaboration aimed to increase their own understanding and knowledge about the communication possibilities in manufacturing environments, making these goals strategic. To reach such strategical goals, a more operational and concrete goal of the project was used. This goal was the actual implementation of a LTE-network in the factory. It was found from an observation and internal documentation that for Ericsson, this goal means to contribute with implementation of the network and then analyse the data gathered. The manufacturing firm, on the other hand, strived for the goals to improve production efficiency and flexibility, reach excellent traceability, and generate social and environmental sustainability. From one interview, it was understood that the fourth goal regarding sustainability only implied social aspects, indicating an opposition between the interview and the internal documentation. The documentation clearly described both social and environmental aspects when working towards sustainability in the project. Furthermore, person G

claimed that the work with sustainability had not yet been started because the manufacturing firm had not yet shown any interest of introducing it.

Another step in the process of implementation a LTE-network was that each WP is dedicated approximately two demonstrators, which could be characterised as intermediate goals. One of the interviewee claimed that it was a challenge with the amount of these demonstrators because Ericsson normally works with one or two at the same time, and not seven. The same person also claimed that the demonstrators have not been sufficiently defined, which has created an ambiguity between the project members of what to focus on.

### 5.3.2 Collaboration performance

This part describes the performance of the collaboration in the Manufacturing project which includes legal aspects, the leadership, how the parties were in contact with each other, and the meaning of trust in the project.

#### *Legal aspects in relation to IOC*

It was found from the interviews that the IOC in the project was based on contracts consisting of agreements controlling both IP and confidentiality. Contracts are almost always used in this type of collaborations at the site but there are always negotiations before contracts are written, to clarify the outcome of the collaboration. It turned out that not all participants knew who signed the contracts and what the contracts contained, only the steering group member could talk confidently about this in the interview, shown in an illustrating quote below. As the project was governmentally financed it had contractual requirements from the beginning. Person A claimed that when engaging in governmental financed projects there is always a framework to follow, already in the application of the funding. Though, other types of collaborations can face a lot of negotiation and issues as well.

*"We always have contracts when we get involved into this kind of collaborations. If we have an initial dialogue with a company, we do not need any contract but as soon as we begin collaborating more closely we need to create some form of agreement." Person F*

#### *Different aspects of leadership*

It was clear from the interviews that the university contributed with a member classified as the formal project leader. The main reason why the project had one outspoken leader was mainly because it was governmental financed, such projects require formality, both in the leadership and in the structure. It turned out that it is pretty hard to have a formal structure as this was a project constituting a collaboration between three different parties. The interviewees thought it is more important to care for the relationship and trustworthiness, than to care for the formalities. According to person F, it can be strange for the project leader to tell the other parties what to do and when, because such behaviour can have a negative effect on the collaboration as it in practice is characterised as a mutual partnership. In other words, the project had a formal project leader but this person was not steering the project in reality. Instead, it was found that the leadership rotated in some sense, in relation to the phase of the project. However, the rotation was not something that had been formally stated in the project, rather a perception by the participants. The reason why the leadership as switched is that the project manager does not have enough knowledge, making it appropriate for other members to take lead during suitable periods. Therefore, other members of the project could step forward and drive the project during some phases. Another person stated that this is generally the case for collaborations at the site, the control can vary between firms over time depending on what the party can gain from it and what is in focus. For the Manufacturing

project, Person H stated that since the members decide the time they want to spend themselves, it is easy to get responsibilities if wanted and the project itself could be seen as very free and open.

*“It is very free so it feels almost like everyone can do what they want, in other words you have a lot of freedom. This means that if you want to have more responsibility then you can have it.” Person H*

Furthermore, it was also stated that each WP was responsible for their own demonstrators and each WP can push themselves in their work. However, it was not a shared sense regarding the leadership in the WPs as one of the interviewees only knew who the leader was in the own WP and not who did lead the other ones. Another interviewee stated that the university got members that lead each WP, making the responses to this question ambiguous. It was found that projects with formal leadership can face issues if they do not have any mental attitude towards it. Earlier in the project there was lack of progress resulting in replaced leaders. Furthermore, the participants had divided opinions of how the leadership was organised in general in the project as one expected it to be fluctuating and another one wished more formality and structure.

### ***Communication channels***

All interviewees agreed that it is important to find a balance between the information that is shared between the parties in order for everyone to reach their goals. Some activities are more intense in certain periods which might require specific knowledge or experience from participants during such times. The Manufacturing project involved members that were needed occasionally to gain the right competences during specific periods. One of the interviewees had not been involved in the project from the beginning, and claimed that it might be harder to get into the project afterwards, since it had been ongoing for a while. This means that latecomers lack tracks of all details which might affect the individual performance.

Regarding how the parties were in contact with each other, person G claimed that all project members have met face-to-face once early, at the start-up of the project. Beyond this meeting, the project aimed to communicate and meet in different ways. Physical face-to-face meetings took place for the WPs occasionally and the location was usually rotated between parties' offices to create a fair balance. Between these meetings, the members communicated via Skype, phone calls or emails. The communication between and within the steering group and the WPs slightly differed. The steering group had formal meetings four times a year in which its members met face-to-face. At these times, a clear agenda was followed but it is also understood that they have meetings and communicated in between these occasions if necessary. The steering group determined strategic decisions, which were communicated to the WPs by the three coordinators. It is understood from the interviews that each party working individually between the meetings and the meetings aimed to sort out issues that had occurred since the last meeting was held and that no specific agenda was followed but the meetings were still structured. Furthermore, the coordinator from Ericsson identified that internal meetings with the site's representatives was needed and therefore were internal reporting meetings held, on biweekly intervals.

### ***The importance of trust***

It was clear from the interviews that all participants thought of trust as an essential and necessary detail in collaborations and that parties must be open in order to reach trust. Some business information is not supposed to be shared which was obvious for the interviewees since all parties involved got their own secrets, and the parties should not share information only for the sake of sharing. Moreover, one interviewee described the Manufacturing project being in a honeymoon phase, which might affect the

openness and what is shared and what is not between the members. Yet, person H thought that the project had a good dialogue with members daring to signal if something was unclear.

*"One could say that we still are a little bit in a honeymoon phase, where no one dares to say what they really think. However, I have noticed that all members want this project to succeed, which is very good." Person H*

It was found that since there was no central budget for the project and the members basically decide themselves how much to be involved, it is even more important to trust each other. This was because the project had an agile planning and the participation was voluntary, no party got mandate meaning that the collaboration must be built on friendship. Person G was the only one who stated that one way to reach trust between the parties basically lies on relying on the individuals involved rather than relying on the organisation itself, as the collaboration occurs between individuals.

*"In the end I think it is all about trusting individuals as in all projects, whether it is internal or external collaborations." Person G*

### 5.3.3 Challenges

Several challenges existed in this collaboration due to quite a few reasons and most of them were known, according to the interviewees. One interviewee claimed that it sometimes can be complicated to communicate between the four WPs since they were working with different demonstrators but still were dependent on each other. Furthermore, the fact that there were three parties involved does not make the collaboration easy. According to person H, this project was probably an even harder collaboration for Ericsson since they were not used to the structure of the project unlikely the other parties, which created some difficulties among the parties and added organisational complexity from beginning. This reasoning was also shared by the other participants from the Manufacturing project.

*"Especially when you have a structure as we have in this project, with four different workpackages, where it is hard to track what happens in the other packages. Maybe we should try to find a balance there. We are of course trying to get everyone to contribute equally [...] But it is not easy and it is very difficult to determine how much other members involved are working behind the scenes." Person H*

Another interviewee stated that the communication had been even worse earlier but it was synchronised at the moment for the study. Even though the communication between the WPs probably could be improved, it was still clear who to make contact with. However, the members of the project usually talked to the own organisation first to avoid to say anything stupid or seem unprofessional in front of the other participants.

Person G stated that Ericsson had learned what is important in the manufacturing industry so far in the project, but also that learning things like this requires a lot of time. To communicate the plans to each other have been found to be an important part in the project. Two of the interviewees described a misunderstanding that was raised in an early phase. According to these participants, Ericsson did not communicate their plans good enough to the manufacturing firm. However, the conflict was solved by Ericsson gathered information and explained the situation, which saved the project. Moreover, when the interviewees were asked to elaborate if the conflict could be related with competition between the parties one interviewee thought it could be some sort of competition while another one did not relate it to competition rather to bad communication from Ericsson's side.

Furthermore, it was described in the interviews that the start of the projects was slow because all parties used different terminology which created misunderstandings. One example described by the interviewees was the difference in the meaning of the term *operator*. Ericsson dealt with telecommunication language and its terms while the manufacturing firm and the university used manufacturing related terminology. The misunderstanding was that Ericsson meant telecom operators, while the other parties talked about machine operators leading to different definitions. One of the interviewees stated that this was nothing new and the parties was not surprised that a misunderstanding arose. Another example was that Ericsson understood that safety was one important aspect for the manufacturing firm and the university, though Ericsson did not exactly understand how important it was, which had been detected during the execution of the project. Person H stated that one reason why differences occur is due to differences in culture and technology, which became particularly clear in these specific examples.

*"There is a large difference in culture and technology and it takes a lot of respect and requires patience to understand each other. It is very easy to draw conclusions before someone has finished talking [...] In these cases, you might think that you understand what they are saying, but it does not always tend to be true." Person H*

Furthermore, the term *workpackage* for the subgroups was adapted specifically to this project, which one of the interviewees thought was far from obvious and the same goes for their names; design, deployment, operation, and maintenance and change. There were other terms that was mentioned during the interviews which the parties in the project had different opinions about, but these issues were handled by compromising and using new terms in order to share the same definitions and avoid future misunderstandings. One person claimed that in order to overcome challenges of not understanding each other, all parties must ask a question in at least ten different ways to really understand. Pictures can also be used to explain when words are not enough. It is important to not judge the other parties when collaborating by thinking that the other party is stupid and do not understand. However, it was stated that it is easy to judge many times and one must try to have good self-awareness to not do it. One example was that one participant did not consider it educational for the manufacturing firm nor the university to see prototypes of Ericsson's technologies. This is because it was assumed to be very basic knowledge, and just computers. Furthermore, even though misunderstandings occurred, this project have had a lot of discussions, briefings and presentations initially in order to decrease potential possibilities for misunderstandings.

A general challenge found in the interviews dealt with the level of ambition. If the ambition level has not been predefined there will be discrepancies meaning that the parties might contribute differently in terms of labour hours, for instance. Parties will most likely have different views of what to deliver which might lead to conflicts. Furthermore, the Manufacturing project had a challenge regarding the implementation of the technology in a new environment, as no party knew how to do it because it has not been done before. Person F illustrated this in a good way as this person thought that it is important to find right questions to answer in order to reach a successful result and a well-functioning collaboration, which can be very hard to find but also for all parties to understand. One goal was to implement the technology while another one was to increase the understanding of how this type of communicating technology can be used in manufacturing, which makes it hard to know when to focus on what goal.

*"It is important to find the right questions to answer which is a challenge in itself. [...] We are not only interested in this particular factory to function, but in the understanding of how our systems can work generally in the manufacturing industry. And the*

*manufacturing firm is most likely not only interest in this particular factory as they want our technology to work in all of their factories globally.” Person F*

## 5.4 The Garage project

The Garage project constituted a physical area for innovation, which is shown in figure 7. As can be seen in the figure, the physical area is divided into three zones in which the innovation projects will be able to work at different levels. The zone that is shallowest and daily exposed to the employees as they walk by is, according to the interviewees, going to be a place for exhibition of what is going on in the Garage. Projects that are being developed will be exposed there, in forms of videos and showcases, to the rest of the organisation. By doing so the Garage teams working in projects can gain both acknowledgement and feedback on their developments. The middle zone of the Garage is a place in which Ericsson managers will be able to reserve and use for short term innovation purposes, lasting one or two days in forms of workshops, meetings or presentations. The deepest zone of the Garage is where the Garage teams are going to be situated working on their projects. In general, a project can be executed in this zone between three to six months, yet these projects must be admitted before working there which none had during the study due to the early phase of the implementation.

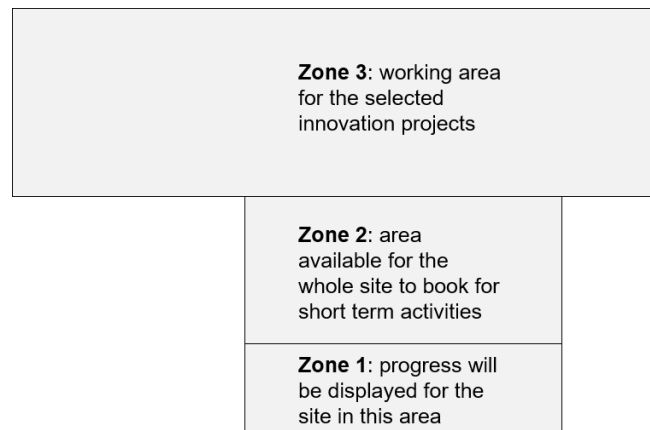


Figure 7. The layout of the Garage area.

### Organisation of the Garage

There was a group of people in charge of the Garage and its execution at the site. This group of people were at the moment of the study forming both a steering group as well as an operational group, even though the intention was that there will be two groups consisting of slightly different people in the future. In the current situation, this steering and operational group, further referred to SaO group, decided what teams and ideas that will be included in the Garage.

For teams wanting to join the Garage and develop an idea there will be a predetermined structure and workflow to follow, see figure 8. The Garage was not supposed to be a place for idea generation, rather a place for engaged employees to turn their ideas into reality. The main plan was that the Garage will house projects working with innovation and there will be a few stages for the teams to pass before getting seats in the deepest zone. In the first step the teams need to pass an entry board, constituted of the steering group deciding if the team have fulfilled the following criteria required by the Garage program; the idea must have some novelty to it, the team must have developed an idea that fulfils a clear need, the team must be able to answer to what value the idea aims to create for the site as well as what resources will be needed in the incubation time, the teams must also have an external partner included. If these



criteria are fulfilled, there will be a possibility for the team to get allocated time from their current managers and be able to work with their idea in the Garage.

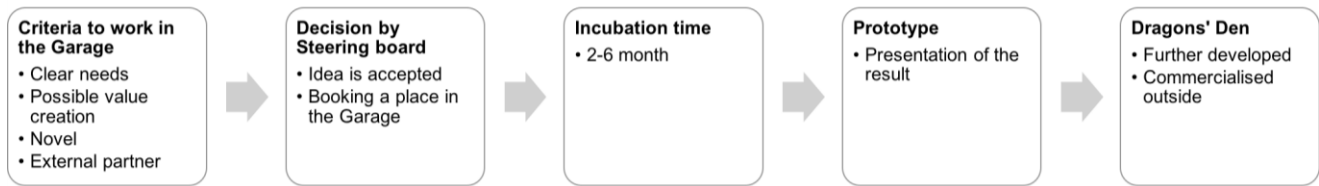


Figure 8. Workflow of the Garage.

Before the teams will be accepted into the Garage as well as during their time there, the teams will be supported by innovation coaches educated in methods such as lean start-up and design thinking. The idea was to letting coaches take place and provide the teams with the best conditions to develop their ideas. The Garage progress will be finalised by the team pitching their MVP to a Dragons' Den. The Dragons' Den will be constituted by people from the steering group and other top managers at Ericsson, existing on both local and global levels. However, the site will have their own Dragons' Den for local decisions regarding if developed MVPs are valuable for Ericsson, and how these should be executed further on.

The empirical findings will both focus on the Garage as a project in itself and describe how the Garage's innovation projects aim to be initiated and performed. It will also be presented how external parties will be involved in the innovation projects.

#### 5.4.1 Initiation and development

This parts describes the early phase of the Garage project, how it was initiated and developed but also how external partners are supposed to be found for the teams. Goals with the Garage and the innovation projects are presented as well as challenges.

##### *The beginning of the Garage project*

The launch of the Garage was a result of a focused project work to get the Garage facility and basic management ready for the inauguration. Even if the Garage in Gothenburg was connected to the Ericsson Garage program, the SaO group have been able to work independent to create a Garage concept they think suits the site. Person J, expressed feelings that there finally is a Garage at the site, making it possible to care for the innovations that the employees have and unite the site in a new way. It was clear that the Garage was seen as a good complement to Ericsson's current innovation processes. The same person explained that usually when an idea pops up at some unit it is put into a digital idea box, evaluated and might be a bit processed. What was seen as spectacular with the Garage is that there is a function that can capture ideas that have been slightly processed and help the originators to turn the idea into reality.

Aforementioned, one of the Garage's criteria for the aspiring teams was that the accepted projects include external partners. This means that the teams have to be able to attract other company representatives to their teams and work jointly with innovation. A finding was that the teams that want to apply their idea to the Garage first should use their own personal network in order to get in contact with potential collaboration partners. However, the SaO group can also support the teams with their networks outside of Ericsson, in order to pair up Garage teams with external partners. Another perspective was presented from person J who had a vision that the Garage will become a place where

anybody from anywhere can work with their ideas, and that it would be interesting for Ericsson to include such ideas.

A general finding from the interviews was that the search process in finding collaborative partners was a bit challenging. For external companies, it might be difficult to navigate and find the right persons and proper units at Ericsson to initiate a dialogue with. This can be traced back to the site as it was constituted on different units having different goals. Yet, this could also be the case the other way around, when Ericsson employees seek to initiate a collaboration with external companies. Furthermore, person I explained the Garage vision regarding the ability to include external parties into the projects. This vision was that the SaO group will look for companies suitable for the innovation projects in the Garage and hopefully also the other way around, that other companies will approach the Garage because they want to join. It was found that the Garage will make no difference between including small or large companies, neither regarding what industries companies are active in. If the partners are from other industries, it will only be seen as favourable for innovation. Yet, no competitors will be included in the innovation projects.

*“We will look for external companies that suit us and want to come here and work, but it will also be the other way around. The most natural to do, because we are situated in Gothenburg, is that we are close to the automotive cluster and the manufacturing firm in the Manufacturing project. We will not eliminate small companies to collaborate with us in the Garage. Strategically, this location holds one of the world’s strongest automotive clusters making it a great place to have a Garage at. [...] We will not include companies we know nothing about in the Garage nor direct competitors.” Person I*

Differences in company sizes, was found to be a general challenge for IOCs at the site. One person thought that openness can differ between large and small firms, as large ones might be scared to open up while small firms are more likely to be used to it. Contrary, another person stated that small firms might have extraordinary knowledge in special topics and therefore base their whole existence on that, compared to larger companies who probably have a broader knowledge base. However, there might be risks collaborating with companies with different sizes, according to person E, since smaller firms might end up as subcontractors when larger firms require more control.

