Open Innovation: Transferrable to Startups?

An Explorative Case Study of Open Innovation in Norwegian Technology Startups

Einar André Gasmann

Master Thesis

Centre for Entrepreneurship

UNIVERSITETET I OSLO

May 20, 2016

2016

Open Innovation: Transferrable to Startups?

Einar André Gasmann

http://www.duo.uio.no

Abstract

BACKGROUND: The startup trend is on a rise in Norway, more and more individuals see being an entrepreneur as a career choice. But how should they go forth, is the Norwegian culture suitable for growing successful startups? From my own experience and observations I have noticed that startups and individual entrepreneurs can be a somewhat closed about their plans, and not as open as previous research tells us to.

OBJECTIVE: The goal of this study is to explore startups' interaction with its environment in the innovation process, by using the open innovation theory described by Chesbrough (2003).

METHOD: The study was done in the form of a case study, an explorative case study that examines startups interaction with its environment in the innovation process by having qualitative interviews with key personnel. In addition to interviews, I have used my own insights as an observer and analyzed documents in my company's archive.

RESULTS: In all, six interviews were conducted with technology startups based in Oslo, three had offices in other parts of Norway and Scandinavia.

CONCLUSION: The findings show that startups use some forms of open innovation, mostly external networking, involvement of non-R&D workers and customer involvement. In addition, the study found that the startups had a tendency of following an arbitrary strategy where choices were based upon their current situation.

Acknowledgements

This semester has given me new and valuable knowledge and I would like to thank the following people for their support:

My partner Hanna, for helping me with one of the hardest tasks this semester, staying motivated, and for listening to my brainstorming sessions with myself late at night.

My supervisor Tronn, for guiding me in the right direction and giving helpful feedback.

The startups that so eagerly wanted to be interviewed, making the data collection process one of the best parts of this thesis.

My boss Åsmund, for happily wanting to help me throughout the whole semester.

Table of contents

Table of tables

Table of figures

1 Introduction

"Most innovations fail. And companies that don't innovate die" (Chesbrough, 2003). This research paper looks at how Norwegian technology startups innovate and their use of open innovation.

Startups' openness or startups' interaction with its environment in the innovation process has been a trending topic for many years, and startups are receiving more and more focus from media and government. Newspapers and journals are occasionally writing about the importance of being open to your employees and customers (i.e. Svrluga, 2013; McClure, 2014). Do a quick search on Google on the term "openness in startups", and you will find thousands of hits concerning transparency and openness in startups. New models have emerged (i.e. lean startup model), that are urging startups to be in continuous contact with external sources and not dwell on new ideas by themselves. There is a growing complexity and cost involved in developing new products, so companies can no longer stay to themselves but seek knowledge and expertise beyond their organizational boundaries (Wind & Mahajan, 1997). There is no question that being open can be rewarding for a small startup, but how open are they?

1.1 Background

There has been minimal scientific research on openness in startups, maybe because it is a broad and general term, which is hard to define. The articles displayed when searching for "openness in startups" describe numerous variations of "open" startups. A bit more specific type of this openness is open innovation, focused on increasing the organizations' innovation by opening up the innovation processes to both internal and external stakeholders. In one of his papers, Henry Chesbrough (2012), the father of open innovation, reflects upon the progress and changes of open innovation since his publication of the book *Open Innovation* (Chesbrough, 2003). Much has changed since that time, especially the focus on open innovation. He did a Google search on "open innovation" the same years as he wrote the book, and found 200 links that said, "Company X opened its innovation office at location Y."

He says that the two words together had no meaning. Then he did a search on the same term in 2012, and found 483 million links, and states that most of those links were about the new open innovation model.

Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation (Chesbrough, 2003). Many large companies have a closed innovation model, where a selected group of people works to innovate the company. This can be a slow process without much novelty, as the sources of input are few, thus making the innovation process risky and slow in the long run. Because of this, some companies have decided to open up their innovation processes to other sources like customers, suppliers, partners, and startups (Chesbrough, 2003; Van de Vrande et al., 2009; Vanhaverbeke et al., 2012), to mention some.

To the best of my knowledge, the adaption and use of open innovation in startups have mostly been excluded from research. Most of the recent research has been focused on small- and medium-sized firms (SMEs), which is closer to startups than large firms in size and available resources, but the research is not necessarily transferrable to startups. Some researchers are turning their attention to – and suggest that this is an issue that future researchers should pick up (i.e. van de Vrande et al., 2009; Bianchi et al., 2010).

In my search for prior research on this subject, I found a master thesis (Liu & Andersson, 2014) looking at the prevalence of open innovation in startup micro-enterprises in Sweden. It is a quantitative study assessing the links between open innovation and increased innovation performance. The study found that customer involvement has a significant and positive relationship to innovation performance. Not so strong support, but still significant and with a positive impact on innovation performance was the use of technology sourcing.

Some of the aspects of open innovation require a substantial amount of resources (Van de Vrande et al., 2009; Chesbrough, 2003), but an interesting point stated by Vanhaverbeke et al. (2012) is that small firms lack the required financial resources and technical capabilities to follow the rapid market changes, and therefore must collaborate with external partners. He argues that a logical step is to apply open innovation and that small firms (< 250 employees) rely more on open innovation than larger firms. A known way for large firms to innovate is to use startups as a technology source, they are fast and require small amounts of resources.

Vanhaverbeke et al. (2012) agrees with this, but also suggests that startups use larger firms as a technology source. He says that large firms have great amounts of leftover technology that does not fit their business model, and therefore it will be stored away and not used by anyone. If startups could capture the value from this technology, it would be a win-win situation for them both.

In this thesis I am not implying that startups are using all the forms of open innovation. From my experience in the startup environment I know some of them use a selection of the forms. Therefore, my research will investigate the forms they use, how they use it, why they use it, if they are aware of it, and if they should focus more on the use of it by comparing those who actively use it and those who do not.

1.2 Motivation

My personal motivation for studying this subject has three reasons. Primarily, I am currently working in a software startup myself and have experienced first-hand that we are somewhat "closed" and not including as many as we probably should. Secondly, I have a great interest in innovation and entrepreneurship, and the importance of new startups in Norway. "What are we going to do when the oil-wells run dry?" That is an often-asked question in Norway these days, and I believe that starting new companies and growing them to a profitable stage is one of the things we should be doing. Lastly, I am baffled by the entrepreneurial culture in Norway. I have met startups and entrepreneurs that are trying to make something, but they are reluctant to talk about their plans and ideas. For example, one friend of mine told me that he had an idea he strongly believed in. He said that he believed it would go viral if he managed to make it good enough, but so far he kept the idea a secret for everyone but himself. I, as one of his closest friends, asked what the idea was, but he was reluctant to tell me. After some discussions and arguments from my side about the importance of talking about your ideas, he finally told me. I decided to help him with his idea, and after some time we figured it wasn't that good after all. The reason was the feedback we got from our potential users and customers. He has now decided to drop the idea and focus on something else. My point in this story is that he would probably have put down a great amount of work to this idea before he would figure out whether it was any good or not because he was

unwilling to talk about it. If you have close to no available resources you have to use what costs you the less, and in this case that is being open about it.

From an academic point of view, the motivation for doing this study is to add to existing research done on open innovation by expanding the scope of it to startups. As mentioned, there have been done close to none research on open innovation in startups, and some researchers are suggesting that the subject receives more focus.

1.3 Research question

I found in my preliminary literature review that startups could benefit from being more open (Vanhaverbeke et al., 2012). I also see similarities between a startup and a small R&D-team in a larger organization, and therefore believe that investigating open innovation in these startups is a logical step. Thus, the research question for this study is the following:

How transferrable and applicable is open innovation to Norwegian technology startups?

Open innovation is a broad topic with many subtopics. From the literature review and my first-hand experience in the startup industry I have developed four propositions for this study:

- Proposition 1: Startups involve their whole team in everyday innovation activities
- Proposition 2: Startups have continuous contact with their users and customers to improve their innovations
- Proposition 3: Startups actively use networking and alliances to create valuable connections
- Proposition 4: Startups have a high grade of open innovation implemented in their strategy without knowing it

Further explanations of each of the propositions are found in section 2 – *Literature review and theoretical framework.*

1.4 Layout

Following chapter focuses on the literature review and theoretical framework used in this study, the chapter also presents four propositions. The third chapter outlines the research design chosen for the study. The fourth chapter presents the results. The fifth chapter discusses the results and findings derived from those results, and ends with additional findings not related to the propositions that were used as a starting point.

2 Literature review and theoretical framework

There have been done a great deal of research on startups (i.e. Bhide, 1991; Klepper, 2001; Sarasvathy, 2001), and what they can do as a company or as individual entrepreneurs in order to increase their chances of success. It could be entrepreneurial education, company structure, management control, customer contact, networking, or other factors that that are the most important for a successful startup. Baloff (1970) demonstrated in his article that poor management actions results in productivity losses, and argues that more effective management and development of policies should minimize unnecessary losses. More researchers have picked up this subject in recent years (i.e. Kaplan & Warren, 2009; Storey, 1994; Stevenson, 2007), thus it is a well-covered subject. Other researchers focus on education (i.e. Dickson, Solomon & Weaver 2008; Aulet, 2013; Middleton & Donnellon, 2014). The subject of education is broad and many of the researchers are debating how to best educate entrepreneurs (Middleton & Donnellon, 2014). Learning books have been written with specific guidelines for entrepreneurs to follow (Blank & Dorf, 2012; Aulet, 2013). However, the subject is also well covered as many researchers have picked it up.

A subject that is somewhat less covered is that of open innovation in startups. There is a need for increased focus and research on open innovation in SMEs (Vanhaverbeke et.al., 2012). As mentioned in the introduction, SMEs are closer to startups than to large organizations, and they should apply open innovation because of the lack of financial resources and technical capabilities in their organizations (Vanhaverbeke et.al., 2012). Chesbrough (2003) on the other hand argues that large organizations need to apply open innovation because of their stagnation in trying to innovate and a shift in the era of innovation. Van de Vrande et al. (2009) argues that enterprises can no longer afford to innovate on their own due to labor mobility, abundant venture capital and widely dispersed knowledge across multiple public and private organizations.

Research on open innovation in SMEs and startups might have been excluded because researchers did not think that SMEs and startups needed a change in their way of innovating, as they are known for being quite innovative and fast (Freeman & Engel, 2007), and also

work as an innovation source for large organizations (Chesbrough, 2003). They might also think that it requires excessive amounts of work and resources to apply. But research done on large organizations is not necessarily transferrable to smaller firms, thus the theory derived from that research needs a small change. And the reason for applying open innovation should perhaps be closer to Vanhaverbeke's (2012) argument than to Chesbrough's (2003).

2.1 Closed innovation

To understand open innovation, it is important to understand the traditional type of innovation. The traditional type of innovation is a closed innovation model (Chesbrough, 2003), where the company has a dedicated R&D department that does all of the innovation research in the company. The company must make up their own ideas, use their own resources to develop them, build them, market them, distribute them, service them, finance them, and support them (Chesbrough, 2003). It is closely related to the saying: "If you want it done right, you have to do it yourself". Chesbrough (2003, pp. xx) lists some implicit rules of closed innovation:

- We should hire the best and the brightest people, so that the smartest people in our industry work for us.
- In order to bring new products and services to the market, we must discover and develop them ourselves.
- If we discover it ourselves, we will get to market fist.
- The company that gets an innovation to market first will usually win.
- If we lead the industry in making investments in R&D, we will discover the best and the most ideas and will come to lead the market as well.
- We should control our intellectual property, so that our competitors don't profit from our ideas.

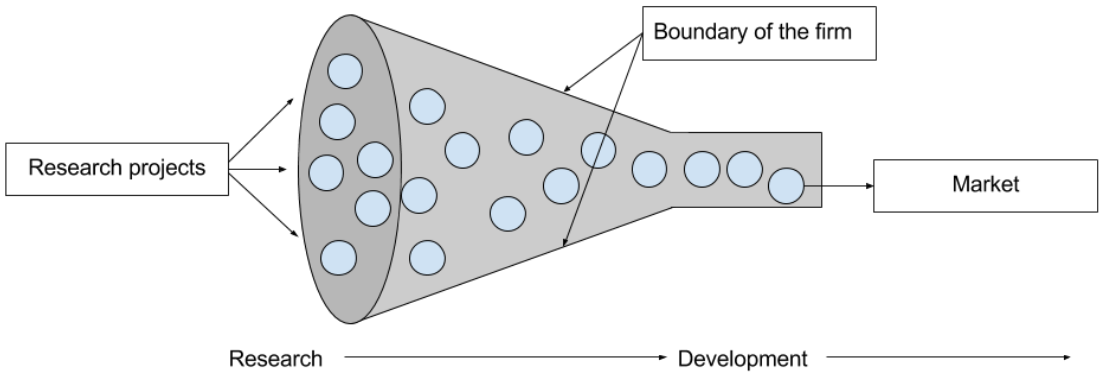

Figure 1 - Closed innovation model (Chesbrough, 2003)

Figure 1 above illustrates how closed innovation works. The R&D department has several ideas, which they turn into research projects. The projects are evaluated by the firm and are strictly held within the boundary of the firm. Once the research is done, a specific project goes to development, also done within the firm. In the end the product or service reaches the market they were initially aiming for.

It is important to note that this model has worked for a long time, and most of the 20th century (Chesbrough, 2003). It has not been the wrong way of doing it, but it has expired for some industries. One important reason that this model has some major flaws is when the highly experienced and skilled people leave the company; the whole model is based on having the best people available. Another reason is speed. Innovation has become faster and faster, and the competition has increased. New technology has a short shelf life and the importance of intellectual property is therefore reduced (Chesbrough, 2003).

2.2 Open innovation

> *"Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology"* (Chesbrough, 2003, pp. 15)

The new type of innovation opens up this closed model and includes several external and internal non-R&D sources. Van de Vrande et al. (2009) argues that labor mobility, abundant venture capital and widely dispersed knowledge make it difficult for organizations to innovate on their own and need to engage in alternative innovation processes.

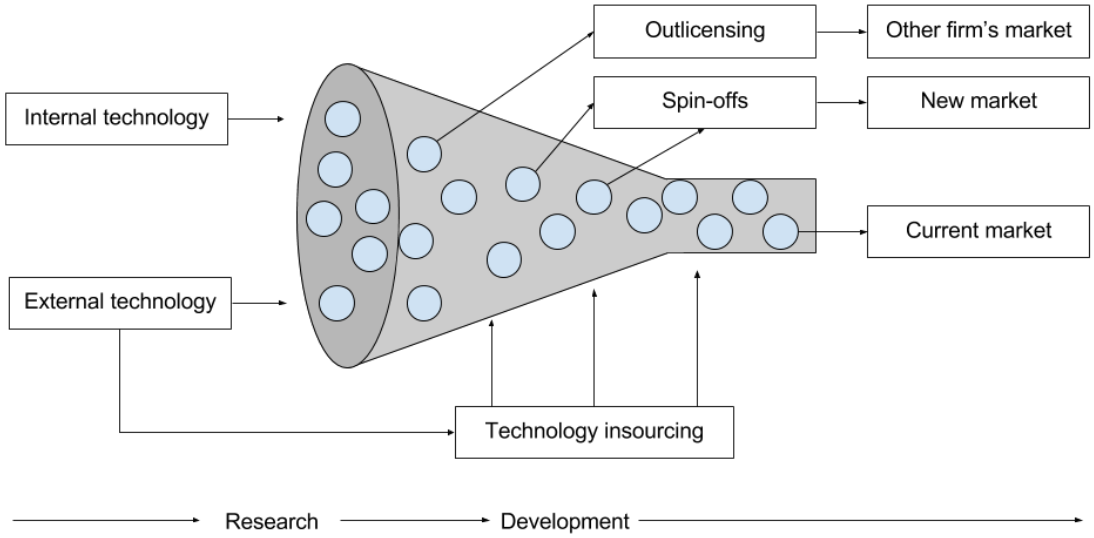

Figure 2 - Open innovation model (Chesbrough, 2003)