*“In many cases I believe that Ericsson’s collaborating partner feel more like a subcontractor if it is a smaller company, as the smaller company only might listen to what Ericsson wants” Person E*

### **Goals for the Garage and its teams**

Person I claimed that the Garage consists of several goals, something that was also mirrored by the rest of the interviewees. One goal was to support internal cross-functional collaborations at the site, meaning that it is important to spread the word about the employees’ possibilities to work in the Garage. A second goal was to be able to work with other companies and gain a natural role in the ecosystem. What Ericsson wanted was to create a pull effect to invite companies for collaborations. A third goal was to develop products for commercialisation but also to explore and learn how Eriksson’s technology can function in new areas and industries. In addition, one could see the Garage itself as a goal, reached at the inauguration, yet the Garage also stood for reaching complex and strategic objectives.

Regarding the goal of including external parties to the Garage, several interviewees discussed their thoughts on this matter. It is possible to see the Garage as a mean for other companies to get benefits from the knowledge that exist internally at Ericsson. One interviewee expressed that the main idea with the Garage will be to make Ericsson, together with external parties, come up with something new that

none of them would be able to do individually. The participants included in the SaO group hoped to combine Ericsson's knowledge with external knowledge, in order to create something commercial to a third user.

In addition, the Garage also incorporated some other goals. Person J stated that the Garage can be seen as a mean for building Ericsson's brand through getting attention and becoming an inspiring company to work with. Person I also discussed this and wanted the Garage to lead to other companies thinking that Ericsson is cool to work with, thereby making the Garage function as a marketing and public relations tool. This person clearly saw the Garage as a marketing function. The site had always been acknowledged as a closed player in the ecosystem, and the Garage was supposed to steer the perception of Ericsson towards openness. Furthermore, from the interviews it was found that, even though the Garage program's goal is to have the Garage as an incubator for technical projects, the Garage at this site should also demand the projects to have clear business cases. Person J, wanted the teams to present how they think that their idea will be able to create business results. This person also stated that a primary goal was to create a culture at the site that gives opportunities for the employees to become innovative.

Another interviewee discussed the same matter and stated that it will be impossible to leave the business perspective out when accepting or denying teams from entering the Garage. According to person I, one of the Garage's underlying goals was to explore and incubate with other industries to find new use-cases making it possible for Ericsson to do completely new things. A general challenge that was found from the interviews was that Ericsson employees sometimes are too focused on technology, and have not enough focus on business cases and what is valuable for the users. Person A illustrated what many of the interviewees described, in order for ideas to become innovations it is essential to understand what the users really need.

*"The trick with innovation and what makes innovation real is to find what is really needed from a user perspective. [...] But I think for the future and as far as we have reached with technical developments, it is very much about the users and user needs and to be able to work in ecosystems. [...] But innovation will never become innovation as long as you have not found a real use-case for it. Until then, it will just become a smart or cool technical solution but never a real innovation" Person A*

One of the interviewed persons pointed out that the SaO group tends to mainly focus and work towards short term goals with a practical character in the area of the Garage. One example is the inauguration which was the SaO group's biggest focus for a long time, not leaving much space to plan what should happen in the Garage after the initiation. This interviewee explained that the group did not have a good enough balance between urgent and important goals. Important or long term goals are for example, how to fill the Garage with teams after the inauguration. The interviewee also stressed that it is of great importance for the SaO group to have visionary goals. Another interviewee had anxiety over the SaO group's lack of understanding that the Garage was a place supposed to find new industries and areas for Ericsson to focus on. It was claimed that it is significant that the people in the SaO group understands that the results from the Garage intend to play a big role in the future for the site.

*"Not everyone in the steering group has the 'sense of urgent' that is necessary at the moment. Some of them see the Garage as a creative playground, but it has got strict goals report to CTO-level. It can be a risk that the group have different perspectives on the goals. At the same time it is a process getting everybody on the same track. Everyone understand that we have to find new areas to earn money from, but everybody does not understand how important this is for the company's future" Person I*

Furthermore, there were general goals that Ericsson Garage Program developed for every Garage and can be found in the internal documents. These objectives were that the Garage has to facilitate four innovation projects and two innovation events per year. Person I mentioned that there also will be certain site KPIs that the Garage will have to relate to and work towards. One of the goals coming from the site-management, which the Garage will be measured on, is that the Garage should increase the amount of collaborations between units internally at the site. The site will most likely also have an influence in what kind of innovation events that will be performed and make sure that there will be held IOC hackathons in the Garage. Person I, continued to explain that since the Garage will be self-financed, which must be taken into consideration while evaluating the results. As long as the Garage does not have a budget of its own, the evaluation regarding performance can only be made on such conditions. Moreover, person J illustrated just as many other interviewees that the measurement or evaluation of the Garage will not eliminate the important sense of passion that is needed when being innovative. The main measurement, according to this interviewee, should be that people have been involved and worked throughout the whole Garage process. This measurement was also stressed in the internal documentation of the Garage.

*“Regarding the accomplishments in the Garage, I hope that we will evaluate number of completed projects. The results of the projects are not prior and the important thing is that the employees have tried and been active in the Garage.” Person J*

## 5.4.2 Collaboration performance

This section presents how the SaO group worked with the Garage, as well as how the work within the teams intends to be managed and performed.

### *Legal aspects in relation to IOC*

The Garage initiative meant that the involved companies are supposed to share knowledge with each other making it an arena for openness and knowledge sharing. Even though Ericsson will be the host of the Garage and perhaps the giant in many collaborations, the possible IPR or other results will be shared between the involved companies with details formulated in agreements. Regarding legal documents, the findings were at first rather fragmented, yet the picture of the role of legal documents in the Garage appeared eventually. An overall impact from the findings implied that the Garage is supposed to be a facility that is not entirely a part of Ericsson’s normal bureaucracy and stands beside these organisational processes. The Garage is supposed to be an area that does not focus on agreements and where IPR are not prior. According to person J, this attitude toward legal documents is essential for the characteristics of the Garage. At the same time as the Garage aims to reach new ideas rather than optimise Ericsson’s core businesses, this way of taking on IPR in the Garage depends on the fact that the Garage is not going to be a place for the core business, according to another interviewee. According to person E, contracts and agreements will be less critical in the Garage, since Ericsson’s core business will not end up there.

*“The Garage is a way to avoid having to comply with Ericsson’s processes, you do little as you want. This means that you do not need to have all the documents from the start and the projects are mainly personnel driven.” Person J*

The Garage aims to invite representatives from external companies and most interviewed participants implied that some contracts and agreements are necessary. Person I, was convinced that all projects performed in the Garage will be initiated with NDA, controlling individual confidentiality. This goes in line with other interviewees who claimed that the Garage guaranteed will have some kind of NDA, but it was mainly person I who could explain this explicitly. Yet, person E illustrated this in a good way

showed in the quote below, as this person described that teams in the Garage will have a higher risk level when collaborating making strict contracts less important.

*“Innovation is about daring to take risks, however the risk level must be acceptable and one cannot put the whole business at stake. Projects in the Garage can probably have a higher risk level, and in those cases there will most likely not be any needs for such strict contracts, yet agreements regarding confidentiality through standard agreements will probably be used.” Person E*

Person I had strong opinions regarding how agreements and IPR affect IOC in general. IPR affect IOC negatively, but are at the same time a necessity. This interviewee saw a risk in Ericsson being a large company with long and slow processes, because it can result in loss of collaboration possibilities with small, agile, and hungry companies. Therefore, person I believed that it is of great importance for the Garage to make sure that their bureaucracy is short and quick.

In sum, person I could explain the agreement process which the Garage is supposed to follow, which the other interviewees were not able to, because they did not share the same detailed understanding. First there will be a basic and personal NDA that the team members sign. This NDA states that IPR are going to be shared which limits the individuals to talk about information outside the projects. Further, there might also have to be NDA at a company level, which can be seen as a stricter version of the personal NDA. This NDA makes it impossible for any of the parties to do anything with the result before checking with the other partner. When the IOC has been performed during some time and when it will be possible to understand an outcome, an agreement regarding IPR can be made through negotiations between parties' legal functions.

### ***Communication channels***

One general opinion the interviewees shared was that the SaO group should not work too structured since the process is supposed to be iterative. There were separated opinions on how the collaborations between the Garage teams and their external partners are going to be performed. One of the interviewee did not seem to have reflected over this, as this person pointed out that members in the SaO group shared the same vision of how the Garage collaborations are going to be performed. When discussed the IOC in the teams with person I, the response was that every time a team is working in the deepest zone of the Garage they will collaborate with an external partner. However, whether the external partner will be present with the team continuously depends on the type of the project. The ambition will be to include the external parties at a daily basis, but sometimes an external partner might not be needed throughout the whole project only during certain phases. Therefore, it will most likely depend on what kind of collaboration it will be.

As the Garage will be a host for teams working with IOC it will become an arena for sharing and receiving knowledge. This implies that the companies joining in the collaborations need to communicate with each other. Therefore, it is important to also raise the question about communication and terminology. The interviewees understood that there is a possibility that company representatives from the site and externally might have difficulties in understanding each other. Person K saw this as a risk, however the site is willing to take this chance in order to reach new knowledge. This person also illustrated solutions that can help companies understand each other better while collaborating.

*“It is important that you actually dare to speak out if you do not fully understand, and that it is important to have an open mind. One term that someone from another company uses could mean something else for us. We have to be really open to each other in order to understand each other.” Person K*

When it was discussed what kind of knowledge Ericsson want to gain from the Garage, person I described it as understanding other parties' actual needs. It is not the kind of knowledge that can be written on a paper that is of interest, but rather knowledge embedded in experiences and skills. According to this interviewee, one of the goals with IOC will be to learn unspoken knowledge. This urge for knowledge also affects different cultures and therefore, it is important for the teams in the Garage to understand that there are big differences between companies. Further, this interviewee continued discussing the phenomenon of communicating and sharing knowledge between collaborating parties. This person saw that Ericsson employees, in general have an attitude towards their own knowledge as not being as worthy as knowledge coming from other parties. This means that the employees thought they had a lot to learn, but not as much to teach others.

The practical sharing of knowledge is supposed to be implemented through communication, talking and explaining. The teams in the Garage will be supported with different tools through which the team members can detect user needs. However, person I also mentioned that the SaO group had not discussed much about how knowledge is going to be shared inside the Garage, but that the Garage will have some kind of digital *lessons learned bank* and that the Garage aims to be a hub for knowledge sharing. Regarding how to share knowledge, the same person illustrated a possible way to share knowledge between Ericsson and a large automotive company. The automotive company could for example place a real car inside the Garage and let Ericsson employees work with its software, facilitating the knowledge exchange in a very concrete and demand-controlled way. Moreover, it was discussed during the interviews how gained knowledge is supposed to be communicated back to the site, in which the main ways found will be via the first and most visible zone of the Garage. According to person K, this will be a place to put showcases, show films, and have other ways of presenting what is going on in the projects working in the area. By doing so, it will be possible for the teams to get feedback on their work, because it is something person K believed the teams will need and request.

### ***The importance of trust***

As the Garage will be an area for innovation, different managers at the site as well as in the partner companies must have a high faith in the employees working there. Team members will use time from their ordinary labour hours to work in the Garage with something uncertain, namely innovating by turning an idea into a possible product. Therefore, from a manager perspective it is very important to have faith in the employees, which was illustrated in a good way by person J.

*“As a manager, one has to have such trust for people within the organisation that one has to let them do things of their own and not to manage them too much. If a manager controls them too much innovation might be hard to reach. [...] One should not be too afraid about daring to share knowledge in the Garage.” Person J*

The climate inside the teams will, according to person K, be a facilitator for the team members to dare to share knowledge. Therefore, this culture will be very important for the outcome of the Garage projects. This interviewee expressed a hope for Ericsson in not becoming the owner of the results, because such setting could make it more difficult for other parties to trust Ericsson and be willing to share knowledge to them.

### ***Individual abilities and leadership***

As the Garage was in an early phase in its life cycle during the study, all interviewees stressed the importance of filling the Garage with projects from an early stage. The interviewees did at the same time mention that the participation in the Garage will be very much dependent on the individuals that want to work with innovation. According to one representative, these people need the ability to think outside

the box. Another important aspect, also pointed out by most interviewees, was that the Garage culture has to become ingrained in the rest of the site's culture. According to person D, this is very important because such culture and mind-set is not something that will occur over one night. To overcome resistance, one has to actively work towards openness at the site regarding innovation, particularly in relation to the Garage. The individual skillset will also be important when enabling openness toward each other. General findings showed that it is more likely for individuals that are thinking outside the box to become involved in collaborations. In line with the above mentioned, one interviewee stated that collaborations should be run by enthusiasts and brave individuals.

Person I pointed at the importance of including engaged and strong individuals that can take part of the SaO group as the Garage should be lead democratically. The Garage is going to host several collaborative teams and it is therefore important that everyone in the SaO group are involved in the decision-making process. In addition, two of the stages in which the teams are going to pass during their work include juries with a lot of power. First will be an entry selection board, and second a Dragons' Den.

In order for the Garage to become an open arena it was considered by almost all participants that it will be important to have an open leadership that welcomes other companies and unite internal employees to meet and work together. When it comes to the leadership of the teams, the interviewees were united that it should be of coaching styles and not too strict. The leaders will most likely have an innovation coach role and be a part of the operational group and they must have the attitude that it is acceptable for the teams to fail. The teams might have to fail several times before reaching result. To help coaches and leaders that are going to work in the Garage, one interviewee highlighted the importance of using people that have good personal networks, both inside and outside of the company. This can improve the quality of the IOC within the Garage. By doing so, person K stated that it makes it possible for the Garage to include the right competences coming from both inside and outside the organisation.

*“Concerning the leadership, one has to understand that it is possible to do things differently than usual and that it is okay to test and that it is okay to fail. Therefore, one has to learn how to adjust.” Person K*

Furthermore, the teams are also supposed to have an internal leadership in terms of team leaders. It was found that teams were planned to be structured in line with lean start-up, meaning that there will be an idea-owner from the beginning and further an idea-CEO will be nominated in each team.

### 5.4.3 Challenges

There were some challenges regarding the Garage such as uncertainties concerning how the Garage is supposed to be managed, what kind of projects will be included, and how to establish this pioneering initiative at the site. According to several interviewees, there will also be a difficulty in how to measure and evaluate innovation projects, due to their qualitative nature. Another challenge regarding the Garage was the kind of projects that are going to be allowed to prosecute their developments. The definition of the Garage, from the global program, was that it should be a technique and knowledge incubator however, several interviewees saw the importance of also include a business perspective in the projects.

Regarding the steering and the management of the Garage, there were different opinions from the interviewees. Even though one of the interviewees stated that the SaO group shared the same plan for the Garage mentally, it was somewhat unclear how this group is going to work. According person I, there will be some changes in the SaO group in the future. What will be crucial, according to this interviewee, is to include people in the group who has the ability to work with stakeholder management

as there is overall a lack of structure and understanding of what the group need to achieve. Furthermore, establishing a new way of working into an old process oriented company will also be seen as challenging. The participants had a vision of creating a culture in the Garage that will comply a sense of 'just do it'. The teams should not have to ask for permission before proceeding, preferably ask for forgiveness afterwards. This makes the Garage structure different from the regular processes, by being more flexible and agile. However, this way of working will not be suitable for all individuals, making the Garage challenging, but also challenging for the SaO group to find the people who like to work in an innovative environment with a lot of uncertainty and undetermined goals. An additional aspect regarding the culture in the Garage was that when performing IOC two or more cultures need to merge. Dealing with cultural differences might come to be a challenge for the teams in the Garage. However, cultural and industrial differences are what person I wanted to include in the Garage, because it will be important to learn from each other's differences when innovating.

## 5.5 Additional findings

The following part describes additional findings from the interviews about how the site in general collaborates with external companies. The same structure is followed as for the Manufacturing and Garage projects, starting with initiation and development followed by collaboration performance and challenges.

### 5.5.1 Initiation and development

The findings regarding how IOC is initiated in general is further presented and separated into the areas of the search process including how Ericsson finds collaboration partners and goals in IOCs.

#### *The search process*

From a general perspective, it was found that it is important to find a common reason for collaborations with the partners rather than spending energy on who to collaborate with, according to person A. Yet, it was also essential to broaden the search in order to find new potential partners.

*"For me it is the height of the issue and the joint collaboration that is more important than who the partner is. [...] I think it is very important to broaden the search and constantly find new partners as well." Person A*

In order to find new potential partners and to be able to entering new business, Ericsson usually map their existing relations, which is contrasting to what is stated above. One example of such collaboration was one established collaboration as the site had with the automotive industry, based on the ecosystem. One interviewee claimed that open forums such as technical conferences, are essential ways of searching for partners nowadays as these create possibilities to get in touch with other people in coffee breaks, for example. Later, it is possible to create further contacts through LinkedIn. Person B claimed that when collaborating with partners it is important to find partners that complement the site in a good way, meaning that companies that are too similar might not end up as partners. Yet, person A claimed that this is also a challenge since it means that companies most likely differ, making it harder to find common objectives and difficult to transform these into concrete cases to work with, that both parties understand and agree upon. Furthermore, it was very clear that the site was not collaborating with competitors since there are risks that these could make use of received knowledge for their own purpose.

*"I think that how companies relate to each other pretty much affect the collaboration itself. [...] If companies stand very far apart from each other due to different industries, it*



*can be harder to find common denominators that make them actually find concrete things to work with.” Person A*

### **Collaborating goals**

All participants were united that some of the reasons why Ericsson initiated IOCs were to access technologies the site does not have and to reach users the site otherwise would not have reached. It was much about getting insight into other businesses and increase the learning about other companies and industries as well as their skills and experiences. Yet, great emphasis was put on the understanding of and finding use-cases as these are what actually generate value for users. Moreover, when the researchers asked what was most important to keep in mind when collaborating with external partners, most answers were about goals and the importance of understanding these. Person F illustrated this in a good way by explaining that goals must be synced between parties involved in collaborations, companies do not necessarily need to have common goals but it is of great importance to understand each other's goals. Person D stated this in another way by describing that it is most important to have an open mind and that firms cannot push forward ideas with any paper or agreement, but there must be some kind of obviosity in what they are doing.

*“The most important thing is that you should be clear about what you want to accomplish and sync it with the other party. Each party can have different goals but you have to understand the other's goals. If we are supposed to collaborate, the big picture must be clear for both of us, otherwise the collaboration will not become successful.” Person F*

When another interviewee was asked to describe what was most important to think of when collaborating the answer was that it sometimes can be hard to point out concrete things to work with when collaborating.

*“Sometimes we have had discussions with other companies, but it has been difficult to come up with something in common and what each party actually do. The absolute most important thing is to be able to initiate concrete collaborative projects. This is because the collaboration itself maybe would culminates in nothing because you have not found any common goals and you have only thought that ‘this would be fun to do’.” Person A*

Furthermore, there were different opinions coming from the interviewees on whether it is possible to measure IOC or not. One claimed that there is no way to measure collaborations, without reflecting thoroughly on the question asked, while person A stated that it is very hard to measure but it is possible to measure number of performed meetings. It was also stated by one participant that the site used KPIs that were monitored by partner managers when measure strategical collaborations with unpredicted future. These KPIs could for example be number of press releases, marketing campaigns or customer engagements. It was also found that some units measure innovation on the monetary value as it generates.