Figure 2 above illustrates how open innovation works. As seen in the figure there are still generated ideas from within the firm, but some of those ideas may reach out of the boundaries of the firm, for example in the form of a spin-off company or external licensing. Open innovation also encourages external ideas, which could be in the form of partnerships with other companies, feedback from customers or acquisition of external licenses. You could say that open innovation is a waste of time because it creates too many ideas doomed to fail, but it also enables the recovery of projects that companies believed would fail in the first place (Chesbrough, 2003).

As Chesbrough's (2003) definition states, open innovation contains inflows and outflows of knowledge. Van de Vrande et al. (2009) calls this technology exploitation (outflows) and technology exploration (inflows). I have chosen to use those terms as I see them as more descriptive. The terms are described in more detail below.

2.2.1 Technology exploitation – Outflows

When a company exploits technology, it implies that it is using existing internal knowledge and capabilities. Van de Vrande et al. (2009) points out three different types of technology exploitation.

Venturing – is founding of new companies with internal knowledge and resources. Examples are a spin-off company or a spin-out process. In this case, the spin-off receives support from the parent organization in the form of financial and/or human resources, administration, etc. A spin-off is one of the aspects of open innovation that might require substantial amounts of resources. And if we look at the standpoint of a startup, it might also steal away their much-valued focus. Research done on venturing in startups is lacking and it is a term related to larger organizations.

Outward licensing of intellectual property (IP) – Many organizations believe that their patents and copyrights are there for one reason only, to protect their IP from being stolen. If a company holds IP, it can license it out to obtain more value from it. The company may choose to only license out to companies it does not see as direct competitors; companies that are aiming for other markets.

Helmers & Rogers (2011) looks at whether patenting helps startups in the form of competitive advantage. They found that startups that do patent their products have a lower likelihood of failure and higher asset growth within a firm's first five years of existence. They also mention that a motivation for patenting is to obtain licensing income, and that it is great for startups that want to be an innovation-generator instead of marketing their innovation by themselves.

According to Mann & Sager (2007) patents might help companies receive the funding they need. But they are arguing that the question of whether patents actually foster innovation is difficult to answer, especially with empirical evidence, because it is impossible to provide comparable datasets. They also mention that patents might generate licensing revenues, but it is not common among software startups.

Involvement of non-R&D workers in innovation initiatives – Workers outside of the R&D department have great understanding of how new products are created and commercialized, giving them relevant knowledge for the company's innovation processes. Van de Ven (1986) suggests that individual employees are a resource to help innovation and lead to organizational success.

In their paper, Gemmel et. al. (2012) found that entrepreneurs rely heavily on their "inner group" including a "trusted partner" to increase ideational productivity and search for solutions. The "inner group" in this case is colleagues who interact frequently with the entrepreneur. And the "trusted partner" is one person from the inner group who were crucial for their success.

Sarasvathy (2001) describes entrepreneurs as effectual. I will not go into detail on effectual reasoning in this paper, but some points of effectual reasoning is worth mentioning. Entrepreneurs start with a set of means: who they are, what they know and *whom they know*. Whom they know are their social and professional networks, both externally and internally of their company.

The literature clearly indicates that startups involve their whole entrepreneurial team. An entrepreneurial team is usually not divided in separate teams with a strict hierarchy, but with a flat organization structure where everyone cooperates with everyone (Laforet, 2008). Hence my first proposition is:

Proposition 1: Startups involve their whole team in everyday innovation activities.

2.2.2 Technology exploration – Inflows

Technology exploring means that a company acquires knowledge and technologies from external sources. Van de Vrande et al. (2009) points out five different types of technology exploration.

Customer involvement – Gassmann (2006) theorize that to inform internal innovation, the company should involve their customers in the process. Customers are uninfluenced by the

development of a certain product or service, and may therefore provide useful feedback. This principle is closely related to a popular model used in many startups, the lean startup model (Ries, 2011). The lean startup model works in a circle where you as an entrepreneur test your idea on your customers and users, use the feedback and results to redefine the idea, test it again, and so on, until the product satisfies the needs to be released to market.

Sawhney et. al. (2005) outlines certain capabilities by using the Internet as a platform for customer engagement. They discuss how it helps interactivity, enhanced reach, persistence, speed, and flexibility, and that all of it combined help firms to engage in collaborative product innovation. They also suggest two different levels of customer involvement: high reach (quantitative, i.e. surveys) and high richness (qualitative, i.e. advisory panels).

In her article, Smith (1998) found that startups value customer relations and used various methods to assure that their customers were heard. All of the high performers in the study would implement changes based on suggestions from customers. Yli-Renko & Janakiraman (2008) also emphasizes the need for customer involvement in product development. They describe today's processes as so complex and splintered that startups have no other choice to include both internal and external parties. Gupta et al. (2004) stated that startups' customer relationships are the most central in order to generate profit and for its market value.

The literature suggests that startups should have continuous contact with their users and customers, and that it is easy for them to apply. Not only when it comes to implementing it in the business model, but also when it comes to available resources (van de Vrande, et al. 2009). Hence my second proposition is:

Proposition 2: Startups have continuous contact with their users and customers to improve their innovations.

External networking – consist of the creation and maintenance of connections with external sources, including both individuals and organizations, both informal and formal. In the startup I am working in, my boss always tells me: "Talk to those guys, they know how to do it. You don't need to invent the wheel every day", because inventing the wheel could require substantial amounts of time and resources. A well working connection might also evolve into

an alliance or a partnership, which are a useful way of acquiring technological capabilities (Gomes-Casseres, 1997).

Gemmel et. al. (2012) found that entrepreneurs utilize complex and sophisticated social networks as sources of ideas and to test, refine, and validate trial ideas. In addition to the "inner group" mentioned earlier, Gemmel et. al. (2012) also discovered a "close outer group" consisting of key partners, customers, support groups and a "personal board of directors". I mentioned in the section "*Involvement of non-R&D workers in innovation initiatives"* that entrepreneurs are effectual. Sarasvathy (2001) also describes another principle related to that, which occurs later in the process: *the strategic partnership principle.* She argues that entrepreneurs' focus is on building partnerships rather than doing systematic competitive analysis, and that this is to compliment and add on to whom they already know.

Pittaway et. al. (2004) emphasizes the importance of business networking for increased innovativeness. The paper also provides evidence suggesting that network relationships with suppliers, customers and intermediaries such as professional and trade associations are important for innovation performance and productivity. This aligns with what Brown & Eisenhardt (1995) describes as the "web of communications" between various internal and external parties.

I therefore believe that startups use alliances and their network to increase their competencies, without knowing that this is a form of open innovation. Edwards et al. (2005) states that SMEs use alliances and network to extend their competencies. Hence my third proposition is:

Proposition 3: Startups actively use networking and alliances to create valuable connections.

External participation – includes investing or recovering startups and other businesses to keep an eye on potential opportunities (Chesbrough, 2003). For example, some startups are not fit to be a service on its own and might be better off being an extra functionality to another company.