*“In collaborations at my unit, it is much about building networks of partners and collect information in order to increase the understanding, which is very hard things to measure. Then it is easy to say that in order to measure this we must have four meetings so we can follow up on it.” Person A*

### **5.5.2 Collaboration performance**

The following part presents the additional IOC findings regarding how collaborations are performed at the site. The sections concern legal aspects, leadership, communication channels, and how trust and openness can be related.

### ***Legal aspects in general***

It was understood from the interviews that the site in general never starts an IOC with discussing contracts, rather by discussing the level of collaboration that is expected from all parties involved. Normally, contracts are only used if something goes wrong and person H illustrated the thoughts shared by the interviewees in a good way. However, most of the participants from both projects as well as in general did not know who signed the contracts and agreements, nor what these usually contained.

*“Usually I find that paperwork is placed on the side, it is just in case something would go very wrong it could be used and in such cases, I think relations probably are based on trust.” Person H*

What was found to usually be discussed regarding contracts and agreements when collaborating was for instance; who owns the final product, who own the patent, and what kind of information is allowed to be exchanged. It was found that these were concrete problems that many encountered in IOCs. Ericsson had a legal group responsible for contracts and agreements at the site this group is usually involved in the beginning of collaborations, before agreements are made. The legal group represented a central support for legal rights in order to avoid inaccuracies, which creates a sense of security due to the complexity of legal rights. Furthermore, it was also understood that some units at the site, like the research unit, were more free in their collaborations and not as tied to contracts as other units. Though, this puts a responsibility on the research unit in that they handle collaboration seriously as well as the information shared. Moreover, it was found that contracts that were neglected in general usually depend on lack of time, meaning that projects were not finished when predicted. One interviewee claimed that in these situations, it is not any particular party's fault but often both parties. Contracts can also be ignored or not followed due to difference in the level of ambition for each party or because of reprioritisation. In these kind of situations, companies should have contracts and agreements to lean on to avoid unnecessary conflicts.

Some of the interviewees stated that contracts can generate trust since they create some sense of security, yet one claimed that it is still time consuming to increase the level of trust in other parties even though contracts may help in the beginning. Writing a contract shows that the parties involved are taking the collaboration seriously and professional, but also that they will not distribute and spread information gained. However, according to person B the willingness and interest of working together is still needed even if trust is seen as important in order to be able to innovate together. Furthermore, it was found from the interviews that the site always writes contracts but these can be seen as either important or not, indicating another perspective of trust in relation to contracts. This was because it is assumed that basically, contracts do not reflect trustworthiness if it is chosen to ignore what these consist of.

*“With different types of contracts, companies can gain some kind of security, but they can never get the innovation if one of the parties does not have the desire anymore for the collaboration nor feel any interest.” Person B*

### ***Legal aspects affecting IOC***

When the interviewees got the question whether contracts and IP agreements have a positive or negative effect on the collaboration performance, there was divided opinions. It seemed like one interviewee had not thought of that perspective before, but in the end this person did not think that contracts could result in any positive effect on collaborations. Person B, on the other hand, stated that IP agreements have a lower affect than we think on the performance of collaborations, because Ericsson as a company got IP included in their business in terms of different standards. Instead, this person thought that the big issue around IP was rather; where is the site heading and how will they continue in the future. The IT industry,

in comparison to telecom, had very little revenue based on IP since this industry makes its IP openly available for other users, meaning that IP is not creating competitive advantages as it does for telecom. The future for IP at the site might change in the future due to changed conditions when moving toward open sources. Therefore, it could result in Ericsson treating IP like the IT industry was doing. Person F claimed, on the other hand, that this kind of question is usually discussed between parties but later it is only an issue whether IP affects or not. This person rather saw contracts as something necessary in collaborations and thought contracts does not have any particular impact on the partnership itself.

*“I consider contracts necessary, if we had not had it, we would not have been able to collaborate. [...] There tend to be some discussion of contracts effect on collaborations, but after you have agreed to collaborate you can work on, then there is no issue and it will not affect the collaboration.” Person F*

### **Leadership in IOC**

When discussing leaderships in collaborations and innovations, it was found that it is pretty common that companies with most employees involved in collaborations also lead them. It is also common that the firm who initiated the collaboration most likely end up as the leader. In another example where Ericsson has exchanged knowledge with a firm in the automotive industry, the collaboration was more Ericsson characterised because Ericsson employees were responsible for workshops, which the collaboration was built on. Regarding the style of leaders, most of the interviewees agreed that leaders must allow an open and creative climate with a style that strives for allowing and making participants dare to speak their minds. It was also clear that it is even more important when working with innovation to have leaders with such personalities, because the organisation climate must allow creativity, and the leaders should be coaching rather than controlling. Furthermore, leaders should be able to set up clear rules but at the same time be flexible and adaptable if needed. These considerations were illustrated in a good way by person C.

*“I think it is important that the leader is open and allows a creative climate. [...] I also think that it is very important to have clear roles but it should also be an open climate where it is high ceilings and permissive for the members. I believe that the leader should be there to guide, and perhaps set up some rules but at the same time be flexible as well as adaptable and dare to change if necessary. The leader has to be consistent, but also if they notice that a change is needed they may change their rules and follow developments.” Person C*

Furthermore, one interviewee stated that it is important to get the support from the management when acting in turbulent times when the company must go through changes. This requires changes that can be handled by IOCs, which in turn must be embedded in the management as well as the leadership in collaborations.

### **Communication channels**

It was a shared vision that it is important to balance knowledge that is exchanged when collaborating and that it is much about complementing each other with competences and skills, which was also described in the studied projects. Yet, person E claimed that it is still possible that one company only utilise the other's competences in some cases. In order to make potential customer segments, most participants thought that it is essential for the firm to understand user needs and cases.

*“A result of collaborations is the exchange of knowledge. Sometimes we might only use their skills, but often competences complement each other.” Person E*

One interviewee claimed that employees at Ericsson traditionally work almost their entire careers at the company meaning that much internal knowledge is kept in-house more easily than it would have been if employees changed companies more frequently. Person B, on the other hand, stated there had arisen many open sources and IOCs are efficient ways to share resources and exchange knowledge in order to access new ones, which is clear incentives for collaboration itself. Also, from an innovation perspective, IOC is important since it creates new impulses which in turn can lead to innovations.

*“Instead of building your own skills in the slow processes in-house it is now possible to recruit individuals with the right skills externally. [...] Through collaborations, you can get access to the right resources for a period and then quickly get on to something else which, I believe, is a very clear incentive for collaboration.” Person B*

Person A described that the site does not have any specific processes regarding how to be in contact when collaborating with external companies and when leading and working together. According to this person, it was because all Ericsson employees have agreed on confidentiality agreements which means that they know how the internal information should be kept limited and safe. However, the person also explained that this does not mean that the rules cannot be pushed a bit and ignored because it is when the site starts to give information that the employees actually can receive as well.

Furthermore, it turned out from the interviews and the projects that Ericsson was in contact with external firms in many different ways but the most common ways to communicate were through face-to-face meetings, phone calls, email conversations, workshops, and video conferences such as Skype calls. It was claimed that these forms of communication are good when exchanging information while pure knowledge is rather exchanged by workshops and discussions since these are effective ways of generating ideas. Prototyping was said to be one ultimate way of showing and increase the understanding for another party about how something works in practice. Also, site visits take place sometimes, but who to visit and the amount of visits depend on the collaboration. Person B illustrated this in a good way by claiming that normally, firms are in contact by video conferences and emails in the beginning of a collaboration but once it starts it is more common with physical meetings. Furthermore, when discussing innovation, it was found that physical face-to-face meetings are very essential. This was because ideas are usually created by impulses which are easier created when people meet in reality.

*“Often you need to physically meet to get enough energy going between the collaborating parties. But to get the physical meeting to work, you will usually work through a series of conference calls and emails, in which proposals are exchanged and discussed.” Person B*

### ***How to reach trust and openness***

All interviewees agreed that trust is an important aspect when discussing IOC and everyone thought that it is needed in order for the collaboration to work. According to one person, a reason for this was because telecom industry itself changes which makes collaboration outside the company borders even more important and this requires trust. This means that collaborations must be open and have good transparency to ensure success. It is essential that collaborating partners must create a climate where the parties can be friends and creative, at the same time make innovation possible. Another person claimed that an open climate can only be built if parties talk openly and if they are honest and clear in their intentions. In one example from an earlier collaboration the site has had, the other party decided to present a company secret in an early phase, which indicated a transparency as well as it was a good icebreaker. The participant thought that this resulted in something positive for the trustworthiness between the parties involved.

*“Even if you want a free and creative environment I think it builds on all parties knowing being clear to each other what they intend to do and what risks they are willing to take. The clearer they are with it, the more open they will be because they know the boundaries for the collaboration. Then, they can begin to feel confident with each other.” Person E*

### 5.5.3 Challenges

It was understood that there are both internal and external challenges regarding the goals when collaborating. The internal challenges were to find resources in terms of labour and time but also to see that the collaboration itself fits within the own business plan. Person D claimed that it is also a challenge that the site got many units and each one got different goals, making some goals contradictory to each other in the short run. Furthermore, it was also found that it is cumbersome when partners change their priorities as it, in such cases, does not matter what other firms do because partners have already made their choice.

*“Either we have had different views on what should be delivered and what should be done, or they do not succeed in what has been agreed on. [...] These situations often result in some kind of conflict” Person E*

One interviewee claimed that it is important to have all members from Ericsson included when starting IOC. This was because Ericsson has a pretty flat organisational structure and the employees must work collegially, which can create challenges in-house if members must be included in collaborating projects over time. Sometimes it can be easier to get people involved if a supervisor tells them to do so. This can be mirrored in the culture, in which it seemed like the interviewees agreed that an open culture favours trustworthiness, however it was also claimed that it is easier said than done to create an open culture. This was because the site already got their culture with a tradition of heavy processes, making it a challenge to change it because there is a reluctance and inertia to create an open culture. To overcome this, one participant thought that it is important to have permission to work openly, either on a structural level or by managers in one's department. Another person stated that it is important to be paranoid to some extent when collaborating because it must be considered what kind of information that should be shared and why. However, in collaborations that are not 100 percent certain, where it is unclear what the members should generate and put their energy into, it is important to be agile, according to person B. This person illustrated this by describing that it is about creating a mind-set of moving on quick and an ability to be flexible, to avoid getting stuck.

*“It is required of us people to have an ability to trust and put our energy into something that is not 100 percent clear. Therefore, it is important to be agile if the partner ends up in moving another way than you expect” Person B*

Furthermore, the interviewees were also very aware of the fact that an open culture is not created by itself but the organisation and its employees must create it themselves, making it a huge challenge. In this process, perseverance was assumed to be extremely important since IOC is very time consuming. It is for example important to be perseverance and keep collaborating projects as well as partners even if the management or the strategies changes. Furthermore, the participants also thought that it is important to allow failures because everything will not generate positive results and therefore, it is important to not do anything rash and take short frequent steps.

## 6. Analysis

*This chapter presents the analysis of the study based on the findings and the theoretical framework. The structure is based on the research questions, where each section is dedicated to each question including analysis of the findings and theoretical framework.*

### 6.1 What does inter-organisational collaboration and innovation mean for Ericsson Gothenburg and the telecom industry?

The first part aims to answer the first research question and starts with a summary of the main empirical and analysis findings, table 7. The analysis is further divided into findings regarding the role of IOC in the telecom industry and at the site.

*Table 7. Summary of the main empirical and analytical findings for the first research question.*

Perspectives	Main empirical findings	Main analytical contributions
<b>The telecom industry</b>	<ul style="list-style-type: none"> <li>• Telecom was facing a breaking point and products are becoming commodities</li> <li>• The turbulent situation forces firms within telecom industry to collaborate across company borders</li> <li>• Even if it is important to find new markets, it is still important to not forget current collaborations within the industry</li> </ul>	<ul style="list-style-type: none"> <li>• Telecom industry must adapt to turbulent and changeable environments to stay competitive</li> <li>• Improved collaborating results if choosing to collaborate rather than being forced</li> <li>• Mutual attraction between this telecom industry and other, since the technology is seen as a complementary asset and experience an attraction towards external collaborations</li> <li>• Focusing on collaborations with current customers and suppliers to be able to face changes in the industry together</li> </ul>
<b>The site</b>	<ul style="list-style-type: none"> <li>• The site experiences higher frequency of IOCs in this changeable period</li> <li>• Geographical location was seen as important for the site and the ecosystem was seen as an important place to collaborate at</li> <li>• The Garage can be seen a competitive tool helping the site to focus even more on innovations</li> <li>• IOC can be seen as marketing making the site more locally known</li> </ul>	<ul style="list-style-type: none"> <li>• The OI paradigm is identified at the site and will most likely gain a stronger position in the future, due to surrounding changes in markets and an increased interest of IOC</li> <li>• Securing a strong position in the ecosystem with telecom capabilities is important for the site's value and competitive advantage, yet there is a risk of arrogance that can limit OI</li> <li>• Relating to IOC as a marketing tool can generate new possible collaborations by attracting new partners and thereby increasing innovativeness</li> </ul>

#### 6.1.1 The telecom industry

Almost all interviewees shared the same understanding of the uncertain situation that the telecom industry was facing and that IOC will be very important for the industry in the future. The common perception was that the industry was standing in front of a breaking point, where digitalisation and increased use of Internet of things-solutions were contributing. One participant gave a very clear explanation when stating that the telecom industry now experiences a breaking point since the telecommunication has almost become a commodity. The literature also address that it is turbulent times, Andersson and Berggren (2015) describe the intense competition as a result of the globalisation. This was even mentioned by Lewis back in 1991 where he, in the IOC literature, addressed an increased competition since companies were striving to both develop new products and gain access to new industries. As the products are about to turn into commodities, one interviewee claimed that the users are expecting telecom offerings to just exist and function. This indicates a future saturated telecommunication market meaning that there is a limited growth potential, leading to the company trying to find potential growth in new industries and markets in order to be in frontline of innovation. The same thing is also described by Dodgson (2014) who illustrates the increased customer demand in

this industry, because they expect devices to be able to communicate with each other, regardless. According to the researchers, this puts a great pressure on the industry to live up users' expectations because the expectations are assumed to be much higher today due to the digitalisation. Turbulent markets are more dependent on strategies like OI, according to Schweitzer, Gassmann and Gaubinger (2011), and such strategies can be helpful when companies are facing uncertain times. This indicates that the telecom industry must adapt to its environment, and in order to stay competitive, the industry has to come up with new developments for an increased user base. The participants thought it is urgent for their industry to enter new markets in order to gain future opportunities. By integrating in other industries, it is possible to reach their users and therefore also new customers for technology originating from the telecom industry.

According to Lewis (1991), companies are forced during such uncertain times to interact with other companies in order to survive and grow. The participants thought that it was important to collaborate across firm boundaries in order to reach new markets. Studying the OI literature, companies can through collaborations, get access to new industries, innovate more rapidly, and share risks by opening their innovative processes (Andersson and Berggren, 2015). This indicates that the participants understood that IOC is of essence and that they are in some ways forced to collaborate in order to develop and innovate, if looking from Lewis' (1991) perspective. However, the perception was that the industry is choosing and showing a willingness to collaborate externally rather than being forced since collaborations are searched for. It is believed to be better to choose external collaborations rather than being forced to collaborate, since collaborations will most likely reach better results if it comes from companies' inner motivation and willingness.

One participant claimed that the telecom industry is not going to grow on its own, meaning that it requires actions in terms of IOC. Other industries will probably require telecom technology in the future, but it is assumed that the technology and telecom infrastructure might be used in new ways and by new industries. Dahlander and Gann (2010) claim that a firm who possess complementary assets, from an outbound perspective, for other industries is highly demanded and therefore also more likely to be introduced to collaborations. It is assumed that telecom industry will have a strong position in future relations to other industries, because the telecom industry possesses the infrastructure that is attractive for other industries. However, the infrastructure will have to be adapted and developed in order to meet future needs, making collaborations with new partners essential. Dahlander and Gann (2010) also discuss complementary assets from an inbound perspective meaning that potential industries, that are suitable for the infrastructure, can be identified by the telecom sector. Assumed that the telecom industry wants to engage in new industries they will most likely search for such collaborations. This leads to the understanding that, due to the strong complementary asset in the telecom infrastructure, it is possible for telecom companies to be engage in both inbound and outbound perspectives of OI, favouring competitive advantages to companies within the industry. From a contemporary perspective, it is important to not forget the current market. It is, according to Schweitzer, Gassmann, and Gaubinger (2011), important to integrate with both customers and suppliers in turbulent times both in terms of technology and market turbulence. Some participants said that current customers, mainly telecommunication operators, had expressed an anxiety regarding the future mobile telecommunication as these operators have a desire to collaborate in the industry. Technology turbulence was found from the study and it is believed to depend on the transformation towards digitalisation, while market turbulence is believed to exist due to a saturated market as products are turning into commodities. This implies that it is important to collaborate with both suppliers and customers as well as new partners since it generates more perspectives, leading to broader market understandings and creates possibilities to find innovations. It is believed that it should lie in Ericsson's global interest to collaborate with current actors

within the telecom industry in order to face changes in it together. It is most likely impossible to manage changes in such a complex industry by themselves and therefore, all actors must face it together.

### 6.1.2 The site

The findings regarding the telecom industry being in a turbulent period was also affecting the site, as the participants experienced that the site was going through a period of changes. It was found that the site had an unclear future because the market and the industry are facing challenges, previously mentioned. Regarding IOC, the participants have noticed an increased amount of collaborative incentives at the site. This goes in line with what Lewis (1991) states when talking about an increased importance of IOC due to an increased interdependency between firms. The changeable times can be related to the site being more dependent on collaborating with other firms in order to understand where Ericsson is heading. Moreover, increased speed of production and shortened products life-cycles were also found to be reasons why the site engages more frequently in IOCs nowadays. This goes in line with the theory by Schilling (2010) who claims that shorter product life-cycles are forcing technology firms to faster developments. This pressure can, according to one interviewee, result in increased speed of processes and commercialisation. It is therefore believed that collaborations and innovations are central for the site and that OI most likely will get a greater significance there in the future. The site's current uncertain situation with the pressure from both within the company and from the outside is strengthening the theory about the new paradigm of OI by Chesbrough (2003). Based on this theory, the site should search externally for collaborations to find new innovation areas and hopefully new market potentials.