As startups have a limited amount of resources, it is difficult for them to invest any resources in another startup. However, in some cases a trade of resources may benefit both companies without taking up too much of the startups' time. Startups will gain access to social, technical and commercial competitive resources by configuring effective alliance networks (Baum et al., 2000). This kind of alliance is probably not exactly what Van de Vrande et al. (2009) mean when describing external participation, but might be the closest a startup will get to another company in an early stage.

Outsourcing R&D – By outsourcing R&D, companies can acquire external knowledge, which can then be licensed or bought (Gassmann, 2006). This might be a strange move for a startup, since their innovation processes is often the core of their business. Nevertheless, companies should not stop innovating, because if they do, they die (Chesbrough, 2003). Startups are also moving forward and are probably developing new services and products, which could be outsourced to other companies.

Inward licensing of IP – To benefit from external innovation opportunities, companies may license IP. This might also be a bit strange move for a startup, because many startups are making something new. And by obtaining already patented IP might be somewhat contradictory. But on the other hand, unused IP licenses could be a potential startup in itself.

The table below summarizes some of the differences between open and closed innovation

Closed innovation principles	**Open innovation principles**
The smart people in our field work for us.	Not all smart people work for us. We need to work with smart people inside and outside of the company.
To profit from R&D we must discover it, develop it, and ship it to ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to market first will win.	Building a better business model is better than getting to market first.
If we create the most and the best ideas in	If we make the best use of internal and

the industry, we will win.	external ideas, we will win.
We should control our IP, so that our competitors don't profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP when ever it advances our own business model.

Table 1 - Contrasting principles of closed and open innovation (Chesbrough, 2003, pp. xxvi)

Many of the parts of open innovation seem logical for a startup to apply, and maybe they already have some of the types implemented in their business model. I do believe that I will find many parts of open innovation in startups, but I will not do it by using the term open innovation, because I believe that they do not know what that is. Thus, my fourth and last proposition is:

Proposition 4: Startups have a high grade of open innovation implemented in their strategy without knowing it.

3 Methodology

This section describes the methodology used in this thesis. I chose this topic because I am currently working in a startup and have found that being open can profit your business. You might think that the most open companies of them all are startups, but from my experience that is not always the case (see example in chapter 1.2 Motivation).

3.1 Research approach

As I am working in a startup and have been in the startup industry for one year, I have a certain understanding of how it works. I will therefore use that understanding as a starting point for my research. It is arguable that this starting point will make me subjective to the manner, but I will bear that in mind as I will strive to make the research as objective as possible.

Wilson (2010) divides research in two approaches: inductive and deductive. My research will use open innovation as a theoretical framework, thus making it a deductive approach because it "begins with and applies a well known theory" (Wilson, 2010, pp. 7). But, as the theory is developed for large organizations and not small startups, I do not believe that the theory can be directly generalized to startups. For this reason I will also use some elements of inductive research in my study. By using this approach I will develop a set of propositions based on the existing theory and test them on the unit of analysis. This will result in observations and findings, and might be used for further research.

3.1.1 Research philosophy

In addition to taking a mixed deductive approach it is important to think about what kind of view I have on the development of knowledge (Wilson, 2010). In my research I adopted the interpretivist approach. Since I am a part of the unit I am analyzing and it is important for me to understand the way entrepreneurs act, it is natural for me to "analyze social actors within their own cultural setting" (Wilson, 2010, pp. 11). I will as a passive participant observe the

unit of analysis; in the time I am studying this phenomenon, I will not actively engage in everyday innovation activities to better observe them from an external angle. I will still not be completely value free and it is important to have that in mind to produce credible data.

The research is also gathering entrepreneurs' personal experience and knowledge. Therefore I am mainly adopting the subjectivist view when it comes to the question of ontology, the nature of reality (Wilson, 2010). For a small part of my data collection I will use historical data from one of the companies, which is an objective way of collecting data.

3.2 Research design

Having the research approach in mind I found it best fit to do an exploratory case study, with elements from descriptive research. The goal of this study is to understand entrepreneurs understanding of open innovation and how they apply it to their company. Very little research has been done in the field of open innovation in startups, thus an exploratory case study approach was the most suitable. It is important to note here that there are large amounts of research done on open innovation, but as mentioned earlier, it is focused on larger organizations, which is very different from startups. This is why the study is partially descriptive, as I will use open innovation as a framework when exploring the use of it in startups. Yin (2009) also categorizes case study research in research asking the questions "how" and "why", which is exactly what I am doing with my research question: *How transferrable and applicable is open innovation to Norwegian technology startups?*

Chesbrough (2003) states that companies today are in a shift, from a closed innovation model to an open one. That is 13 years ago, but many companies are still sticking to the traditional way of innovating. In the introduction I mentioned the increased focus on openness. Therefore I would say that this is a contemporary phenomenon and according to Yin (2009), a case study is appropriate when the study investigates exactly that in a real-life context. He also states that it is best used when the boundaries between the phenomenon and context are not clearly evident, and in this case difficult to control.

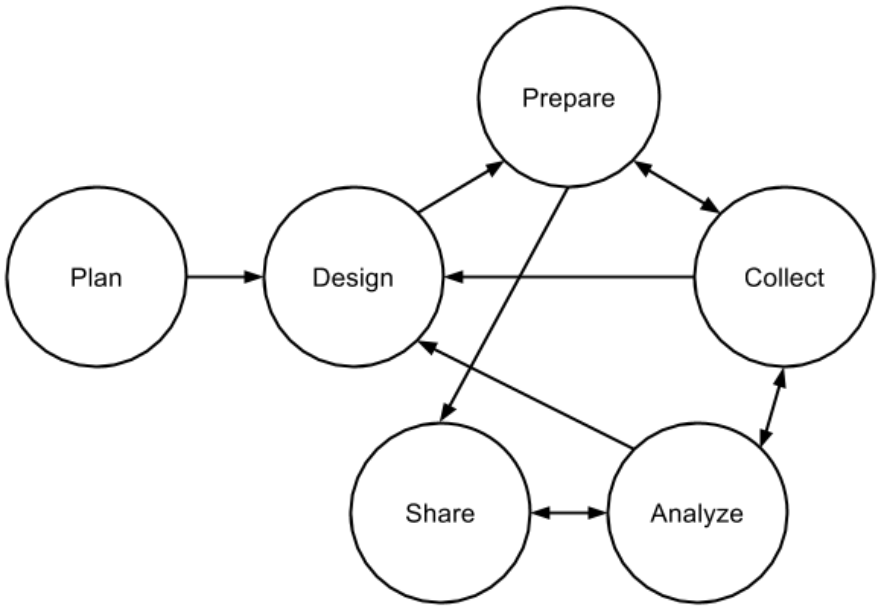

Figure 3 - The case study research process (Yin, 2009)

3.3 Unit of analysis

For the unit of analysis I have chosen to look closer into technology startups in Oslo. The reason for that is that I am a part of this group, and have already built up some knowledge in this area. As part of my motivation for doing this study is to increase that knowledge. Being in this position also helps me to get in touch with the companies fitting the requirements for this study. I also chose to analyze the company that I am working for, because it fits the requirements and I have access to archival data that can be used to add on or crosscheck information from the interview. In addition to that, I will be in a great position to observe the company closely.

3.4 Data collection

Yin (2009) describes three principles of data collection, which might help establishing the construct validity and reliability of the case study evidence:

1. *Use multiple sources of evidence*

The different types of evidence are documentation, archival records, interviews, direct observations, participant observations, and physical artifacts. In this study the main types of

evidence were interviews and documentation, in the form of formal studies of a similar phenomenon, news articles and administrative documents. In addition I will also be in a position to be a direct observer in the company I am employed.