Most participants had a common understanding that the site's geographical location was important for the permanent state in the city. From a local perspective, there was a lot of growth potential, for instance with the development plans for Gothenburg city, that the site intends to be involved in. This implies that even though there are uncertainties regarding the site's future, the possibilities to get involved with the developments of Gothenburg can somewhat be a safety from a site perspective. Furthermore, there were also good possibilities in collaborating with universities as well as experts and consultancy firms in the area, meaning that the site can gain accessible skills by interacting externally. From an innovation perspective, this goes in line with OI literature by Chesbrough and Bogers (2014) who claim that the way of collaborating has changed the last decades, which is exactly what the site was experiencing. These authors claim that one reason why mobilisation of participants can make companies access knowledge in human capital at a high rate, is due to turnover of employees. However, it was understood that site personnel were not changing employment frequently, which does not align with previously mentioned theory. Although, the site was somewhat mobilising personnel in the meaning of letting them change tasks, include other company representatives in projects, and interacting frequently with the universities in the city. This means that the theory was both in line with the findings and not, as the mobilisation was experienced in other ways than changing employment frequently. Another reason why collaboration has increased at companies is, according to Chesbrough and Bogers (2014), the fact that universities are getting more capable and experienced, which makes them more attractive for companies to collaborate with. Collaboration with universities was something that the site was used to do and what the participants found interesting.

Dodgson (2014) claims that collaborations can occur in relation to ecosystems and platforms, forcing partners to collaborate. Regarding ecosystems, a strong automotive ecosystem was found to exist in Gothenburg and was something that the site was eager to be deeply involved in. Grant (1996) claims that a company can via IOC gain a stronger market position and become more competitive. It is assumed that the automotive ecosystem therefore can be seen as a strong incitement to be situated in Gothenburg. By collaborating in the ecosystem, the site can gain a stronger position relative other actors in the system



and in Gothenburg. It is possible to assume that the site can get an even stronger position in the ecosystem when talking about digitalisation, due to their technological knowledge being complementary to other industries in general and the automotive industry in particular. In these turbulent times, this insight could also create a sense of safety for the site. Since the site had this specific knowledge it is likely to believe that the site will, in the future, become a significant player in this ecosystem. However, being such significant player in the system creates issues. One identified risk is that if the site considers themselves as too important they might experience the NIH syndrome as the employees might become narrow minded without considering other actors' ideas and thoughts. This risk is assumed to limit OI possibilities for the site, which goes in line with Katz and Allen (1982) who claim that NIH affects the possibility to understand each other.

Furthermore, it was found that IOC is important for the site because it creates possibilities to be in the forefront of innovations. It was especially important because Swedish sites have difficulties in manufacturing competition with developing countries, making it even more important for them to focus on innovation. One interviewee thought the Garage project might be a way for the site to be in forefront regarding innovation and a way to stay competitive. Some interviewees related the Garage project to an OI approach, and according to Dodgson, Gann and Salter (2006), OI can be a way to continuously innovate. One interviewee stated that collaborations can be seen as ways to become more innovative and through collaborations the site can be able to find new use-cases and technologies. Illustrating that the OI theories are imprinted in reality, the Garage project aimed to have an OI approach in order to continuously innovate along with other actors, assumed to create even more innovation impulses. Some participants thought that the Garage was a new kind of OI and that it was a way to combine competences at the site with external partners in order to create new things. According to Lazzarotti and Manzini (2009), OI can be performed in many different ways and the relations of OI can differ. It is believed that the Garage can function as a mean while going through uncertain times. Grant (1996) claims that it is possible to use IOC as a tool to increase the chances of reaching new market opportunities. This was illustrated in the Garage project as one participant claimed that the project can be seen as a marketing tool meaning that other firms can become attracted by Ericsson. One participant believed that IOC can help the site to gain more local recognition by showing other companies that they are in forefront regarding innovation. A similar statement was done by another participant, who thought IOC generates marketing value as IOC can show to other firms that the site is an important player to collaborate with. Using IOC as a marketing tool in order to attract other actors, was not a found subject in the literature. However, it is believed that it is a possible way to become recognised as a good collaborating partner, which creates even more innovation opportunities. Yet, a third participant claimed that collaboration should not be a goal in itself, collaboration should rather be a pathway to understand other business better, in order to understand other industries' use-cases and develop innovation from that. This implies the importance of OI for the site, especially since the time was considered as turbulent and pushes the site to find new market opportunities.

## 6.2 What kind of collaboration aspects are there, and how do these affect inter-organisational collaboration and innovation in the two projects and at the site?

This part aims to analyse the second research question of the study. It starts with a summary based on the developed table from the synthesis, including main empirical findings and main analytical contributions, see table 8. Thereafter follows the analysis which has the same structure as the developed table.

Table 8. Summary of the main empirical findings and analytical contributions based on the developed table and the second research question.

Developed aspects	Main empirical findings	Main analytical contributions
<b>Partner selection</b> Refers to how partners are selected and found. Relational aspects are involvement, goals, and complementing capabilities.	<ul style="list-style-type: none"> <li>Manufacturing project searched national level for new industries and within manufacturing industry for new innovations</li> <li>Garage project will base the search on personal networks</li> <li>The site did not engage in collaborations without obvious gains</li> <li>A main goal for the site was to increase the learning about other firms' skills and experiences in which the projects had different ways of achieving this</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturing project search both broad and deep while Garage mainly search broad for new innovation possibilities</li> <li>A mixture of search processes is beneficial to reach innovation</li> <li>Strategical and operational goals should be understood by all parties, internal and external</li> <li>The projects got different kind of involvement suitable for their purposes. Manufacturing project is characterised as relational while Garage focus on novelty</li> </ul>
<b>Knowledge &amp; knowledge exchange</b> Constitute the communication between firms and the importance of balancing the knowledge exchange. Relational aspects are the impact of trust, cultures, and the ability to understand each other.	<ul style="list-style-type: none"> <li>To increase the knowledge base at the site, balancing in and out flows of knowledge was seen as important</li> <li>Core business will not end up in Garage projects</li> <li>Garage had a plan on how to communicate learning back to the site unlike Manufacturing project</li> <li>Knowledge was exchanged in different ways, from emails and video conferences to face-to-face meetings</li> <li>Confusion regarding leadership for WPs in Manufacturing project</li> </ul>	<ul style="list-style-type: none"> <li>Not sharing knowledge about the core business is the opposite of trying to have an open approach. The core competences is most likely what will attract partners to collaborate</li> <li>It is important to be able to bring received knowledge back to the site to make it valuable</li> <li>Physical meetings are important for understanding tacit knowledge embedded in culture, experiences, and skills</li> <li>Strict structures make communication channels less flexible, affecting innovativeness</li> </ul>
<b>Openness</b> Knowledge exchange is related to openness, since increased knowledge exchange increases openness and in turn the innovativeness. Important aspects affecting openness are time, patience, and trust.	<ul style="list-style-type: none"> <li>The projects had different approaches regarding openness</li> <li>Trust in relations and from management was considered as essential in collaborations</li> <li>Individuals must be able to think outside the box, be passionate, and have patience while innovating</li> <li>Openness can be facilitated by a coaching leader style</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturing project got a symbiotic collaboration making its approach more collaborative, while the Garage is characterised as open innovation</li> <li>Communication, trust, and openness are interdependent of each other</li> <li>Individuals must be able to collaborate and combine each other's capabilities rather than having a specific personality</li> <li>Manufacturing project's openness can be favoured by zig-zagging objectives, while the site can be seen as lead organisation in Garage projects</li> </ul>
<b>Legal mechanisms</b> Refer to how legal aspects affect collaborations.	<ul style="list-style-type: none"> <li>Legal documents were always used while collaborating at the site but only considered if needed</li> <li>Collaborations usually had initiating dialogues before legal aspects were considered</li> <li>The signing and the content of contracts were unknown to most participants</li> <li>There was different thoughts regarding legal documents</li> </ul>	<ul style="list-style-type: none"> <li>Initiating dialogues show willingness to collaborate and the legal aspects are later put aside</li> <li>Legal documents have low impact on collaborations due to members' unawareness</li> <li>Legal documents indicate seriousness and create trust, yet these cannot create innovation</li> <li>Attitudes play a critical role toward how legal aspects affect collaborations</li> </ul>
<b>Compatibility</b> Implies the suitability while collaborating. There must be a balanced overlap between firms in terms of technology, structure, and content when collaborating.	<ul style="list-style-type: none"> <li>The site was unused to work in a functional structure and would prefer it to be sequential</li> <li>The development of the Garage concept had an iterative approach of the structure which created collaborating problems</li> <li>Manufacturing project experienced terminological issues even though it was foreseen</li> <li>To avoid misunderstandings, one could ask a question in different ways or compromise on definitions</li> </ul>	<ul style="list-style-type: none"> <li>It is possible to see both strategical and resource fit in the projects,</li> <li>Structural compatibility affects collaboration coordination. The effect is negative in Manufacturing project due to its complexity</li> <li>Company size affect compatibility, yet size will not affect Garage projects</li> <li>Manufacturing project is not fully compatible in terms of terminology, creating communication problems</li> <li>Communicating on a basic level can overcome the difficulty of being compatible</li> </ul>
<b>Uncertainty</b> Occurs in companies' contexts and in collaborations. Leadership, individual skillset, and trust between firms are ways to handle uncertainty.	<ul style="list-style-type: none"> <li>Must be agile when handling uncertainty</li> <li>In Garage project uncertainty was found at managers not relying enough on the setting</li> <li>In Manufacturing project uncertainty was found in the collaboration itself</li> <li>Mistakes must be allowed and learned from rather than avoided</li> <li>Use-cases must be find and understood to create value and innovation</li> </ul>	<ul style="list-style-type: none"> <li>Organisational structures must be supportive and flexible to handle uncertainty</li> <li>Working in uncertainty requires courage</li> <li>Moving forward cautiously makes trials and errors possible favouring innovation</li> <li>Leadership is important as it supports members to focus on business related use-cases</li> </ul>

## 6.2.1 Partner selection

When searching for companies to collaborate with, in terms of innovation, the findings were divided. The researchers examined both how the search process in the two projects occurred and how the site had searched for collaborative partners in other cases. Laursen and Salter (2006) claim that companies

with many search channels can be more innovative since they contribute with useful information. Also, these authors state that innovation is positively affected if collaborations rely on top management. From another theoretical viewpoint, it is important to search both deep and broad to find innovations (Davis and Eisenhardt, 2011). The Manufacturing project had tendencies of searching broad to find new innovation possibilities as it had, at the national initiative, examined many different industries to figure out which ones to collaborate in. At the same time, while studying this project, the researchers experienced that the project also had elements of deep search, because the partners were carefully selected and the collaboration was not rushed into. This means that the innovation ability was affected in both ways, since the project searched both deep and broad for innovation. The Garage project illustrated and intended broad partner search, because employees at the site will be able to work in the area with whomever they chose. Also, since one goal with this project was to smoothly include externals, it is believed that the search process will be affected to be more agile facilitating broader search. Furthermore, the researchers understood that the Manufacturing project was anchored in the top management of the company as it was an initiative from the national level, making it a strategic move. The Garage project, on the other hand, did not seem to be as anchored in the top management, because the SaO group was independently in charge. This indicates that the innovation ability might be affected by that, as well as affected by the Garage being in a very early phase of its development, it is believed that it is important to focus on the top management support. Yet, in comparison to the Manufacturing project, it is believed that the Garage might not need to be as anchored in the top management, because this project was not as strategically robust as the Manufacturing project. Yet, to have the Garage anchored in the top management, it might imply that the employees will be more motivated to join and use their personal network when searching for partners. Moreover, the search process in the Garage will in the beginning focus on using the members' personal networks, however the future goal was that the Garage will become self-selling. To reach this, the Garage project needs to become recognised externally, however it is assumed that creating such establishment takes time and patience. Therefore, it is believed that focus in the beginning should lie on establishing the Garage project internally at the site, by anchoring its concept in top management.

Beyond the search ways in the projects, it was found that the site uses different search ways depending on what kind of collaborations they aim for, including everything from open forums to social media such as LinkedIn. This indicates a flexibility in searching and it is assumed to be favourable in terms of innovation, since the site was not locked into defined processes. One interviewee said that it is possible to search amongst the already established partners that the company has to find a company to innovate with. It is believed that when searching for completely new partners to collaborate with, it is suitable to still base the search on existing network of partners in order to find recommended potentials. By doing so, it is possible to gain a trustworthiness faster since one can base the choice partly on recommendations. One example was that the site was included in an ecosystem, creating possibilities to initiate innovation collaborations with firms within that network. It is also essential to have a broad search as well as focus on what the collaboration is aiming to achieve, rather than the partner selection. This can be compared to Shilling (2010) who argues that partner selection is made due to the collaborating goals. If there are turbulent times, Dahlander and Gann (2010) believe that it is more difficult to find partners to collaborate with. To focus on the collaboration objectives themselves rather than what partner to collaborate with, is another perspective. This is the opposite of using established partners. From the researchers' point of view, it is believed that a mixture between different search methods is beneficial for innovation. It can be smart to utilise a combination of searching via established networks and broad search, and to focus on objectives because the established networks can facilitate flexibility and this focus makes sure that the collaboration will be valuable.

Furthermore, it was found that if the site does not see any obvious benefits to collaborate, they will not engage in any initial contact or discussion. This is analysed to mean, that in order for another company to attract Ericsson it needs a potential business case and value proposition to present. In comparison to Chesbrough and Bogers' (2014) approach toward OI, it is analysed to not be as spontaneous and unpredictable at the site as these authors state it should be. This is because the site demanded more safety before engaging in collaborations. Moreover, a challenge found was that it can be a difficulty to navigate and find right functions or human resources when trying to establish a collaboration. This can be related to Alexy and Dahlander (2014) who state that it is important for companies to understand if there are special companies they are looking for or if they are looking for certain resources. Therefore, it is of great importance to understand what you, as a company, are looking for when searching. Also, this points at the essence of being able to fully express the objectives and needs while approaching another company in order to be guided right. It is most likely the other way around as well, when the site is being approached with a request from another company, the site must be able to interpret the objectives and needs correctly in order to guide the approaching company to the right function at the site.

### *Understanding the goals to favour IOC*

According to Gallaud (2013), a collaboration is usually formed by its goals and tasks which differ due to company sizes, markets, and situations. A central goal that most interviewees shared, was to reach complementary knowledge and technologies outside the firm boundaries by learning from other firms' skills and experiences. This goes in line with Ford et al. (2011) who claim that it is more common that companies find competence outside their firms nowadays. The argument by Ataee et al. (2011) states that it is important to understand each other's goals when collaborating. This was also shared and understood by the participants. It is believed that understanding each other's objectives is of higher importance than having common ones. This goes in line with Dodgson (2014) who states that the resources or capabilities are of no essence if goals are not understood. This is topical when collaborating with other industries, as goals then most likely differ, indicating the importance of communicating them. Schilling (2010) stresses that collaborations can improve firms' flexibility, which is seen as positive while working with innovation, since it helps them avoid being locked in habitual patterns. Furthermore, it was found that collaborations can be used as marketing tools to show that the site is experienced in innovating together with other companies. This increases the possibility for other companies to notice Ericsson as a possible collaborating partner creating opportunities for other actors to show their interest in the site's innovative capabilities.

It was found that the Manufacturing project had many different goals. One person claimed that the site's goal was to increase the understanding of telecommunication needs in the manufacturing industry. The manufacturing firm, on the other hand, wanted to increase the understanding of the telecom business but also to fulfil four KPIs. The WPs had goals in terms of demonstrators. Even though the goals were different in this project, it is believed that they still go hand in hand, because Ericsson must understand the KPIs in order to understand the manufacturing industry and the demonstrators can be seen as milestones in the implementation of the network. The same goes for the manufacturing company who needs to understand how Ericsson's technology can be applied in their business. Yet, the implementation must be considered as central in order for the manufacturing firm to not perceive the collaboration itself as a failure. It was found that one participant did not share this understanding, while stating that one of the KPIs had not been discussed because the manufacturing company had not shown any interest in it yet. However, it is believed that for Ericsson to really understand this industry, it should be in the site's interest to include this safety KPI in the collaborating agenda and not just wait for the manufacturing company to take initiative. Furthermore, this project illustrates that a collaboration can contain several goals. The analysis highlights the importance of having a wide perspective, to communicate all

objectives clearly, and not forget the underlying reasons of why the collaboration was initiated from beginning.

On the contrary, the Garage project had the goals to create an internal culture facilitating innovation, give the employees a possibility to concretise their ideas, and to actually develop new innovations in collaboration with external partners. In sum, the Garage project's main goal was to create an internal culture facilitating IOC and innovation. It is further assumed that the Manufacturing project and the projects that are going to be performed in the Garage have different kind of involvement in how they are performed, related to theoretical terminology of long and short-term relations. There are disagreements in the literature regarding whether long-term or short-term collaborations affect the collaboration result positively or not (Williamson, 1985; Schilling, 2010; Dodgson, 2014). Granovetter (1973) favours long-term collaborations, as collaborations deepens the actual relations, while Elfring and Hulsink (2007) advocate many short-term relations as such favour innovation and novelty. In comparison to each other, the Manufacturing project has been analysed as a long-term involvement between the parties since it was a more detailed collaboration having concrete goals. The Garage projects were, on the other hand, seen as short-term because these future projects are going to be housed there are probably not as complex. The Manufacturing project aimed to increase the learning and it is therefore believed that this project should have a more relational approach, while the Garage projects aimed to be in forefront of innovations making novelty in the technology and market adaption more important. Furthermore, Tidd (2014) presents common challenges companies are facing when they engage in collaborations, for example the difficulty in making values to concrete capabilities. One participant, in the Manufacturing project, had experienced this and expressed that it is essential to find the right questions to answer. The network implementation is seen as a concrete way of achieving the strategic goal of increased learning making it a focus area during the collaboration. The Garage can be seen as a concrete innovation initiative, and its innovation coaches facilitate innovation capabilities by contributing with innovation methods, and thereby increasing the understanding of how to create prototypes and be innovative.

Furthermore, measurement is an important part of all businesses, making sure whether goals are achieved or not, however it is hard to measure the outcome of innovations and collaborations, according to David and Eisenhardt (2011). Even though collaboration and innovation are assumed to be personal perceptions regarding success, it was found that the projects should be evaluated anyway. The Garage project will evaluate its number of completed projects, rather than their results. This is because innovation must be pleasurable and encouraging indicating that it goes in line with the theory by David and Eisenhardt (2010) since results are not going to be measured. The Manufacturing project worked toward the KPIs, however these KPIs do not indicate the actual result of either the collaboration nor its innovation. It was found that the site in general measured collaborations with for instance, number of press releases, marketing campaigns, and meetings performed. These metrics are assumed to not reveal the content of the collaboration, yet they can function as milestones and ways to create motivation factors. An analysis is that collaborations themselves might have been perfectly good but the innovation outcomes were not in line with customer needs, or vice versa. It is assumed that collaborations and innovations should rather be evaluated than measured due to their non-numerical nature. One could for example evaluate expectations against the perceived outcome and estimate the value of this in relation to the goals. It is strongly believed that it is important to be objective while evaluating, to avoid bias and gain accurate estimations.