2. *Create a case study database*

All of the interviews and articles used for this study are stored in the authors' cloud storage, accessible if needed for inspection. Interviews are stored both in the form of audio and text. As most of the documents at Meshcrafts are not meant for public view, a particular agreement must be made with the author, Meshcrafts and the inspector. Coding sheets used for analyzing are stored together with the transcripts.

3. *Maintain a chain of evidence*

It should be possible for an external reader of this document to trace my steps in either direction. I will therefore have a clear route of investigation. Starting with thorough literature review leading to a research question with linked propositions. The literature, research question and propositions create the guidelines for the interviews. Finally the findings are based on the literature, interviews and additional evidence.

3.4.1 Interviews

The main source of data for this study is qualitative interviews with entrepreneurs in startups. To form a base for the interviews, thorough literature review was first done. The main and starting literature was open innovation in SME's. The reason for that is because the literature on startups were lacking, and SME's are closer to startups when it comes to company size, age and revenue, than compared to a large organization. In addition to open innovation in SME's, reviews of the literature on larger organizations were also done. Mostly because the open innovation theory is based on these companies, and the pioneers in open innovation are mostly looking at that unit of analysis. These articles formed a good base for the understanding of open innovation. In addition to open innovation theory, I did reviews of articles about openness in startups, interaction between the user/customer and startups, articles concerning the remaining parts of open innovation. These articles provide supporting information about how startups use open innovation.

Interview guidelines

The entrepreneurs are encouraged to speak freely and not twist their answers to what they believe I want to hear. They are also asked to sign a consent form specifying that that are a part of the study. All interviews will be recorded, unless the interviewee whishes otherwise.

The research aims to understand how startups stay innovative and if they have any innovation focus or awareness of it. Thus, the interview starts with some simple and open questions about innovation. These questions will hopefully give me an idea of their stance regarding innovation. *The first question asked is "How innovative would you say your company is?" which is open for unclear answers. But not only gives this an idea of the interviewees stance on innovation, but it also prepares the interviewee for the topic we are about to discuss.* The next questions specify by asking how they innovate; what activities and processes they conduct to be as innovative as they say they are.

The next and main section of the interview looks closer at open innovation practices. As I believe most of the startups I will talk to do not know what open innovation is exactly, I will break it down to an understandable jargon.

3.4.2 Observations and document review

As mentioned in the introduction, I am currently working in a software startup. This puts me in a great position to observe in real-time and get a better understanding of the phenomenon.

Another opportunity by being so close to a unit of analysis is that I have full access to historical data about the company. The data includes partnership agreements, strategy plans, letters of intent, meeting logs and mail archive. This data will be used to crosscheck the information I receive from the interview, and to see whether there are elements that help me understand the use of open innovation in my company.

3.5 Data analysis

Wilson (2010) describes two types of approaches to coding of data: emergent coding and priori coding. All interviews will be transcribed and then coded using priori coding. The categories used for the coding are derived from the open innovation theory. As I am trying to understand entrepreneurs' way of acting, I am not precluding the emergent approach because some interesting insights might be "outside" of the open innovation theory.

To make the coding process easier I will use a coding frame (Wilson, 2010). A coding frame is a table with definitions or examples of each of the concepts being coded. The coding are done in Excel, where I put bits of data proving either use of or not use of open innovation. A fitting color scheme is also added to easier see the whole picture and draw conclusions.

3.6 Ethics, reliability and validity

Wilson (2010) informs that the researcher has a moral responsibility to carry out the research in an accurate and honest way. I will throughout this whole semester bear in mind that I am in a biased position, as I am part of the unit of analysis. It is therefore important for me to always try to be objective, especially the times when I use my own experience as a data source. During the interviews I will also try to stay completely objective, and not steer their answers in one direction or another.

Regarding anonymity, I have chosen not to use company names (other than my own) in the study. Instead I will use pseudonyms as "Company A", "Company B", etc. When doing the interviews, all of the interviewees were asked to sign a consent form. The consent form asked them if they had received information about the study and whether they wanted to be anonymous or not. Some questions occurred at this point, consequently I chose not to use their names.

It is important that the study measures what it is supposed to measure (Wilson, 2010), giving the study validity. In addition, the study should provide stable and consistent results

(Carmines and Zeller, 1979), giving it reliability. In order to improve reliability I will follow Yin's (2009) three principles as described in section 3.4 Data collection.

In order to improve validity I will use the general advise as suggested by Wilson (2010, pp. 122):

- Ensure that your research questions and objectives are clearly defined, understood and workable
- Fully engage your research stakeholders
- Make sure that your measures are related to your research questions and objectives
- Compare your measures with that of previous research

4 Results

This section contains the results from interviews done with the six startups. Every proposition has its own section where citations from the interviews are described.

Company	What they do	Age	Employees
A	Making a energy market place for electric vehicles	Started as a student company in 2013. Done some important pivots, and would like to say they started in June 2015.	4 full time 3 part time 1 intern
B	Task management-and team management platform for companies	Started 10 years ago. Changed direction 2 years ago, started prototyping 1,5 year ago.	3 full time 1 part time
C	Travel service for mobile, where users may build their own travels and download offline maps when they leave.	Started 2010. First version in 2012, before that it was mostly a research phase.	8 full time
D	A cloud service for publishing and communicating geographical data	1 year	2 full time 2 freelancer
E	Building a “managed Wi-Fi” for home use to fix network problems and giving more control of the network to the user	2,5 years	6 full time 2 part time
F	Booking system for directives in Norway. Mobile app and web platform.	4 years	4 full time 2 part time 1 intern

Table 2 - Interviewed startups and basic information

4.1 Startups involve their whole team in everyday innovation activities

Company A divided their employees in two groups, technical employees and business related employees. He mentioned that they have different roles when it comes to innovation activities, roles connected to what their tasks are.

"Everyone actually. Some have more technical roles and some have more business related roles. Everyone except the intern is in some way involved in the development of the company." – Company A

Even though they were divided in different groups, they communicated across those groups and everyone, except the intern, were involved in everyday innovation activities.

While acknowledging that they included everyone, Company B also pointed out that it is because of their small size. It would have been difficult to not involve everyone. They did however have one part time employee who worked with management who were not that involved in the innovation activities.

"Everyone contributes to innovate us. We aren't that many, so it is quite okay. […] Or, the one that is working only 50 % isn't that much involved, he works mostly with management, so we are maybe 3 (of 4) who works with the product and innovation" – Company B

Company C was also arguing that it was most natural for them to include everyone. The interviewee mentioned that it would have been "weird" not to, and pointing out that everyone in the company are at the same level, that they have a flat organization structure in matters like innovation.

"It is very natural for us that everyone is involved in everything and we have open design discussions and stuff like that. Everything is very open. You have as much right as anyone else to come up with objections or suggestions if you are a developer or content producer, it doesn't really matter." – Company C

Company D differed a bit from the other companies, since they did not involve their programmers. However, those programmers were hired freelancers, which means that they are not really part of the entrepreneurial team.

"It the two entrepreneurs. The programmers we have only does what we tell them to do. So it is us two." – Company D

Company E was somewhat similar to company D, whereas they did not include their programmers that much. They were not freelancers, but they were located in Finland, making continuous contact slightly more difficult. But mostly it was the two entrepreneurs leading the company that did most of the innovation in their company.

"Well, it is me and one other who are running this company. And we include a guy from BI quite a lot, who writes a paper about us. […] We also include our developers in Finland, but not so much." – Company E

In their company, they were 4 full time workers, 2 part time workers and 1 intern, but they mostly involved three of the full time.

"3 of 4 full time. ['What about the part-time?']. We have a developer, but no, she wouldn't really, no. There is one other that does quite a bit of research to ensure that what we are doing is relevant." – Company F

4.2 Startups have continuous contact with their users and customers to improve their innovations

The difference between "wanting" and actually "having" is clear in Company A. They said that they hoped they did it more now, than what they had done so far. As this is the company I am employed in, I can confirm this statement. Much of the customer contact that we actually had was mostly minor design fixes, and not pushing us to new innovative ideas. As he also mentioned, they have decided that it will be better and are already in the process of setting up a customer community platform.