## 6.2.2 Knowledge and knowledge exchange

The three theoretical fields imply that one core of collaborations lies in the exchange of knowledge. Nooteboom (2008) claims that there must be a balance of knowledge flowing between firms in collaborations, and Gallaud (2013) points out this as mainly tacit knowledge. Tacit knowledge is further comparable to Ricceri's (2008) argument which defines human resources as internal employees and their knowledge, skills, abilities, experiences, and innovativeness. The interviewees understood that it is beneficial to have a balance between giving and receiving knowledge. However, it is perceived that the exchange of tacit knowledge is what is in focus, but not spoken from this theoretical perspective, because the site's employees aimed to increase the knowledge base by learning from other companies. The funnel model by Chesbrough (2003) illustrates how knowledge can be flowing in and out from a company during the innovation process, in OI. Lakemond and Tell (2016) claim such flows can contribute with competitive advantage, market entrance, or creation of new markets. The site's goal was to understand how other industries and markets are affected by the digitalisation, in order to figure out how Ericsson's future business can take part of this transformation. This does not imply where collaborations end up in terms of markets, yet it is possible to see that the site wanted to study future possibilities. Ericsson wanted to increase their internal knowledge by receiving external knowledge, and from the funnel perspective this means that the firm is mainly focusing on inbound knowledge flows. However, it is analysed that this classification depends on which perspective one is looking from. If looking from the manufacturing firm's point of view at the Manufacturing project, it is possible to see knowledge flow from an inbound view since this company also wanted to increase its internal knowledge base. Seeing the same project from Ericsson's point of view shows a picture of Ericsson having inbound focus while the manufacturing company an outbound. This indicates that this project can be seen as having coupled knowledge flows.

Even though it is important to exchange knowledge externally, one must not forget internal knowledge at the site, as one of the Garage projects goals was to improve the internal knowledge base. Tomkins (2001) claims that trust and knowledge sharing is interdependent, and building trust is time consuming. One interviewee claimed that core businesses at the site will not be put directly into the Garage projects, because the firm does not want to reveal such knowledge, while other participants had the opposite opinion. The researchers think that in order for the Garage to work as planned, it is important to not focus on keeping secrets. The Garage culture must have a trustworthiness in order to gain valuable collaborations. Applying this to Tomkins' (2001) theory, it will be time consuming for the teams to build trust and in order for them to do so, they will have to exchange information i.e. knowledge in an open way. It is believed that the site cannot expect other firms, involved in the Garage projects, to exchange their core knowledge if the internal representatives does not share their core competences. When analysing internal knowledge, it has been understood that it is important to not forget how received knowledge are brought back to the site. Tidd (2014) states that it is important to be able to concretise capabilities to understand how to use the result of the collaboration in order to create value. In the Garage, the projects' progresses will be presented in the shallowest part of the zone though showcases and presentations. As one of the site's strategical goal was to increase the internal knowledge to figure out where to go in the future, it is of great importance to be able to anchor received knowledge in site. In the Manufacturing project, it is believed to be even more important to be able to concretise the gained knowledge due to the project's large extent and complexity, but also because this project aimed to increase the learning about manufacturing, and vice versa for the manufacturing firm. However, no findings regarding how this is supposed to be done have been found, indicating that this have not been any focus area of the project. Yet, it will be of great importance to be able to communicate the learnings back to the site in order to make it valuable and useable in the future. If the employees

cannot communicate the learnings back to the own organisation, the knowledge might be lost. This in turn means that the strategic goal, of an increased knowledge base, will be hard to reach.

### ***Communication channels are essential for successful collaborations***

There are lot of possibilities to interact and communicate across company boundaries nowadays, in terms of ICT for example (Gassmann and Enkel, 2004; Dodgson, Gann and Salter, 2006). Yet, Antikainen, Mäkipää and Ahonen (2010) state that it is harder to communicate if actors do not know each other, and it is more difficult to get to know each other through technologies than in real life. According to Gallaud (2013), there are different ways communication can occur in collaborations but the author does not give any practical examples. The findings in the study show that the site for instance uses face-to-face meetings and visits other companies to get to know each other and to be able to collaborate. Lazzarotti and Manzini (2009) claim that OI in terms of collaborations can be formed in different constellations and with different partners. According to one interviewee, it was common that collaborations were initiated with email conversations before taking the step into face-to-face meetings. This is an important sequence as the information that is shared through technical devices can help the parties prepare for a first meeting. It was also found that the communication intensity and its sort can vary during the collaboration, as the need for information and knowledge was changing due to what phase the projects were facing. It is most likely that individuals are affecting the communication methods due to their personalities and preferences. One participant stated that even if meetings were held, firms are usually working independently between them and sees the meetings as briefing sessions to clarify what have been done since the last times. This was also observed in the Manufacturing project and it could be questioned how much the firms actually were learning from each other when only interacting every second week. This is an important question according to the researchers since the site's strategic goal was to increase the understanding of manufacturing. The idea with the Garage was that individuals from different companies will be located in the Garage area, and it is believed that this will favour the learning but also that trust will evolve faster, due to them being frequently exposed to each other. However, since the integration also depends on the collaboration itself, the Manufacturing project is not supposed to imitate the Garage due to its complexity and larger size. Yet, Ericsson's part in the Manufacturing project still aimed to explore the manufacturing industry and learn from it, indicating that it is of importance to learn the culture which is believed to be achieved through experiences. This highlights the importance of physical interactions in order to access tacit knowledge, such as culture.

David and Eisenhardt (2011) state that it is difficult to understand other companies since much is embedded inside companies' cultures, personalities, and structures. These authors therefore illustrate how hard it is to access tacit knowledge. It turned out that knowledge was easiest exchanged and learned through workshops and discussions, occurring face-to-face. The researchers believe that site visits and prototypes are favourable in terms of understanding tacit knowledge, since these are concrete ways of making it possible to learn. The Manufacturing project had meetings at different levels, where the top level met four times a year, while the WPs met every second week. It is possible to question whether the frequency was high enough to facilitate exchange of tacit knowledge. Communication across company borders are, according to Cohen and Levinthal (1990), time consuming. It is assumed that it is even more time consuming when communicating tacit knowledge. The communication between the WPs was considered as non-synced by the participants, indicating that there were possibilities for improvements. It is assumed that the Manufacturing project's structure was a major contributor in affecting the communication, because the hierarchical levels and the WPs were strictly separated and at the same time communication channels were well defined. This might imply that the participants perceived that they lack the ability to communicate freely in the project, which might have limited their innovativeness. Furthermore, this structure did suit the other parties involved, but Ericsson employees

had difficulties in adapting to its strictness. However, in order to increase the learning of manufacturing in general, it is believed that the site benefits from learning the manufacturing structures, and should therefore try to adapt to it.

Face-to-face meetings where people are exposed to impulses were, according to one participant, facilitating innovation. It was also found that the participants were aware of the possibility to access knowledge outside the company borders at a higher rate via IOC, which goes in line with theories by Shilling (2010), Grant (1996), and Todeva and Knoke (2002). It is further believed that an important step for Ericsson to be able to innovate is by stimulating partner's needs. Due to the findings, it is believed that even though face-to-face meetings are important for innovation, it is also important to understand what kind of knowledge that should be exchanged. Tacit knowledge was, as mentioned, found to be the main required one when working externally with innovation, since reaching tacit knowledge is facilitating innovation. In line with the above mentioned, it is considered that frequent interactions help firms to exchange tacit knowledge and in the long run also improve the innovativeness. Moreover, these arguments also go in line with the theory by Dodgson (2014) who claims that high involvement collaborations favour more detailed information.

### ***The use of human resources***

In the Manufacturing project, there had been tendencies of mobilising resources dependent on needs in different phases. According to one participant, the members of the project have been entering and leaving the project during its lifetime. The reason why employees have been mobilised was that it had occasionally been an increased need for certain competences. Gallaud (2013) explains that this is common when it comes to collaborations in innovation processes, as different constellations are needed during different phases. In addition, Dahlander and Gann (2010) mean that in order for a project to access necessary human resources, an active managerial support is beneficial. It was found that the management at the WP level were not perceived as working sufficiently enough, however it is difficult to draw any conclusions if this affected the mobilisation of participants in any way. Elfring and Hulsink (2007) state that mobilisation of employees is not supported by weak ties between companies as much as by strong ties due to the strong one's nature. As the Garage was assumed to mainly house weak tie collaborations, it makes the mobilisation of participants an issue. These projects are considered as weak tie approaches, since they consisted of such a small part of the site's business and for a relatively short period of time. On the other hand, the participants expressed a willingness to mobilise participants dependent on the current need of the Garage projects. The researchers found that the possibility of mobilising participants lies within the tasks of the innovation coaches, making it their responsibility to include the right capabilities at the right time of the projects. Even though the theory states that weak ties collaborations are less able to mobilise participants, the innovation coaches are in this case what makes it possible to overcome this issue.

According to Bass and Avolio (1992), transformational leaders play an important role in collaborations, who are able to create open cultures and manage changes. It is hard to use theories regarding leadership styles in collaboration and innovation since individuals originate from different firms, making it hard to choose leaders and give them credibility (Vangen and Huxham, 2000). Alternating decision control is presented as one way of deciding leadership that can help to improve the performance of innovation and reach complementary skills (Davis and Eisenhardt, 2011). One interviewee explained that the leadership can vary during the lifetime of a collaboration, since it is related to which party that can gain most out of the collaboration at the moment. During periods when one firm is able to contribute or gain more from the collaboration it is likely that this party drives the collaboration forward. Yet, this was not any outspoken strategy rather something spontaneously occurring in the studied projects. It is believed that



in order for such management method to work, it is important to be clear of how to practically perform it in order to avoid confusions among the parties. This means that what to expect of the leadership must be clear to all participants. Regarding the Manufacturing project, the researchers perceived divided opinions of its leadership. The university was designated to be the formal lead organisation because the governmental funders demanded a predetermined structure with the academia as coordinator. To have a willingness to decide a leader is, according to Vangen and Huxham (2000), common because it creates legitimacy. However, it is possible to question the university's mandate in this project. Because the communication regarding what to expect from the leadership was not fully communicated to the members and created conflicting views, found in the interviews. Dahlander and Gann (2010) explain that it can be difficult for the management to divide tasks in cases where the parties possess different knowledge, as in the Manufacturing project. In comparison to the Manufacturing project, the outcomes of the Garage projects were unknown which implies that the structure in these projects will be less strict. This in turn leads to less dependency on designated leadership, which also depends on the novel character of the projects in the Garage, which was totally different from the Manufacturing project in this matter.

### 6.2.3 Openness

In general, the participants had an understanding of openness being important for increasing the knowledge base and to be innovative, and that it is important to have an open and honest communication. This goes in line with the theory by Andersson and Berggren (2015) claiming that knowledge is one underlying reason why companies have an increased interest of openness. The OI and the CI literature sort openness into different classifications, for example inbound and outbound innovation (Dahlander and Gann, 2010; Gallaud, 2013). As Ericsson traditionally has been a company with a central revenue stream in their patent portfolio, one can easily classify the company in having an outbound selling approach towards openness. However, companies can, according to Dahlander and Gann (2010), have different combinations of approaches towards openness. This is assumed to be dependent on the perspective one is looking from. The Manufacturing project is analysed to have a CI approach, whereas the Garage is assumed to have an OI approach. This is because the Manufacturing project involved a more balanced exchange of knowledge between the parties, which is why this project also is classified as sourcing in Dahlander and Gann's (2010) way of mapping openness. The Garage project is, on the other hand, classified more as the selling of openness, because the projects that are going to be performed in the Garage will most likely deal with ideas originating from Ericsson's employees, according to the researchers. This implies that these projects are not going to be as able as the Manufacturing project in reaching a symbiotic relationship, but they are rather going to be focused on absorbing knowledge.

According to both Nooteboom (2008) and Andersson and Berggren (2015), there are always risks of spillover when collaborating externally. Spillover was not considered as any risk in the Garage project nor in general at the site, because the company was actively choosing not to collaborate with competitors. The participants in the Manufacturing project claimed that knowledge was not given away without any reason, indicating their awareness of this risk. Explicit knowledge does more likely become spillover, yet it is possible for tacit knowledge to become spillover as well (von Hippel, 1994). Even though the site was not collaborating with competitors, the researchers think that there might be risks of spillover in collaborations because it is impossible to guarantee that partners will not take advantage of gained knowledge. The Garage participants had a common mind-set that everything does not have to be super-secret, which is believed to be favourable for innovation which contradicts their plan of not including core business there. However, if the first statement was correct, it shows that the employees have an open mind toward revealing information and knowledge. One reason why there might be

different practices is because the outline of the Garage has not been thoroughly discussed nor communicated. Furthermore, as the Manufacturing project was in the middle of a honeymoon phase the employees act very polite, according one person. It is believed that the openness also depends on the collaboration phases due to developments of group dynamics. Collaborations are affected by the phase since a team gets more comfortable and open to each other by time.

A common thought was that trust is very central in innovative collaborations in order to reach openness. According to Gadde and Håkansson (1993), trust enables an honest and fair communication between parties when disagreements exist. From an innovation perspective, the participants claimed that there must be a friendly and safe climate, allowing free thinking and exchange of information. From a management point of view, it was found that it is important to trust the employees if they are working with innovation. This will especially be true when letting employees spend time in the Garage area, since they will spend time on something very unpredictable. Based on these findings, it is believed that the employees need support from their management in order to work as open and innovative as possible. Furthermore, it was found that trust can be created through face-to-face meetings and be built if parties communicate their intentions and what risks they are willing to take. This argument shows that trust and sharing information are found alongside each other, as in the literature by Tomkins (2001). Tomkins implies that sharing information builds trust and when the sharing decreases, so does also the level of trust. From what have been found, it is believed that trust and communication are even more important while collaborating with other industries and especially with non-familiar actors, since there are no fundamental relationships to fall back on. Firstly, trusting the organisation one is collaborating with is assumed to be important, otherwise no collaboration will occur. Secondly, it is also important to trust the individuals involved since the actual interaction occurs between people. No trust on the individual level will most likely affect the trustworthiness of the organisation as well. It is therefore overall important for a focal company to focus on its own trustworthiness in order to attract collaborating partners. However, trustworthiness goes down to individual levels, since personal relationships affect trust and thereby also openness.

### ***Individual skillset to reach openness***

A common opinion was that innovation requires people that are able to think disruptive and outside the box, and that innovation is favoured by passionate individuals with daring personalities. Alexy and Dahlander (2014) claim that individuals should be able to combine skills in order to efficiently work in OIs. It is assumed that the abilities to combine knowledge and to be able to collaborate are more important than the mentioned personalities themselves. To make innovations real and gain as much as possible out of collaboration, individuals need to be team oriented and be able to make use of their complementary competencies in terms of skills and experiences. Chesbrough and Bogers (2014) highlight the uncertainty and unpredictability of working within innovation. It is therefore assumed that finding individuals that are able to work under such circumstances is essential. One ability seen as sufficient for innovation mentioned during the interviews was patience, since the site had excessive and old ways to progress via their heavy processes. It is believed that it is even more important for large firms to have perseverance since these kinds of firms do not have as flexible processes as small ones, making it more time consuming to engage in IOCs for them. According to some participants, perseverance was a central matter when creating an open culture, because it cannot arise by itself. Yet, it was also challenging to maintain such culture and make sure that it is not only empty words, because one might have to adapt to it. Regardless, it is believed that an open culture must encounter collaborations.

In order to reach an open environment when collaborating, the participants preferred a coaching leader style. One participant argued that it is important that the leader is open, allows a creative climate, and sets clear regulations yet, it is also of essence that the leader is flexible and can adapt to changes and follow developments. This goes in line with Schruijer (2008) who claims that leaders should be flexible and promote ideas but also the importance for them to stick to predetermined principles. It is believed that it is essential to have clear principles and regulations in order to generate a feeling of safety for the members, but still have a changeable mind-set, since innovation is an uncertain matter. Even though the leader skillset is affecting collaborations, the literature adds that it is not only the leader's individual behaviour that influences collaborations. Vangen and Huxham (2000) point out that the collaborations' structure, processes, and participants are also affecting the performance of the leadership. These influences have been observed in the projects in different ways. The expectation of the leadership in the Manufacturing project was divided, especially in the WPs which is analysed to depend on the structure of the project due to its strict character as have been analysed earlier. In the Garage project, on the other hand, one goal was to speed up legal processes, implying that these processes most likely will force the leadership in making faster decisions. The leaders in the Garage, as well as in the Manufacturing project, need to be aware of the participants' impact on the management. It is assumed that all individuals do not fit for working in such uncertain environments as OI is, therefore a leadership able to manage such issues is considered to be vital. One can also view the leadership based on the project structure where the steering group decided strategic actions and each WP followed those decisions, but chose how to manage it operationally. The intermediate level that was coordinating the WPs could be seen as administrative leaders, since these members were presenting decisions from the steering group and had knowledge about the WPs. This indicates that leaderships exist at different levels.

Davis and Eisenhardt (2011) advocate zig-zagging objectives as a method to ensure that all parties' goals are fulfilled. Applying this theory to the Manufacturing project suggests that the collaboration focus should lie on achieving Ericsson's goals during a certain period while during another period focus on achieving the manufacturing company's goals, to favour openness. However, it is questionable whether this method could be suitable for the Garage, since it is analysed that the site most likely will be the lead organisation and the projects' objectives will originate from the site, in line with the theory by Vangen and Huxham (2000). The reasons why the site could be seen as the lead organisation, are that they are the initiative takers and will house the projects in their facility.

#### 6.2.4 Legal Mechanisms

As the researchers of this study aimed to understand how legal mechanisms affect collaborations, no clear distinction between NDA, contracts or agreements regulating IP have been made. Instead, all are considered as legal mechanisms. Ricceri (2008) characterises contracts and IPs as structural resources. Ericsson used IPR as an essential part in their business, and a part of their core business and source for revenue streams in selling patent and standards. According to Håkansson et al. (2009), formalised contracts are more common in short-term collaborations while long-term collaborations are based on trust. Ford et al. (2011) think that firms that are high involved in collaborations are dependent on so many parameters and exposed for uncertainties, making it hard in those cases to rely on formal contracts. However, these theories were not in line with the findings. One participant said that contracts were necessary without them no collaboration could occur which means that contracts are always used in collaborations at the site. Alexy and Dahlander (2014) and Alexy, Criscuolo and Salter (2009) claim that there is a common phenomenon among companies, refusing to engage in discussions regarding collaborations without including legal documents. Since Ericsson saw contracts as necessary, it can be assumed that they have a resistance toward collaborating without legal documents. However, it is

assumed that the 'no patent, no talk' issue is not as serious at Ericsson, as the literature presents that it can be. Since the site had initiating dialogues before legal aspects were considered, they are showing willingness toward collaboration opportunities which means that the strict 'no patent, no talk' approach does not appropriately fit at the site. Connecting this to openness in OI, it shows that the site was capable to depart from legal aspects indicating that they had an open approach, favouring innovation.