"Hopefully we include them more now than what we have done so far. With other words: way too little. We want to have more contact with them, so that is one of the actions we are going to do." - Company A

Company B was a step ahead of company A. They had already set up a customer support platform, which they used for the masses of their customers. In addition to that, they went out and had quality talks with some closer customers. When asked if they thought it was difficult to filter the constructive and not so constructive feedback, he answered that they had done if for so long that they easily saw the difference, and it was also rare that they received feedback that took them astray.

"We do it a lot. We have daily contact with our customers. We use a service called ... for customer support. That is the one we use for the masses of customers. We also have some we have closer contact with. We sometimes travel and talk to them, see how they use our product and stuff like that." – Company B

Company C had implemented a feedback system in their product. If something out of the ordinary happened, they would contact the customer automatically and ask if something wrong happened. They were also following the customer through the whole process, guiding and helping them along the way. If a customer decides to stop using the app, they will also ask him why. They did however have an issue with bad/unconstructive feedback. Many of the customers that were contacted in this guiding process looked at the customer service as a personal assistant, asking question that were not related to the product, but personal interests in real life.

"Yes we do. We have two levels of customers, users of the app and enterprise-partners. The enterprise-partners aren't as much involved as the normal users. We have a system… it's like… if you install the app and use it for one hour and then you don't open it for one week, then we will contact and ask 'Was it a special reason for you to not use it? Or was it something that annoyed you?' then we do what we can for the customer." – Company C

Company D had a very customer centered approach to their development. Their whole business idea and model were based on their customers needs, and they constantly changed

according to the change in those needs. They knew that they had to learn from their customers in order the make the best product possible.

"We learn extremely much from them and extremely much about how they work with data, so that is alpha-omega for us. […] There is one customer who works with satellite data, which is awesome, it is really difficult data and large amounts of it. So we need to understand that process. We learn so much about how radio waves work to understand the need they have." – Company D

Company E's customers were the resellers of their product; they gave them useful feedback which they took into consideration. The resellers have a lot of experience in that type of products, and know therefore some tips and tricks they might use. They also involved their users in the process, and had so far released 100 products as a pilot test to receive user feedback.

"Yes. Our customers are mostly companies who are selling our product and we receive a lot of feedback from them. […] We also involve our users. We just had a pilot where the whole point was to test the product and get feedback." – Company E

Company F differed from the others, as they did not see the great value of customer feedback. They felt the feedback could get too centered towards individual users needs, and not for the good of the whole platform. They did listen to them, but did not use the feedback to improve their product.

"We involve some of them. We involved them quite a bit more in the beginning than we do now, I think it is, you know, they are paying for the product, we need to deliver on that and it gets you know we found that our customers are very focused on their own individual needs and so they are very interested in catering the product to what their individual needs might be, so very are specific, very micro supposed to macro opinions, but of course we listen to their ideas and you know, maybe there are some ideas." – Company F

However, they used feedback and tips from guiding companies, because they believed their feedback was better than what they received from their customers.

"So when we creating the booking system we are listening to a lot of guiding companies that are not necessarily our paying customers right now but they will be in our eco system, so we do do that, and we do do a lot of kind of research with them to understand what their needs are and understand what kind of booking system, and what their frustrations are with the programs that they are using now and see how we can kind of revolutionize that." – Company F

4.3 Startups actively use networking and alliances to create valuable connections

Company A stated that networking was crucial for them. They went to different events and joining incubators in order to expand their network. My boss uses a large amount of his time to get in contact with new people who could benefit our company. Every time we are at a new place, meeting new people, he urges everyone to make contacts that can benefit our company.

"Networking is extremely important for us. We network in many different ways. Everything from going on academic conferences that are relevant to us, to social settings though work, to attending networks and incubators." – Company A

Company B was not that enthusiastic about networking and did not search for new networks that much either. They had been part of some programs, where they were pushed to network. After the programs ended, they sat down and focused on developing, and removed the "networking focus".

"We don't network that much. We networked quite a bit in the ...-program. When we were done with that we had to sit down and work a bit more effective, so at that time we did not have so much focus on networking, but it will increase again. We have started sales processes and stuff like that to sell more of the product, which makes it more important to network. We have a new program in the end of April where it will be a lot of networking." – Company B

Company C shared some of the same enthusiasm for networking. The interviewee quickly criticized the focus on social events, something he did not see the value of at all.

"The environment we are in wants us to think that it is important, and that we attend as many as possible, eat finger food and drink beer with other people. My personal impression is that it has a limited value." – Company C

Even though he had some strong opinions on networking events in a social setting, the interview revealed that they did go to industry specific events to gain contacts and learn more about the industry they were in.

"We do to stuff that is relevant for us, that is more targeted against the travel industry. Norwegian just did a big redesign of their web- and mobile platform, and that time we followed and went to talks about that." – Company C

Company D got their customers and other contacts through events and conferences arranged in their industry. As they are a business-to-business company, they felt that it was necessary to meet these businesses at certain arrangements.

"I would say it is quite important. We are B2B and it is obvious that we have to meet people, deliberately. […] People who work with geographical data are kind of an own environment, and arrange fitting events." – Company D

Networking was very important for Company E. In addition to admitting that this was crucial for their company, they also had partners helping them reach out to other companies.

"Networking is very important for out company. We have several partners who are a kind of a networking partner who helps us to get in contact with other companies." – Company E

In Company F, almost everything goes through their network. When the interview were done, they had just had a talk with a recruitment staffing firm and told them that they would

probably never need their services because the building of their team and mentors is all done through networks. They also attend some networking events to increase their network.

"Yes, we are building our team and our mentors, and recruitment is all done through networking, and I think that networking is extremely, extremely important. We go to quite a few networking events, and that how we get a lot of our customers, it's all through networking, so that has a huge role." – Company F

4.4 Startups have a high grade of open innovation implemented in their strategy without knowing it

All of the interviews started with me asking the interviewee whether s/he knew what open innovation was. None of them did. However, parts of open innovation were present in their companies, especially external networking, the involvement of non-R&D workers and customers. Only half of them had some sort of external participation, and a couple had thought of or planned a spin-off. When asked about startups' openness an incubator said:

"I don't know if it's something conscious when it comes to startups. I mean most of them follow lean methodology - in terms of reaching customers early, observe, learn from them and iterate."

The lean startup model is highly known in the Norwegian startup environment, it encourages startups to be in continuous contact with their customers, learn from them and adjust their product to their needs and pains.

An overview of the use of open innovation in the companies interviewed is showed in table 3 below.

Type	Used by (planning to use)
External networking	100 %
Involvement of non-R&D workers	83,3 %
Customer involvement	83,3 %
External participation	50 %
Venturing	33,3 %
Outward licensing of IP	0 %
Outsourcing R&D	0 %
Inward licensing	0 %

Table 3 - Overview of open innovation in startups

5 Discussion

5.1 Summary of findings

Proposition 1: Startups involve their whole team in everyday innovation activities

The literature review clearly indicates that involving the whole team in an early stage is normal for most startups. Startups do not have an organized hierarchy with the leader on top and less important employees down the ladder, but a flat organization structure where anyone has as much say in everyday innovation activities.

In my interviews with the entrepreneurs most of them implied that they involved their whole team. However, some of them had employees that were not in their inner circle, typically developers who were only told what to do by the entrepreneurs. Some of them said that it was so the developers could focus on the development of their product and not be disturbed by other factors. It is an interesting finding that teams with less than 10 employees decide not to include everyone, as it is over and over concluded by researchers that they do. Developers are also in a great position to give input on the product, as they know the product better than anyone.