The legal documents in the Manufacturing project were constructed on governmental demands, yet they would still have existed even if it would have been a bilateral relation. Without governmental impact, it is likely to believe that the content of the documents would have been different and that the legal process would have taken place later in the collaboration, since government demanded a contract in the first step of the collaboration. Overall, a confusion regarding these legal documents were found in the study. The participants were doubtful of what the documents contained and of who signed them. Yet, it was perceived that legal documents were not bothered by the participants. This indicates that even though collaborations always include contracts they are not seen as practically significant, therefore it is analysed that contracts have a small effect on collaboration performance, favourable when working with innovation. By controlling who knows about contract details, it is possible to control how much contracts are affecting the collaboration performance. Furthermore, it was also found that contracts were written in the beginning of collaborations and later put aside only to be considered during situations that could not be solved in other ways. This finding strengthens the analysis even more, showing that contracts are not a focus area when collaborating and therefore not as affecting of the collaborations.

An interesting finding was that contracts can be seen as tools to create trust among the site and collaborating firms. Some participants implied that contracts show that the parties involved are serious in their intentions, but as soon the collaboration begins the contracts are set aside. On the other hand, one participant claimed that even though contracts can generate trust, they cannot force innovation. However, trust can facilitate innovation, meaning that legal documents can indirectly affect innovativeness via trust, resulting in people daring to share more knowledge when working in trustworthy environments. It is still believed that contracts are of importance in the beginning of collaborations if agreed in a sound way as they contribute to mutual foundation. Moreover, Chesbrough and Ghafele (2014) claim that IP agreements can affect the effectiveness of innovative collaborations in a positive way. However, they also claim that it is a challenge due to members' attitudes toward IP and legal documents, depending on whether they see them as defensive legal tools or not. Some participants saw contracts as defensive legal mechanisms while others did not think they affected the collaboration substantially. Even if contracts were only used when needed in collaborations, the researchers think that collaboration frameworks are formed in the content in the contracts. For example, if a time frame is clarified in a contract, the collaboration will be dependent on a deadline, which most likely affect the collaboration pace. Regarding whether the contract content affects collaboration positively or not, it is believed to depend on expectations and attitudes the members have.

## 6.2.5 Compatibility

It has been found that it can be hard to understand each other when collaborating firms are acting in different industries or markets. This means that closeness between industries, in terms of sectors, affects collaborations. However, it is the differences between companies that facilitate learning. In order to learn, the technological overlap between firms must be big enough, according to Mowery, Oxley and Silverman (1998). This goes in line with the findings of Ericsson as the site did not discuss collaborations with companies that were too similar themselves. One participant claimed that collaborations need to originate from an interest in another company's capabilities that are complementing the site in a suitable way. Collaborating with companies that are too close can imply risks of knowledge spillover, as it might

be possible to gain advantage of information because firms are facing similar challenges. If companies are too far away from each other it can, on the other hand, be hard to find a common foundation to base collaborations on. Therefore, the researchers think that a suitable overlap is necessary with a balance of having similarities making the collaboration smooth, and having differences in order to gain advantages, for instance in lessons, from the collaborations.

According to Das and Teng (1999), there are risks when searching for partners to collaborate with and companies need to simultaneously consider to fit with each other, both strategically and in terms of resources. This search related analysis can be connected to compatibility since it is a base for how firms fit and can collaborate with each other. It has been identified that the site showed tendencies towards both kinds. The Manufacturing project aimed to find resource fit in the manufacturing company's suitable complementary resources, in terms of knowledge. This project also aimed for strategic fit, because it could be seen as a step in studying the manufacturing industry in general, in order to realise future growth potential. The Garage project was a strategic decision itself due to increased possibilities to innovate, yet the projects that are going to be performed there will mainly aim to find resource fit with their collaborating partners. It is therefore possible to say that the site is simultaneously working with both strategic and resource fit in both projects. It is believed that the theory argues for the simultaneous combining of resource and strategic fit because the ability to reach predetermined goals in an efficient way. If only focusing on one kind of fit, it is assumed that there will be a lack in the overall performance and the collaboration will therefore be negatively affected.

Regarding the structural differences, it was understood that the structure in the Manufacturing project was adapted from the manufacturing industry since two parties originated therefrom. A sequential structure would have favoured the site more, but since the site aimed to learn as much as possible regarding the manufacturing industry the project settled with the manufacturing based strategy. Alexy and Dahlander (2014) explain these matters, stating that differences in structure often results in difficulties with coordinating of collaborations. Coordination issues have been found by the researchers in the Manufacturing project, indicating that the literature is applicable and the structure of the project plays an important role for the collaboration outcome. However, it is more difficult to state anything regarding the structure compatibility of the Garage future projects, since it is still unknown what companies are going to be included. Yet, it is assumed that the structure will affect the collaborations in the Garage less than in the Manufacturing project, since the Garage projects are less complex, have a smaller number of members and that a common meeting place for the teams exists. To figure out how the Garage structure is supposed to be managed was seen as an iterative process. This is assumed to be a beneficial approach when creating an OI arena, however it can be favourable to have a predetermined work structure in order to create clarity regarding objectives and focus areas for the team members. This illustrates an ambiguity in knowing how to structure the Garage in the most beneficial way, however when prioritising innovation, it is most likely that an iterative process could be more beneficial.

Regarding firm size, it was clear that it mattered in the compatibility between firms. One interviewee thought large firms might be more afraid of opening their borders than small firms since smaller ones might be more used to collaborate externally. Small firms can gain access to Ericsson's global network through collaborations and Ericsson can gain access of specialised knowledge the smaller firm possess. However, it was found that there were challenges when companies of uneven sizes are collaborating, because there is a risk that smaller ones become subcontractors. Knoblen and Oerlemans (2006) claim companies that are similar are more likely to succeed when collaborating. According to the researchers, this theory can be related to sizes. This means that firms are compatible when collaborating with companies of similar sizes, however one can question if it is a smooth collaboration or tough learning

that is most important. It is believed that flexibility in processes and time aspects differ due to companies' size differences when collaborating. In turn, this could create conflicts if the site collaborates with smaller firms without good enough communication regarding its performance. A vision was to have a more easy-going legal process in the Garage compared to normally at the site, which means that it will most likely be easier to collaborate with smaller firms in that area. This implies that the Garage teams will be less dependent on company sizes, since they are working in a sheltered environment.

### ***Terminological differences***

Alexy and Dahlander (2014) claim that language makes firms more or less compatible, which also was found in the study in terms of differences in terminology. Different industries use different terms regardless geographical distances. Word as 'operators' had different meanings in the industries in the Manufacturing project, which created confusions and conflicts. However, both Gadde and Håkansson (1993) and Ford et al. (2011) claim that conflicts can be used as a positive and creative resource when innovating. In line with the literature by Mowery, Oxley and Silverman (1998) treating technological overlaps, it is assumed that differences in terminology is an indicator for learning possibilities and therefore also innovativeness. The misunderstandings regarding the term 'operator' created confusion and conflicts, but facilitated learning and innovativeness because the parties needed to communicate thoroughly in order to understand each other. The participants knew from the beginning that there would be differences between their industries reflected in the project, and that they therefore should communicate their own knowledge carefully. Yet, when it was discussed what the site personnel teach the manufacturing firm's representatives, it was found that the site employees saw no point in showing what kind of equipment they aimed to implement in the factory. Tidd (2014) states that there are challenges in sharing tacit knowledge systematically, which is reflected in the aforementioned example. This example indicates that the participants did not understand the importance of communicating at a basic level. It is believed that collaborations depend on understanding of what the other party know and the ability to adapt one's communication thereafter. Therefore, it is believed that a good idea could be to show the manufacturing firm the technologies that were going to be implemented at their factory, since that could facilitate learning and make the companies more compatible each other.

Both Tomkins (2001) and Forsström (2005) highlight that misunderstandings can be avoided by effective communication. Ericsson was not communicating effectively nor clear in the Manufacturing project, there was a misunderstanding mentioned in the findings. This was solved by Ericsson gathered information to be able to explain how the details would not affect the existing equipment at the factory. Examples of efficient ways of communicating have been found in the interviews, for example to ask a question in ten different ways or to create new terms in order to share the same definitions. It is also important not to rush into conclusions of the other party and a mean for that is to have many meetings in order to really understand each other. As it is believed that tacit knowledge is more difficult to exchange while collaborating, the mentioned concrete ways of communicating can facilitate this exchange. Nooteboom (2008) states the importance of decreasing the cognitive distance in order to collaborate effectively, and the examples of how to efficiently communicate are believed to decrease this distance as these contributed with clarifications. Finally, even though it was found that the participants in the Manufacturing project understood the industrial differences from the beginning, it has been observed that they somehow were unable to overcome this. The examples regarding the word 'operator' and the misunderstanding regarding the important role of safety in the factory, indicate that enough considerations regarding compatibility were not taken. This shows the difficulty of understanding each other even if the firms were aware of the differences from beginning. Further, it also shows the importance of communicating on a basic level in order to really understand each other. Schein (2010) claims that cultural differences occurring are most likely not noticed, which is a central challenge.

It is possible to assume that cultural differences are expressed in for instance blaming leadership or the other parties' inability to collaborate. It is therefore believed that, when misunderstandings occur, members should examine them carefully in order to realise if they depend on cultural differences or something else, making it possible to improve the collaboration. Being aware of cultural differences on beforehand helps when facing misunderstandings and other cultural clashes. Yet, by avoiding 'we and them' approaches while collaborating, it is believed that misunderstandings are more easily solved due to a more open atmosphere and joint collaboration.

### 6.2.6 Uncertainty

Nooteboom (2008) claims that personal trust is essential when collaborating during uncertain conditions and in these cases, formal contracts are also difficult to specify. Yet, Håkansson et al. (2009) claim that it is easier to deal with uncertainties when having contracts since these got wider limitations. From an innovation perspective, some interviewees explained that it was less costly to collaborate externally and that such collaborations with innovation elements had emerged at the site. It is considered to be more uncertain to collaborate externally, than with internal R&D, because it is probably harder to control the members involved and counteract information leakage, i.e. spillover. This shows the greater importance of trust in external collaborations. By getting involved in IOCs, firms can gain help to understand rapid changes faster as more perspectives can be accessed (Dodgson, 2014), which is considered to be good in relation to innovation due to its unpredictable nature. One participant saw an uncertainty in people having to put their energy in actions that were not a 100 percent predictable, such as the innovation in the projects. Collaborations with innovation are facing uncertainties at different levels, partly in the innovation itself and partly in the collaboration. This is because it is not possible to control another party, which makes it even more uncertain when firms are interdependent. This is comparable to the literature by Chesbrough and Bogers (2014) claiming that innovation can occur in products, processes, and in services. It was found that one way to handle uncertainty in collaborations was by agility. Having a flexible structure is assumed to be helpful in order to be agile and handle uncertainties due to the unpredictability of innovation. The structure's flexibility can function as a mean in order to meet changes on demand from an organisational perspective. It is further assumed that organisational structure has a greater impact on facing uncertainty than individuals' flexibility or characteristics. In Ericsson's case, working with unknown industries required a flexible structure so the site can adapt to the partners since collaborations aimed to increase a holistic understanding of another industry or partner.

From a management perspective, a risk found regarding the Garage was that its projects can be seen as uncertain activities to let employees engage in, since the projects steal time and effort from the regular business. It is therefore believed that communication to the site explaining thoroughly what the Garage is and what it aims for is of importance, in order to create legitimacy. It is assumed that in order for the Garage project to function and overcome its current impression of uncertainty it is for both managers and employees important to dare getting involved. By doing so, the Garage project will most likely be able to rise in the employees' minds and the uncertainty connected to its early phase will slowly disappear, since its effort can be communicated to the whole site. The Garage was in general seen as a very innovative initiative, both by its characteristic and by what is planned to be achieved. The Manufacturing project, on the other hand, was innovative mainly in the collaboration itself. This is because no party developed anything new, but rather combined already existing knowledge in a new setting. This means that the uncertainty was not found in the technological competences regarding the network that was going to be implemented, but rather in making the collaboration function smoothly and efficient.

A finding was that there was an uncertainty in finding the right project to engage in and partner to collaborate with. It is believed to be challenging to prioritise projects to work in when it is unclear what they will result in. Alexy and Dahlander (2014) point out that there is a challenge in attracting firms to collaborate with, because it is difficult to know if they got complementing resources or not. Uncertainty exists throughout the whole collaboration while working with innovation since results might be concealed, partners might re-prioritise the importance of the collaboration, and it is first and foremost impossible to control another actor. Courage and sound risk-taking can be seen as important abilities, in order to overcome the issues stated and be able to innovate externally. Although one must not forget that innovative projects occasionally fail and it was therefore found that mistakes must be accepted and learned from. Furthermore, it was also found that it is in uncertain situations important to move forward with frequent small steps in order to be able to reverse mistakes if needed. From an innovation perspective, small steps are considered as suitable since it is thereby possible to have a trial and error approach, making it possible to change direction subsequently. Engaging in uncertain collaborations means that companies need to take risks regarding costs since it is, according to Andersson and Berggren (2015), expensive to be open. Management of uncertain collaborations is challenged and critical for the collaboration success (Dodgson, 2014). This implies, once again, the importance of moving forward with frequent small steps as well as having a suitable leadership.

The uncertainty in innovation was, according to the participants, that an idea never becomes an innovation as long as use-cases are not found and understood. If use-cases are not understood, the developments will most likely only end up as cool gadgets. One interviewee believed that future use-cases can be found in the cultural clashes occurring between companies that are collaborating. This was clearly illustrated in the Manufacturing project as the site collaborated with another industry, in order to learn from it. By being exposed to their culture it is possible to understand profound user needs. Furthermore, it was found that employees at the site sometimes might focus a little bit too much on technology development, then user needs. Schruijer (2008) highlights the importance of leadership while collaborating, stating that leaders should get out as much as possible from the resources used. It was found that leadership was an important asset in developing use-cases, because leaders can make sure that focus lie on right subjects. The Garage organisation was, according to the participants, aiming to include a focus on business value, in order to create products worthy for the end users. In order to help the members to move from technological, to use-case focus, the innovation coaches will have an important task. This demonstrates that the findings of having a leadership directing toward business focus goes in line with the theory by Schruijer (2008). In order to support the understanding of use-cases, leaders must be able to find appropriate capabilities in members since use-cases constitute the base of innovation for the site.



# 7. Discussion

*This chapter presents the discussion of the study's empirical and analytical findings, highlighting them from various perspectives. The structure follows the research questions just as the analysis, starting with a discussion of the first question followed by a discussion of the second one.*

## 7.1 What does inter-organisational collaboration and innovation mean for Ericsson Gothenburg and the telecom industry?

In general, it was perceived that all participants shared the same understanding regarding the importance of IOC and innovation, both from an industry and a site perspective. What IOC means for the industry and the site will be discussed in the following parts, however one can question what this uniformity of opinions was due to, and some reasons to this have been identified by the researchers. The interviewees themselves might have been comprehended regarding the importance of IOC, because everyone had an academic background. If the study would have been performed with other participants and with a less homogenous group, the answers might have differed and the understanding of IOC's importance might not have been as mutual. How the interview questions were asked might also have influenced the answers, yet the researchers aimed at having a natural approach during the interviews in order to avoid bias. On the other hand, the interviews were structured as discussions rather than just questions and answers, meaning that personal opinions from the researchers could have affected the interviewees when answering. Furthermore, the questions concerning the first research question were asked in the end of each interview, indicating that these answers could have been affected by earlier discussions in the interviews. The general expressions could also have originated from a common understanding at the site, embedded in the culture. It is difficult to say why all participants shared the same view regarding the importance of IOC. However, it is believed that if this understanding was established in the culture it would be beneficial for the site, as it implies a common ground. Additionally, it was also found in this part that the literatures' geographical origins might have affected the analysis potential because the study was performed in Sweden while a lot of literature was based on other geographical locations.

### 7.1.1 The telecom industry

It was found that the telecom industry was in the middle of a turbulent period. Yet, it also came to the researchers' understanding that these uncertainties were probably not considering the telecom industry alone. It is believed that other industries are facing this change and turbulent time as well. As the technology in the telecom industry has a rapid development pace there is a high competition, resulting in tighter rivalry amongst telecom companies. This is comparable to the statement by Andersson and Berggren (2015) who relates high competition to globalisation. When studying Ericsson's position from a global level, it is believed that having this leading position as they had results in that the company never can be relaxed, since the position always needs to be protected. Globally, Ericsson's customers expect to be served by a market leading company, implying that the company was facing risks of losing customers if their position is not constantly considered. These circumstances presented highlight the essence of innovation and collaboration even more and it is possible to state that the theories go in line with these findings. Furthermore, it was analysed that Ericsson globally engages in IOC on its own grounds, meaning that the firm is not forced into collaborations as Lewis (1991) indicates. However, it is possible to question what the literature actually mean by companies nowadays being forced to engage in IOC. Whom or what have the power to force a company into external collaborations, or is it so that the literature means that companies are experiencing a need for collaborations, since they understand its necessity. It is possible that the researchers have misinterpreted this particular word's role in Lewis'

literature. From the study at Ericsson, it is however possible to observe that the urge for IOCs come from members' inner motivation as they have understood the value of it. Is it this inner urge that the literature actually refers to when stating that companies are forced into IOC? Regardless, an inner motivation can be related to a willingness and driving force toward IOC and push it in right directions.

Based on the findings it was analysed that Ericsson globally was collaborating with other companies from different industries based on mutual attraction towards each other. As the telecom technology, adequately can be applied in many other industries, one can question the industry's future outline. From Ericsson's perspective, it is possible to contemplate if its future will be as a pure telecom company or if the company's presence at different industries will change the perception of its industrial affiliation. Possible speculations are that telecom industry might become fragmented and something complementary in other industries. At the same time, it is possible to question whether today's rather clear industry borders will be as present in the future, or if they will be smudged. The interesting is if and how future industries and their borders will affect future collaborations. Moreover, even though external collaborations are central of this report, some participant did point out the importance in considering collaborations in current businesses. Already established relations between Ericsson and its customers and suppliers can be seen as sources of influences and perhaps also innovation. The possibility to perform OI with them is a topic worthy study, as it constitutes a large base of their existing business. Moreover, as such relations are established, collaborations between them will most likely be efficient compared to collaborations with completely new partners. This goes in line with Schweitzer, Gassmann and Gaubinger (2011) explaining that collaborations with customers and suppliers are beneficial in changing times, meaning that this is something that also can be focused on when establishing OI within telecom industry. In sum, this part illustrates that IOC and OI are very important for the telecom industry as they help firms to be in forefront and keep leading positions, which also illustrates the suitability of the theory.