Proposition 2: Startups have continuous contact with their users and customers to improve their innovations

This proposition is also clearly rooted in the literature, and there are developed new models that entrepreneurs are encouraged to use that involve their customer to a higher extent. Without knowing the pains and needs of your customers, you will most likely make something that is not desired by your users.

The interviews showed that most of the startups had a positive attitude to involving customers. However, some did not do it as much as they would liked to have and one of the companies felt the feedback from their customers had no use or were only distracting. They would rather use feedback from experts in their field as they had experienced that customers were too “micro-focused”, looking only at minor design changes. If not done correctly,

customer involvement may steal away much appreciated time. The companies that did involve their customers did it in a very structured way. Most of them had divided their customers in different groups and interacted with them accordingly. Some also used software tools to help them stay in touch with their customers and to help them process the incoming feedback. The finding on a structured approach is something I will come back to later in this section.

Proposition 3: Startups actively use networking and alliances to create valuable connections

The literature states that networks are important for companies to stay innovative. It also suggests an increased trusted circle, as the one mentioned in Proposition 1, that consist of partners and alliances that are actively used by entrepreneurs. Instead of using time on analyzing their competitors, entrepreneurs focus on building partnerships (Sarasvathy, 2001).

All of the interviewees had some sort of network and kept increasing it by attending events and seminars relevant for their sector. Most of them said that it was "very important" for them, and one said it was "alpha omega", that it was essential for them in order to do what they were doing. One of the entrepreneurs criticized how most networking events were conducted in the incubator he was located in. He said "They are like 'listen to what this microchip entrepreneur did in 1990' we don't go to those anymore". But he admitted that they went to events relevant for them.

Proposition 4: Startups have a high grade of open innovation implemented in their strategy without knowing it

Some of the aspects of open innovation are also covered by literature on startups and entrepreneurs. Those were *outward licensing of IP, involvement of non-R&D workers, customer involvement* and *external networking.* Most of the research done on IP in startups mentioned outward licensing as a possibility to capture value from it; few had done research on whether any startups actually did it. The last four, *venturing, external participation, outsourcing R&D* and *inward licensing of IP*, were not found in existing research about startups and entrepreneurs. This means that, according to the literature, the grade of open

innovation in startups is not high, but medium. The literature does not say anything about the entrepreneurs' knowledge of open innovation.

The grade of open innovation was almost the same in the interviews as it were in the literature, which is medium. However, it was not the same types that counted for this grade. The interviews showed that all of the startups had existing external networks and kept increasing those. Five out of six were positive to customer involvement. And five out of six involved most of their team. All of the three aligns with what the literature suggests. The fourth, outward licensing of IP, was not used by any of the companies interviewed. That might be because all of them were some kind of software companies and software is difficult to patent, as much of it is not patentable and software is often visible to everyone. One of the companies said that they might patent some of their work, which they so far had kept hidden, but had not thought about licensing it out.

Half of the companies were involved in another company in some way. This is a high number bearing in mind that it is not done any research on the subject. One of the companies had merged with another company in order to receive their knowledge. Another company had already started working on a spin-off product and was in the process of discussing whether they should take it further. One other saw it as a possibility and had thought of it, but not more work than that was done. All of the entrepreneurs had to be explained what open innovation was, meaning that the proposition is almost true.

To summarize all of the propositions: The proposition that was supported by theory and by all of the interviews was the use of networks and alliances. All of the entrepreneurs said their network was very important for them, and the theory states that startups have no other choice than to find external help.

Perhaps the most interesting was the proposition on the involvement of customers and users. The theory clearly indicates that startups use their customers actively in order to create the best possible service or product for them. One of the entrepreneurs I talked to had deliberately not used customer feedback, and one had not used it as much as he would have liked.

In all, the majority of my findings are supported by the literature.

5.2 Additional findings

5.2.1 "We are thinking about it"

The results above show that there are some aspects of open innovation that is not embedded in startups' way of working. And some of those aspects were unthinkable for most of the interviewees. But almost all of the interviewees considered the possibility of adopting one or more of the aspects that they did not already use. They believed it could be a good idea, and some had already thought of it before the interview. It is an interesting finding that startups have so many plans in their back of their head, but many of them might not get out of there. For further research it would have been interesting to study what factors that influence the choice of their plans.

5.2.2 Planned vs. arbitrary strategy

A linked finding to the latter is that it seems startups have an arbitrary strategy, where they do what they believe is right at a given time, not following a planned strategy. They change and make those choices based on an evaluation of where they are and the situation they are in. One of the companies was an excellent example of this. At one moment they attended a startup program, and because of that they changed their way of working and focused on completely different tasks. Once the program ended, they shifted back to the way they used to work. This was of course partly because the program organizers told them to, but also because they believed it was the right thing to do.

All of the startups had also changed direction in one way or another since they first started. They had an idea of where they wanted to go, but did not hold on to that too hard if something came up. Many of them said that it was because they learned by experience that it was not the best way to do what they were doing.

These ways of looking at your own means is very similar to what Sarasvathy (2001) calls effectual reasoning. She explains a model where entrepreneurs start with who they are (traits, tastes and abilities), what they know (education, training, expertise and experience) and

whom they know (social and professional networks). Then they use those means to imagine different ends/outcomes. The opposite reasoning is the causal reasoning, where the company selects between given means to achieve a pre-determined goal. In school, we are taught to be causal; to plan ahead and determine goals for where we want to go. The same goes for business plans, which are required by many startups when applying for funds or attending certain programs. That might be one of the reasons for why entrepreneurs are not completely effectual (Townsend et al., 2009), but also use causal reasoning in some decisions.

5.3 Further work

This thesis discovered that there are some differences in the grade of openness in startups. An interesting area of study would have been to analyze these differences and extend the research to startups that have become successful (at least with a sustainable revenue). Then analyze those companies and figure out if the openness was a factor leading to their success. If so, what kind of openness was the most crucial factor for them?

Then it would be interesting to measure the grade of open innovation startups have implemented by doing a quantitative study of the phenomenon.

Another interesting finding is the arbitrary strategy that it seems many of the startups have. It could be interesting to see whether being structured with some sort of planned strategy is better than going with your gut. The entrepreneurs in this study that was the most structured had also the most experience.

5.4 Limitations

The open innovation theory as described by Chesbrough (2003) focuses on larger organizations. And some of the parts of open innovation may seem impossible and irrelevant for a startup, which is why I am not implying that open innovation can be directly transferred to a startup, but I see similarities between the secrecy/openness in a startup and closed/open innovation in large organizations and this research digs deeper into that.

This thesis is focused towards startups located in a relatively small geographical range. It could be that there are differences between startups in Oslo and startups in Trondheim. The cities have different incubators, education and other professionals influencing the choices of a startup.

References

Aulet, B. (2013). *Disciplined entrepreneurship: 24 steps to a successful startup*. John Wiley & Sons.

Baloff, N. (1970). *Startup management*. IEEE Transactions on Engineering Management, (4), 132-141.

Baum, J. A., Calabrese, T., & Silverman, B. S. (2000). *Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology*. Strategic management journal, 21(3), 267-294.

Bhide, A. (1991). *Bootstrap finance: the art of start-ups*. Harvard business review, 70(6), 109-117.

Bianchi, M., Campodall'Orto, S., Frattini, F., & Vercesi, P. (2010). *Enabling open innovation in small-and medium-sized enterprises: how to find alternative applications for your technologies.* R&d Management, 40(4), 414-431.

Blank, S., & Dorf, B. (2012). *The startup owner's manual*. K&S; Ranch.

Brad Svrluga (2013, February 1). *Openness and Transparency: Lessons from Startup CEOs.* Forbes. http://www.forbes.com/sites/bradsvrluga/2013/02/01/openness/#5a1c06d412af

Brown, S. L., & Eisenhardt, K. M. (1995). *Product development: Past research, present findings, and future directions.* Academy of management review, 20(2), 343-378.