### 7.1.2 The site

The turbulence that telecom companies were found to be facing was also experienced at the site. In relation to the finding, it was analysed that OI most likely will become influential at the site. This indicates that the site has to come up with concrete and practical ways in which innovation can be developed in collaborations with other industries. This is accordingly already done since the site had its Garage initiative and was involved in the local ecosystem, which Dodgson (2014) theoretically suggests as an alternative for collaborations. Options regarding the future were to engage in collaborations regarding Gothenburg city's expansion. What was common for these alternatives is that the site needs to try to focus on OI, allowing knowledge to flow in both directions, in and out of the company borders, as the literature by Chesbrough and Bogers (2014) suggests that OI is supposed to work. Even though innovation is theoretically uncertain in performance and result, it has been found that the site does not get involved in collaborations that are too uncertain. The site always needed to be able to see gains before investing time and resources in collaborations. Furthermore, benefits can be monetary, but it is also believed that benefits can consist of other driving forces, such as the possibility for the site to be active in upcoming industries with successful companies or technologies on the rise.

It was clear that the site had great possibilities in engaging in the ecosystem in Gothenburg. Having this location gives the site a big competitive advantage in comparison to other Ericsson sites. On the other hand, it is not of the researchers' knowledge how other sites are situated in relation to other ecosystems or potential partners. This makes it difficult to state if the Gothenburg site was better situated than others, yet its location was seen as obviously beneficial. The ecosystem in Gothenburg was an incitement for collaboration possibilities and makes the site valuable, but it is unclear to what extent. A question

regarding the site's position in the ecosystems concerns Ericsson's attitude toward its own knowledge in relation to others' attitudes. Companies that think too highly of themselves due to strong market positions are most likely not uncommon and it is believed that the site need to avoid embracing such attitudes. Companies with hubris can be related to the theoretical syndrome of NIH by Katz and Allen (1982), which is why the site need to remain curious, humble, and open, regardless how strong position they can gain in the ecosystem. To achieve this, it is of the researchers' opinion that the site has to have open channels to the outside world and analyse how current trends might impact the site. Basically, the site would benefit from having an attitude, that nothing lasts forever and that changes and developments are what is most important for the site in order to gain strong position and competitive advantage.

Something explicitly not found in the theories but in reality was that IOC can be looked upon as a marketing or PR mean in order to generate attraction and thereby further collaborations. This implies some sort of ripples on the water approach of IOCs. Even though the theories do not explicitly use the wording 'marketing' when presenting IOC attributes, Grant (1996) states that IOC can generate further market opportunities, which can be related to the site's approach toward IOC as a marketing tool. It could be questioned if the researchers could have included literature regarding IOC as a marketing tool for OI as it most likely exist, since it was found in this study. However, the researchers have the opinion that collaborations between firms should not be performed with the aim to create a media fuzz or perform marketing. Instead, IOCs should include value creating activities in form of development or progress of some kind, but a positive side effect can be that it creates recognition making more companies interested to engage in collaborations with Ericsson. A positive bonus from engaging in several collaborations can be that the site's ability to collaborate will increase, through learning by doing. In sum, IOC can lead to recognition but also teach Ericsson employees how to collaborate efficiently, generate even more collaboration opportunities. Obviously, the findings and the literature were not completely different, yet differences of how IOC and OI are looked upon between reality and theory have been found. One similarity was, for example, that the site considered IOC as very important for a strong position in Gothenburg, yet one difference was that IOC can be looked upon as a marketing and PR tool.

## 7.2 What kind of collaboration aspects are there, and how do these affect inter-organisational collaboration and innovation in the two projects and at the site?

It has been found that it is very hard to generalise collaborations practically, especially when they include innovation. It depends on many different factors such as the collaboration context, differences in company size, collaborative and individual goals, but also company characteristics. When studying the literature, six aspects were identified to be important when collaborating externally and should be looked upon from a holistic perspective, in order to understand the whole picture of collaborations. This is because the aspects are related to each other making them interdependent. Yet, if the study would have been performed by other researchers, it is most likely that other aspects or aspects with other names or definitions, would have been identified as these were developed via discussions by the researchers. Although, the selection was made thoroughly, which is why the researchers believe that the aspects were valid and usable in the study. Furthermore, as was mentioned in the first part of the discussion that the findings depend on how and what kind of questions that were asked can also be applied to this part. However, it has been hard to invest and analyse the findings on a detailed level due to the complexity of IOC and innovation and because the literature is very general and wide, according to Tidd (2014). It is most likely that the result would have been different if the study would have been performed on a smaller organisation or if the theoretical areas would have had a narrower approach. In the following,

the developed aspects from the analysis are discussed and the common features of these aspects are illustrated.

### 7.2.1 Partner selection

Innovation can be seen as unpredictable, according to Håkansson *et al.* (2009), and the site saw the Garage as a concrete channel to work with innovation with an open approach. Though, the site did never get involved in collaborations that were not seen as beneficial in some way, narrowing the search process. To search for innovation possibilities, Davis and Eisenhardt (2011) advocates that both broad and deep trajectory search should be used. This is also the researchers' opinion as a mixture of both is mostly likely beneficial as it creates a greater sample of opportunities. Yet, it is hard to know what to look for while searching for new partners and what aspects should be prioritised and in what sequence. As the site only did choose to collaborate with partners if they thought it would create value, it could be assumed that some kind of selection was made. Furthermore, it is also possible to question the literature in where the division between broad and deep search is made. It was possible to compare the projects with each other in the study, since their search processes could be related to each other. However, it would have been hard to study them individually regarding broad or deep search as the theory does not make any particular division between broad and deep search. Even though, the participants stated that the site collaborates with all kinds of firms, except competitors, it has been apprehended that the site likely prioritised partners of the same size, due to Ericsson finding larger companies more credible and better suiting for them. There might be risks for smaller firms when collaborating with larger ones, as the site, since they might end up as subcontractors. Yet, there will not only be obstacles for smaller firms but also for the site as they search for collaborations where a mutual knowledge exchange can occur, which is believed to be harder to achieve with unevenness between partners. The size impacts on collaborations is further discussed under the compatibility aspect, indicating an interdependency between these aspects.

Furthermore, collaborating goals play a central role while collaborating externally and when searching for partners (Gallaud, 2013). It is strongly believed that goals should not be shared between parties, rather understood by all involved in order to generate a joint base. It was analysed that goals occurred at different levels in terms of strategical and operational, highlighting the importance of keeping this in mind when collaborating since focus differ between parties over time. This shows the importance of knowing what goals that should be prioritised. For instance, members in the Manufacturing project was implementing a network, yet they also had to keep in mind that the goal was to increase knowledge about the manufacturing industry. Obviously, it is pretty easy to know when the implementation has been fulfilled, but not as easy to know if the knowledge base has increased for the participating members. As the actual decision of whether the knowledge base has been increased or not is believed to be dependent on members' expectations. Moreover, Dodgson (2014) is reasoning about the degree of involvement, and what can be highlighted regarding this is the difficulty in identifying differences between high and low interactions. In relation to innovation, it is believed to be better with high involvement relations when aiming to learn cultures, or gain experiences and skills, while low involvement relations might be favourable when searching for impulses between parties. Yet, when does firms know when it is high or low involvement relations they should strive for? It is most likely that this must be clear and understood already when the searching begins as the level of involvement should be reflected upon in the collaborating goals. Most findings within this aspect goes in line with the literature, although it is possible to question what characterise the size of firms, deep and broad search, as well as the degree of involvement.

## 7.2.2 Knowledge and knowledge exchange

As mentioned in both the empirical findings and the analysis, the exchange of knowledge is central in all collaborations with innovation elements (Gallaud, 2013), without exchanges no learning can be reached. Yet, the approach that the participants had regarding what could and what could not be shared in the Garage project illustrates that they lacked a full understanding of what openness in terms of knowledge exchange was. Since the participants were unwilling to include knowledge regarding the site's core business in the Garage, it is easy to draw the conclusion that possible collaborating partners may lose interest of engaging in the innovation projects. This is analysed to be the case as learning from the site's core competencies could in one way be what is most valuable for other parties. It was shown in the analysis that the sharing of information constitutes a foundation for the creation of trust, which also goes in line with the theory by Tomkins (2001) who states that trust and communication are related. Therefore, if partners should sense that the site is hiding knowledge from them, trust might not be built in the same extent. Furthermore, since a general goal at the site was to increase the understanding of other industries and find new market opportunities, it has been found that it is important to consider how received knowledge should be brought back to the home organisation and make it concrete. Literature concerning this has not been found, indicating a gap in the literature. However, that does not neglect the importance that this company experienced in anchoring received knowledge in the site. If knowledge cannot be communicated back to the home organisation, the learned knowledge will not be considered as useful. The researchers have some suggestions regarding how knowledge can be transferred back to the organisation, for instance with in-depth evaluation of what was generally learned from the Manufacturing project, as well as mobilising its members into further similar projects in order to not invent the wheel again. Regarding the Garage project, team members should originate from all units of the site in order to embed the concept of the Garage, as well as specific knowledge gained from projects. This will most likely contribute in spreading the Garage's culture across the site, making it a normal element. Even though the studied projects were different, it is believed that the ability to concretise received knowledge and bring it back to the site are as important for both of them. As the study aims to contribute to the collaborative aspects of the OI theory, this is a matter that is believed to be important to include in this literature field.

It was found that the kind of knowledge that is most sought for in innovation is tacit (Gallaud, 2013), implying that the collaborating individuals are required to be able to communicate in an efficient and understandable way. From an innovation perspective, physical meetings were considered essential because it is through physical meetings tacit knowledge can be communicated and it is such knowledge that drives innovation. A common opinion amongst the participants was that face-to-face meetings were the best way to exchange deeper knowledge, yet none thought of the frequency between such meetings nor if there was any favoured time frame for them to keep going. It is possible to also question if it is just physical meetings that favour the exchange of tacit knowledge. This is closely related to trust, and it is stated by Tomkins (2001) that trust is built over time, which implies that it is important to let meetings take their time and not be rushed through. Furthermore, when comparing physical meetings to ICT it is, according to Antikainen, Mäkipää and Ahonen (2010), more difficult to get to know each other if not meeting face-to-face, which in turn makes it harder to communicate knowledge. This is strengthening the findings that physical meetings are favourable for innovation.

Moreover, the patience to build trust between partners in relation to knowledge exchange can in turn be indirectly dependent on the quality of the meetings and there are more and less efficient ways of having trustworthy meetings. Well performed meetings are also a part of the possibility to exchange tacit knowledge, such meetings are evaluated as a subtle sense noticed by interpersonal interactions.

Furthermore, organisational structure in relation to communication and knowledge exchange was analysed thoroughly, especially in the Manufacturing project. The Manufacturing project had a strict structure and it is of the researchers' opinion that when a collaboration has got such defined structure, communication channels should also be well defined. Clearly defined communication channels are also minimising risks of misunderstandings as these contribute to efficiency and clarity. However, well defined communication channels can though be seen as non-flexible which can have impact on the innovativeness. When analysing the Manufacturing project in relation to the theory by Cohen and Levinthal (1990) it was shown that flexibility and innovation goes hand in hand and it seems difficult to make innovation possible without free communication channels. On the contrary, the structure might make a collaboration more effective, but strict structures for communication are believed to be favourable only when collaborations are predetermined in goals and performances, not when working explicitly with innovation. Comparing the structure issue with the Garage project, it is believed that if the external partners in the projects are different from the site, they will most likely face same structural difficulty as the Ericsson members did in the Manufacturing project. This is because the structure in the Garage will most likely be sequential, and therefore suitable for internal employees but it is unknown how external parties will react to this kind of structure.

### 7.2.3 Openness

The two projects studied were two different innovative collaboration initiatives, the Manufacturing project was classified as being more of a CI characteristic and the Garage projects as OI. This implies that the site can contain a mixture of different IOCs with innovation elements making OI more likely in the future. What should be noticed is that there are not a right or wrong way in how a company can be involved in joint innovative projects. Being able to adapt to the projects shows that the site was multifaceted regarding such collaborative abilities and by doing so the site obtained wide perspectives on openness. Dahlander and Gann (2010) claim that different types of openness exist, making the aforementioned in line with the theory. Furthermore, trust was considered as essential when collaborating (Håkansson, 1993), and it was found that trust was equal to a hygiene factor at the site. In general, trust enables openness and since the projects aimed to be open, they could not be open and innovating without having trust between parties. It has been found that openness is a condition that is hard to measure and it is rather something that individuals are experiencing in culture and climate. Yet, openness is still believed to be important because it relates to how exchange of knowledge and information between companies can be facilitated. This indicates that trust, openness, and communication are very much related to each other and it is hard to claim what is most important. Tomkins (2001) shows a clear interdependency between trust and communication as these are increasing and decreasing with each other. Therefore, it is believed that OI is very much dependent on these aspects. Yet, it is difficult to state when a positive condition regarding the three aspects is attained, one must rather constantly strive towards achieving them. The strive contains of frequent and honest communication, increasing the trust between parties which in turn helps them to be more open towards each other, favouring even more communication. Additionally, trust can be discussed upon since it is somewhat dependent of expectations that are commonly understood by all parties. If expectations are communicated, disappointments can more easily be avoided. This is also why communication, and in particular communication of expectations of IOC are of importance.

When presenting the analysis regarding openness it was analysed whether an open personality or the ability to combine capabilities should be seen as most valuable for innovation. Alexy and Dahlander (2014) state that the ability to combine capabilities are more important. However, it is possible to question how different these aspects really are. It is most likely important to be curious and have an

open mind in order to find and understand suitable capabilities other parties have. Without the abilities of listening and understanding other parties, it is probably hard to combine capabilities. Further, it is also possible to ask what it actually means with combining capabilities and how this should be managed. It is most likely about dealing and exchanging tacit knowledge in a precise and efficient way. Furthermore, it was suggested that, in order for the Manufacturing project to be as efficient and goal focused as possible, it should embrace the CI method by Davis and Eisenhardt (2011) of zig-zagging objectives between parties. Even though this sounds like a sound and feasible method, it is possible to question its possibilities to be embodied. Is it possible to entrust such control to one of the parties only for a while and then change? Does it not take some kind of overall management to facilitate such defined exchange of control? This was not mentioned in the literature by Davis and Eisenhardt (2011), however it is believed that when such management transfer happens spontaneously it is more efficient, since it occurs due to real needs. It is believed that such spontaneous change occurs dependent on what party possess the knowledge that is needed at the moment. In the Garage project, on the other hand, the site was classified as the lead organisation based on the literature by Vangen and Huxham (2000). A difficulty of having one party with the power and control is that the other parties might lose interest or motivation to collaborate. The lead organisation terminology is also questionable, can several parties in a collaboration see themselves as lead organisations in the same collaboration? If this is the case, the term 'lead organisation' falls on its own inadequacy. Further, there might be benefits of not being the lead organisation of collaborations, such as not having the crucial responsibility. This might have a positive impact on the innovativeness, assumed it to be favoured by non-bureaucracy. This implies that the projects most likely benefit from different managerial approaches as they aim to reach accomplishment. This part indicates that openness is highly related to the aspect of knowledge and knowledge exchange as openness is favoured by communication.

#### 7.2.4 Legal mechanisms

Even though legal documents were considered as necessary at the site, collaborations were always introduced by initiating dialogues. This can be seen as natural as it is most likely hard to write the collaboration framework before any discussions concerning it have taken place. Though, it could be questioned for how long these initiating discussions should last before initiating contracts, as it is believed that the site most likely possess information and knowledge which they do not want to exchange rather protect during these dialogues. It is believed that sensitive information most likely will become expressed as the time passes by, which raises the issue of the actual perception of whether contracts and initiating dialogues are affecting collaborations or not. Most participants were unaware of what the legal documents of the projects included or were signed by, and this fact can be seen as interesting as it indicates that legal documents presumably have low impact on collaborations. From an CI perspective, Gallaud (2013) claims that legal documents should have low effect on collaborations to favour innovation. As the site's employees had low awareness of legal documents, it is considered as beneficial for innovation as members then most likely are subconsciously more open to collaborations. The researchers saw several reasons to the low insight regarding legal documents, it could have been in the company's intention from beginning meaning that contracts should only be related to top management, it could have been a coincidence, or it could have been a matter of money. Anyhow, it is believed that the unawareness makes contracts less influencing on collaborations. Moreover, Håkansson *et al.* (2009) separate trust and formal contracts, claiming that collaborations are built upon either one of them. When studying the reality, it was understood that this distinction is not so strict because contracts or agreements must always exist at the site, but it does not exclude trust to be present. Even though contracts can be seen as professional ways to create trust, it is not possible to state that contracts generate innovation. Yet, contracts can indirectly contribute with innovations as trust favours exchange of knowledge. If this

is the case, the results of innovations might be different whether contracts are used or not, as contracts can create trust, indicating limitations in the literature within this area. Additionally, it was analysed that attitudes toward legal aspects affect collaborating performances. This could be related to the members participating in collaborations as bureaucratic personalities are placing greater importance in contracts than personalities who see contracts as less important. No matter personality, it is hard to collect members having similar attitudes toward legal documents making it important to clarify how such documents should be followed and looked upon while collaborating, to create similar expectations. Obviously, neither contracts or agreements should be isolated from collaborations as such documents are created upon expectations, which means that collaborations are based on what is written.

### 7.2.5 Compatibility

The aspect regarding compatibility is much related to the aspect of partner selection, as it most likely can be seen as a tool for selecting appropriate collaboration partner. It is believed that companies that intend to collaborate in order to innovate, need to find a trade-off between having a big enough technological overlap and being able to learn from each other by being different enough. This goes in line with the theory by Mowery, Oxley and Silverman (1998). If there is no technology difference the partners are most likely too similar making the collaboration smooth but the chance of reach new knowledge small. Das and Teng (1999) claim that strategic and resource fit must be considered simultaneously when selecting partners, as it affects the collaborating results. However, it can be hard to figure out whether strategies or resources are fitting or not before collaborations take place. It is most likely possible to believe that there is a fit between firms, but when the collaboration actually begins it turns out that it is hard to collaborate due to other things, such as cultural differences. Yet, using compatibility aspects, like strategic and resource fit, can help the site in the selection of partners. It turned out regarding the Manufacturing project that it can be harder to be suitable if the structures do not fit each other. Even though the structure obviously had a large impact, it is still believed that this project was also affected by the participants' expectations and the leadership, since opinions regarding this differed between the participants. Whether or not there are structural differences between parties, it is less likely that partners will not be selected because of this, as the site wanted to learn about the manufacturing industry. However, it is important to keep this in mind as it might create coordination consequences.