Carmines, E. G. and Zeller, R. A. (1979). *Reliability and Validity Assessment.* Newbury Park, CA: Sage.

Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Cambridge, MA: Harvard Business School Press.

Chesbrough, H. (2012). *Open innovation: Where we've been and where we're going*. Research-Technology Management, 55(4), 20-27.

Dickson, P. H., G. T. Solomon, and K. M. Weaver (2008). *Entrepreneurial Selection and Success: Does Education Matter?* Journal of Small Business and Enterprise Development 15(2): 239–58.

Freeman, J., & Engel, J. S. (2007). *Models of innovation: Startups and mature corporations.* California Management Review, 50(1), 94-119.

Gassmann, O. (2006). *Opening up the innovation process: towards an agenda*. R&d Management, 36(3), 223-228.

Gemmell, R. M., Boland, R. J., & Kolb, D. A. (2012). *The socio‐cognitive dynamics of entrepreneurial ideation*. Entrepreneurship Theory and Practice,36(5), 1053-1073.

Gomes-Casseres, B., 1997. *Alliance strategies of small firms*. Small Business Economics 9, 33–44.

Gupta, Sunil, Donald R. Lehmann, and Jennifer Ames Stuart (2004). *Valuing Customers*. Journal of Marketing Research, 41 (February), 7-18

Helmers, C., & Rogers, M. (2011). *Does patenting help high-tech start-ups*?.Research Policy, 40(7), 1016-1027.

Joshua McClure (2014, December 13). *The Strength of A Transparent Startup*. Techcrunch. http://techcrunch.com/2014/12/13/3-reasons-transparency-makes-startups-stronger/

Kaplan, J. M., & Warren, A. C. (2009). *Patterns of entrepreneurship management*. John Wiley & Sons.

Klepper, S. (2001). *Employee startups in high‐tech industries.* Industrial and Corporate Change, 10(3), 639-674.

Laforet, S. (2008). *Size, strategic, and market orientation effects on innovation*. Journal of Business Research, 61, 753–764.

Liu, X., & Andersson, T. (2014). *Open innovation in Swedish startup micro-enterprises*. Blekinge Institute of Technology

Mann, R. J., & Sager, T. W. (2007). *Patents, venture capital, and software start-ups.* Research Policy, 36(2), 193-208.

Pittaway, L., Robertson, M., Munir, K., Denyer, D., & Neely, A. (2004). *Networking and innovation: a systematic review of the evidence*. International Journal of Management Reviews, 5(3‐4), 137-168.

Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. Crown Business.

Sarasvathy, S. D. (2001). *What makes entrepreneurs entrepreneurial?*

Sawhney, M., Verona, G., & Prandelli, E. (2005). *Collaborating to create: The Internet as a platform for customer engagement in product innovation*. Journal of interactive marketing, 19(4), 4-17.

Smith, J. A. (1998). *Strategies for start-ups.* Long Range Planning, 31(6), 857-872.

Stevenson, H. H., & Jarillo, J. C. (2007). *A Paradigm of Entrepreneurship: Entrepreneurial Management* (pp. 155-170). Springer Berlin Heidelberg.

Storey, D. J. (1994). *Understanding the small business sector*. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship.

Townsend, D. M., DeTienne, D., Yitshaki, R., & Arthurs, J. D. (2009). *The psychological ownership of entrepreneurial organizations: theoretical and model development*. Frontiers of Entrepreneurship Research, 29(6), 3.

Van de Vrande, V., De Jong, J. P., Vanhaverbeke, W., & De Rochemont, M. (2009). *Open innovation in SMEs: Trends, motives and management challenges.* Technovation, 29(6), 423-437.

Van de Ven, A., 1986. *Central problems in the management of innovation*. Management Science 32, 590–607.

Vanhaverbeke, W., Vermeersch, I., & De Zutter, S. (2012). *Open innovation in SMEs: How can small companies and start-ups benefit from open innovation strategies?* Flanders Disctrict of Creativity.

Wind, J., & Mahajan, V. (1997). *Issues and opportunities in new product development: An introduction to the special issue.* JMR, Journal of Marketing Research, 34(1), 1.

Williams Middleton, K., & Donnellon, A. (2014). *Personalizing entrepreneurial learning: a pedagogy for facilitating the know why*. Entrepreneurship Research Journal, 4(2), 167-204.

Wilson, J. (2010). *Essentials of business research: A guide to doing your research project*. London: Sage.

Yin, R. K. (2009). Case study research: Design and methods (4th Ed.). Thousand Oaks, California: Sage.

Yli-Renko, H., & Janakiraman, R. (2008). *How customer portfolio affects new product development in technology-based entrepreneurial firms*. Journal of Marketing, 72(5), 131-148.

Appendix

Interview guide

Intro

About me (my name, study, etc.) and the project (give brief information about open innovation and my motivation of the subject).

About the interview. There are no right or wrong answers, I want you to talk openly about all the topics we go through. I will take some notes and if it is okay for you I will also record the interview by audio. This is just to make it easier for me to transcribe the interview later. I am the only person who will have access to the recordings.

The interview will take about 15 to 30 minutes, and if you have any questions during the interview, feel free to ask me.

Sign consent form

Basic information

- Company name
- Company location
- Company age
- Company type (what do they do?)
- Nr. of employees
- Revenue
- Interviewee position (maybe some daily tasks)

General innovation questions

The questions below help me to form a picture of their focus on R&D and innovation. They might answer that they don't engage in R&D, even though they do it. So this is to see whether they are aware of it.

- How innovative would you say your company is? (Innovative = creating something new/novel)
- Do your company undertake any R&D activities? How?
- How do you innovate? (Help: Is there any standardized processes or actions you perform?)
- Have your company changed directions since the original business model? Explain
- Are there any processes or ways of doing things in your company that has changed since you first started? How/why did that happen?

Main part

Next section will focus on different types of open innovation.

Technology exploitation – Outflows

When a company exploits technology, it implies that it is using existing internal knowledge and capabilities

Venturing – is founding of new companies with internal knowledge and resources. An example is a spin-off company.

- Have your company or are you planning on founding a new company based on your internal resources? If so, please explain.

Outward licensing of intellectual property (IP) – If a company holds IP, it can license it out to obtain more value from it.

- Do you hold any patents or other intellectual property? What is their purpose? Are you licensing them out?

Involvement of non-R&D workers in innovation initiatives – Workers outside of the R&D department have great understanding of how new products are created and commercialized, giving them relevant knowledge for the company's innovation processes.

- How many of your employees are involved in the R&D- and innovation processes? How are they involved?

Technology exploration - Inflows

Technology exploring means that a company acquires knowledge and technologies from external sources.

Customer involvement – Gassmann (2006) theorize that to inform internal innovation, the company should involve their customers in the process.

- Do you involve your customers in the development of your company or products? How? Do they help you innovate?

External networking – consist of the creation and maintenance of connections with external sources, including both individuals and organizations.

- How well would you say your company applies networking?
- Are the networks crucial for your company?
- How do you network?

External participation – includes investing or recovering start-ups and other businesses to keep an eye on potential opportunities (Chesbrough, 2006).

- Is your company involved in any other start-up or business? Why?
- Have you invested financial or human resources in that company?

Outsourcing R&D – By outsourcing R&D, companies can acquire external knowledge, which can then be licensed or bought (Gassmann, 2006).

- What are your stand on outsourcing R&D?

Inward licensing of IP – To benefit from external innovation opportunities, companies may license IP.

- Have you thought of acquiring IP licenses?

Closing

- Do you have any questions for me?
- Is it okay if I contact you if I need to ask some follow up questions?
- Thank you for the interview