Furthermore, the fact that company size has an impact on collaborations was in particular found from the empirical data collection. It is believed that size differences contribute to firms having different time windows, processes, mind-set, priorities, and opportunities to take risks. Size has most likely a larger impact on collaborations than what is stated in the literature and this also shows that the compatibility aspect can be further related to partner selection. If the site must choose between partners that are compatible with the site, it is believed that the one being most similar in terms of size would be chosen since it generates mutual efficiency. Additionally, in line with Alexy and Dahlander (2014), compatibility issues regarding language differences was found, the Manufacturing project faced for instance terminology differences. Even though there were difficulties with such differences, it still showed that the site was not similar with the manufacturing firm indicating that there were new things to learn from the other. As the site wanted to engage in collaborations with other industries, it is important to learn how to handle language differences as such differences most likely will occur in the Garage projects as well. It is believed that misunderstandings could be overcome by communicating and explaining on very basic levels, explain things in different ways to give more perspectives, present terminology that is used in the own business, show physically how things work, and ask questions. It is further important to be open minded and not assume that things are understood.



### 7.2.6 Uncertainty

Uncertainty could be found in Ericsson's situation with the digitalisation transformation, making this aspect similar to the first research question. By having flexible structures, it is believed that uncertainty can be overcome, as flexibility most likely can respond to changes easier. However, if assumed that flexible structures are less controlled, it makes them more inherently uncertain which probably can be hard to work in for some personality types. Innovation can be related to uncertainty, according to Chesbrough and Bogers (2014), and it is believed that courage is important in order to be able to innovate. It is also believed that there must be a balance between courage and safety, yet it is believed that innovation will not occur if risks are not taken. Even though the Garage project could be seen as a ventured initiative, it was not analysed to what extent the site will engage in uncertain collaborations in the Garage area, as no projects had yet started when the study was performed. The idea of only collaborating with partners if there were gains can be seen as a reflection of the site's courage. Comparing this to the aforementioned authors who claim that OI is very unpredictable, one can question whether the unpredictability is reflected in reality or not. As no similar examples have been illustrated in the literature, it is possible to assume that the reality is not as venturous as the literature pictures it. The boldness of the Garage project could also be questioned because of its location in a central place at the site. The Garage area is considered as very safe for internal employees as it was located in their known habitat, which might affect externals joining collaborations there as they might become mentally excluded. This raises the inquiry of other firms' possibilities in the Garage projects, indicating the importance of exaggerate the welcoming and including external representatives by the site's employees.

It was found that small frequent steps should be taken while working with innovation to make mistakes or missteps less affecting. This was not found in any of the literature fields studied, illustrating a practical example of how collaborations could be performed under uncertain conditions. In relation to innovation, this can be considered as a suitable way of working, but the definition of small steps as well as frequency can be questioned. These attributes are most likely dependent on circumstances, since a large company might not take as big steps as a small one, yet bigger companies might have more resources affecting their possibility to instead move more frequent than smaller firms. However, giving some practical examples, it is assumed that follow-up and evaluation meetings along collaborations are favourable in order to understand their progress. Furthermore, it is believed that leadership plays an important role in order to manage uncertainties, since the leaders are in charge of the collaboration during the changes and can therefore steer collaborations through uncertainty. This is believed to be in line with literature by for instance Bass *et al.* (2003) and Davis and Eisenhardt (2011) who describe that leaders can affect and guide members. Furthermore, it is believed that leaders also can help members focusing on use-cases rather than technology, which was considered as important from an innovation perspective. This was especially concerned in the Garage projects as it most likely could become an increased interest of technology there. This might be a risk since it should be the site's technologically focused employees that will take initiative to work in the Garage projects, which means that they might only use it as a playground. Additionally, leadership is further considered to be important in almost all developed aspects presented above since it has a direct effect on collaborations as it can control where focus should lie and in what direction to head. In general, it was found that leaders must be able to create an open environment, have good communicating abilities, and understand that it is difficult to control parties coming from other companies. Davis and Eisenhardt (2011) advocate rotating leadership which is something the researchers see as a possible way of working. However, it could be questioned how the method works in practice as someone still must take the decisions of when to switch leader. As rotating leadership should favour mutuality between firms, it could probably also harm the collaboration if the decisions are not balanced jointly between the firms.

## 8. Conclusion

To answer the first research question of what inter-organisational collaboration and innovation mean for the telecom industry and Ericsson Gothenburg, employees at the site have provided their perspectives and thoughts in this matter. Inter-organisational collaboration can be used as a central method to reach new innovations as the site aimed to be in the forefront of technological development in the telecom sector. For the telecom industry, inter-organisational collaboration and innovation mean that the industry's companies have the possibility to manage the current industry and market turbulence and breaking point that they were facing, in order to maintain leading positions. This could be enabled by establishing telecom technology in other industries through inter-organisational collaboration, and therefore gain growth potential it is believed that to achieve this curiosity is key. Inter-organisational collaboration must be mutually beneficial for all involved, meaning that telecom companies must look for new markets and industries to implement their technologies where those companies require to develop and use telecom technology in their own businesses. This means that a joint attractiveness should be sought for to reach more possibilities of collaborations that can lead to innovation. In sum, inter-organisational collaboration plays an important role for the industry, especially at the moment since such collaborations generate new perspectives, which in turn can facilitate open innovation. Inter-organisational collaboration can result in competitive advantage, which is something that Ericsson was eager to gain, especially during this changing situation due to the digitalisation. Regarding the site, inter-organisational collaboration and innovation mean in general the same as for the telecom industry and in particular it was essential for the site's competitive advantage. As the site always had to prove the value in maintain a site in Gothenburg, it must actively search for and show that the location enables unique collaboration possibilities. This was done for instance via the studied projects as these most likely contributed with new insights to be more innovative. The fact that the city got an established ecosystem in which different firms were connected and that the city planned to grow in the future, also creates great possibilities for the site to engage in inter-organisational collaborations in order to reach new opportunities. This study has illustrated how important inter-organisational collaboration can be for a telecom site, situated in Gothenburg. However, the location aspect might not be the main reason why other firms choose to collaborate in their own contexts. This indicates that while conducting a study like this, it is of importance to remember that these kinds of findings might not be generalizable as they only originate from one case-study.

To answer the second research question, regarding what aspects are affecting inter-organisational collaboration and in what ways, six affecting aspects have been developed; *partner selection, knowledge and knowledge exchange, openness, legal mechanisms, compatibility, and uncertainty*. These aspects should be perceived from a holistic point of view, since they are all containing common features and can be found in each other's disciplines. The following arguments are based on the study in which the developed aspects are central and important to consider when engaging in inter-organisational collaborations regarding innovation. These aspects and the following arguments are the researchers attempt to contribute to the open innovation literature by connecting such literature to the related fields of inter-organisational collaboration and collaborative innovation. This was done in order to strengthen the literature of open innovation with additional collaborating perspectives. It would likely have been possible to develop further aspects that affect collaborations with innovation elements just as valid as the developed ones in this study. Yet, these aspects were developed in conjunction with this study, making it inappropriate to assume that the following arguments are applicable in all collaborating

contexts. Therefore, it is important to keep in mind that these developed aspects were closely connected to the cases of this study.

The most important conclusions regarding the six developed aspects are firstly, the essence of common understandings of all parties' goals. Goals must not be commonly shared but it is necessary that they are understood by all actors included in collaborations, which can be achieved through open communication. Secondly, when communicating across firm borders it is essential to understand what kind of knowledge that is and should be shared. In terms of innovation, tacit knowledge is considered to be the most attractive since it carries experiences and skills of members. Additionally, there must be a way of communicating received knowledge back to the home organisation, in order to make learning valuable as well as useful. Thirdly, trust and the ability to communicate are essential for good collaborations, yet an open approach is valuable and central in terms of open innovation. These aspects are considered as interdependent of each other, implying the importance of keeping this in mind while collaborating externally when aiming to reach innovation. Fourthly, legal documents were always included in collaborations at the site in which the human attitude towards them is believed to affect what impact legal documents will have on the collaborating performance. Fifthly, when choosing partners for inter-organisational collaboration it is mainly done dependent on what the goals are and what is planned to be achieved, yet compatibility is also something that should be taken into consideration in this selection. Compatibility regarding content and structure affects collaboration performance, but also how much parties can learn from each other. From an innovation perspective, it is important to not be too compatible when collaborating in order to favour new learnings. It is of importance to keep the communication on a basic level to overcome compatibility issues, such as coordination flaws and language limitations. Lastly, as working with innovation was found to be an uncertain matter, courage is required and small frequent steps forward are favourable to be able to try out new ways of innovating. However, there must always be realisable benefits to gain from inter-organisational collaborations in order for the site to consider to collaborate regardless, which implies a need for a sense of safety to some extent to overcome the uncertainty related to inter-organisational collaboration and innovation.

### ***Concluding remarks and future research***

This study provides a greater understanding of how inter-organisational collaboration and innovation can be managed in practice. The theoretical contribution of the study is illustrating the complexity of collaborating in contexts of open innovation. It was found that a possible reason why the literature used in the study is wide and lack extensive descriptions of how inter-organisational collaboration with innovative elements can practically be performed. This was because such collaborations are very dependent on their circumstances. Open innovation is about collaborating in none-compatible relations in order to exchange useful knowledge between parties, which is why distinct communication is of essence. It is important to communicate objectives, ambitions, expectations of performance, and result, to avoid disappointments and conflicts. By having a distinct communication, it is possible to reach an open culture favouring knowledge exchange as it also generates trust. As the site aimed to increase the internal knowledge base, they searched for and designed collaborations that were supporting this. Also, the site showed tendencies toward being open to other firms, for instance in the studied projects. Yet, some resistance regarding openness have been identified, since the site only considered collaborations with benefits that was possible to foresee and did not intend to include core knowledge in one of the studied projects. If knowledge is generously shared, it is most likely that trust between parties will increase, generating an even more open approach. Finally, leadership is a common denominator throughout all collaborations, since it has the ability to support and guide teams through turbulence and uncertainty but leadership has also an impact on the collaborative characteristics.

As six aspects have been developed that are affecting inter-organisational collaborations and innovation theoretically but also in these cases, it would be interesting to study each aspect individually and their impact on such collaborations. As this study has scratched the surface of collaborating aspects in open innovation, it implies that there are more to find out within this context. Further, it would also be interesting to study how other businesses are attracted to telecom technologies, since findings indicate that Ericsson has interesting attributes for other industries. The literature was considered as wage regarding how inter-organisational collaboration and innovation could be performed and managed in practice. Therefore, the opinion is that there is a need in increasing the amount of studied cases like this, both within telecom industry and from other perspectives. Since it is impossible to generalise the findings from this study, more case-studies within this context would be favourable for future possible generalisations and standardisations in the field of open innovation. It is strongly believed that open innovation will gain an increased importance in the future which highlights the vitality in developing general courses of actions related to inter-organisational collaboration and innovation.

### ***Personal reflections***

This master's thesis has, according to the researchers, been a period of continuous development and learning. The researchers are at this point very pleased and proud of the result and their own personal developments. As the topics have been both wide and rather vague, the researchers have been forced to challenge their analytical and abstract ability to be able to concretise their thoughts. Also, the fact that none of the researchers have studied theories of open innovation before made this study even more challenging. In sum, this thesis has provided a lot of new insights and learnings for the researchers and it has also been an educational journey and challenging final phase of the researchers' educations.

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# Appendices

## *Appendix i – Literature fields*

Theoretical fields used in the theoretical framework	
Boundary	Multinational corporations
Collective invention	Online operations
Competition	Open-source software
Complementary assets	Openness
Coordination	Operations management
Culture	Organisational structure
Decision making	Organisational behaviour
Diffusion of innovation	Organisational change
Dynamic capabilities	Organisational communication
Economies	Organisational dynamics
Embedded	Patent
Entrepreneurship	Performance
Firm	Problem solving
Globalisation	Product development
Industries	Quality
Information management	Relationships
International economy	Resources
IP	Software
Knowledge management	Spillovers
Leadership	Strong and weak ties
Learning	Telecom industry
Markets	User innovation
Mobility	Work environment
Motivation	

*Appendix ii – References and literature fields mostly used*

Authors	Year	Management	Business	Strategic management	Innovation	Collaboration	Technology	R&D	Leadership	Networks
Alexy, O., Criscuolo, P., and Salter, A.	2009	•	•	•	•	•				
Alexy, O., and Dahlander, L.	2014	•	•		•					
Allen, R.C.	1983									
Andersson, D. E., and Tell, F.	2016	•			•				•	
Andersson, H., and Berggren, C.	2015									
Antikainen, M., Mäkipää, M., and Ahonen, M.	2010				•					
Ataee, M., Memarzade, G., and Alvani, S. M.	2011									
Bachmann, R., and Zaheer, A.	2008	•	•							
Bakhit, W.	2016		•		•					
Bass, B. M., and Avolio, B. J.	1992	•							•	
Bass, B. M., et al	2003	•							•	
Berson, Y., and Linton, J. D.	2005	•	•		•			•	•	
Bleeke, J., and Ernst, D.	1995	•	•	•						
Blomqvist, K., and Levy, J.	2006				•					
Chesbrough, H. W.	2006	•			•					
Chesbrough, H., and Bogers, M.	2014	•			•		•			
Chesbrough, H. W. And Ghafele	2014	•		•	•		•			
Chesbrough, H. W.	2003	•			•		•		•	
Chesbrough, H. W and Appelyard, M. M.	2007		•		•					
Cohen, W. M., and Levinthal, D. A.	1990	•	•		•					
Cropper et al.	2008	•	•							
Dahlander, L., and Gann, D. M.	2010	•			•		•	•		•
Das, T. K., and Teng, B-S.	1999	•		•						
Davis, J. P., and Eisenhardt, K. M.	2011	•	•	•	•		•	•	•	
Dodgson, M.	2014	•			•					
Dodgson, M., Gann, D., and Salter, A.	2006	•	•		•		•	•		•
Elfring, T., and Hulsink, W.	2007	•	•							•
Ericsson	2015									
Eriksson Lundström J.L. et al	2013	•			•		•			
Ford et al.	2011	•	•	•						
Forsström, B.	2005	•		•		•				
Gadde, L-E., and Håkansson, H.	1993	•								•
Gallaud, D.	2013	•	•							
Gassmann, O., and Enkel, E.	2004		•							
Geddes, M.	2008	•	•							
Granovetter, M.	1973	•								•
Grant, R. M.	1996	•			•					
Hansen, M. T.	1999	•	•		•		•	•		•
Henkel, J.	2006	•	•		•			•		



### ***Appendix iii – Interview questions regarding the Manufacturing project***

Please tell us about yourself and your position at Ericsson Gothenburg.

Have you been employed anywhere else before, and/or have you had some other role at Ericsson?

What is your experience of external collaborations?

Can you please explain the Manufacturing project for us, what companies and actors are involved, what are the goals, etcetera?

Can you please describe background of this project?

How did you choose what actors to collaborate with? Which actors are involved, was there any specific needs or requirements that made you include them?

How far have you come with the project today?

Since external companies are included in the project, please explain how the collaboration with them works and how it is practically managed?

In what ways do you think that Ericsson Gothenburg and the partner companies in the Manufacturing project are compatible with each other?

How is innovation characterised in this project?

To what extent are legal documents (contracts) used in the project? What does they contain and how are they used?

In what ways would you say that trust is affecting the collaboration in the Manufacturing project?

Is this collaboration affected by IPR, and are IPR in that case controlling the collaboration in any way?

Please explain the leadership in the Manufacturing project?

Collaborating with an external company implies sharing knowledge and information, what kind of knowledge and information are being share in the Manufacturing project? How is this knowledge and information shared and communicated?

Have there been conflicts in the project? If yes, how were they handled?

Imagine that the project somewhat does not follow the plan, how would your organisation manage that? (Example, a key person disappears, goals are changed or time deviates)

What is the biggest challenge when collaborating externally?

What is the expected result of this collaboration? What is the collaboration supposed to generate?

Generally, what does inter-organisational collaborations mean for Ericsson Gothenburg?

What do you think inter-organisational collaborations mean for the telecommunication industry?

What is most important to keep in mind when collaborating externally?

#### ***Appendix iv – Interview questions regarding the Garage project***

Please tell us about yourself and your position at Ericsson Gothenburg.

Have you been employed anywhere else before, and/or have you had some other role at Ericsson?

What is your experience of external collaborations?

Can you please explain the Garage project for us? What are the goals, etcetera?

Can you please describe background of this project?

Who are going to be able to join the Garage teams? Both in terms of internal employees and external people.

How is the first time in the Garage planned to be like? Will there be any evaluation after a certain period? What will be evaluated in that case?

How are collaborations with external companies, via the Garage, supposed to function? Are there any plans for how this is going to be managed practically?

How are contracts going to be included in the Garage projects?

In what ways, would you say that trust is going to affect the collaborations in the Garage?

Are the collaborations in the Garage going to be affected by IPR, and are IPR in that case going to control collaborations in any way?

How are the leadership in the Garage going to work, both in the individual teams and for the Garage project in general?

Collaborating with an external company implies sharing knowledge and information, what kind of knowledge and information will be shared in this project? How is this knowledge and information shared and communicated in the Garage teams?

If conflicts occur in any of the teams in the Garage, how are they going to be handled?

What is the expected result of the Garages collaborations? What is the collaboration supposed to generate?

Do you think there are any special challenges when working with inter-organisational collaborations in this way?

Generally, what does inter-organisational collaborations mean for Ericsson Gothenburg?

What do you think inter-organisational collaborations mean for the telecommunication industry?

What is most important to keep in mind when collaborating externally?

## ***Appendix v – Interview questions regarding the site in general***

Please tell us about yourself and your position at Ericsson Gothenburg.

Have you been employed anywhere else before, and/or have you had some other role at Ericsson?

What is your experience of external collaborations?

What are your thoughts regarding inter-organisational collaborations when dealing with innovation?

How is an inter-organisational collaboration at Ericsson Gothenburg normally initiated?

How is the collaboration practically managed when the site is collaborating with external companies?

What do you think are affecting the collaboration between Ericsson Gothenburg and external companies?

In what extent are contracts used when collaborating with companies externally? What do these contain and how are they used?

In what ways, would you say that trust is affecting the performance of collaborations?

How are collaborations affected by IPR, and are IPR controlling the collaboration in any way?

What does leadership mean for inter-organisational collaborations? Does leadership have any affection on the collaboration and in that case, how?

Collaborating with external companies means to share knowledge and information, what kind of knowledge and information are usually shared when collaborating externally? How is this knowledge and information shared?

What kind of conflicts can occur in inter-organisational collaborations and how are those managed?

What are the most common goals in inter-organisational collaborations? What do you want such collaborations to generate?

How are you evaluating or measuring the result of inter-organisational collaborations?

What kind of challenges and risks are there with external collaborations?

How are inter-organisational collaborations usually ended at the Ericsson site in Gothenburg?

Generally, what does inter-organisational collaborations mean for Ericsson Gothenburg?

What do you think inter-organisational collaboration means for the telecommunication industry?

What is most important to bear in mind when collaborating externally