Master Thesis

OPEN INNOVATION IN START-UPS AND THE ROLE OF AN INCUBATOR IN THE PROCESS

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ABSTRACT

**Purpose**: The aim of this study has been to investigate the concept of open innovation from a start-up perspective and how an incubator can support this process.

**Methodology**: This is achieved through reviewing the literature in regard to open innovation, open innovation in smaller companies, and on the incubator. Then a case study approach is used by investigating two incubators and four start-ups, who have participated in the incubation programs, through the use of interviews.

**Findings**: This study suggests that start-ups engage in open innovation, they do so in order to access important tangible and intangible resources, which they do not possess themselves. In addition, through the interaction with the external environment, open innovation, can further the credibility of the start-ups. Open innovation can be seen as a natural part of a start-up because of the scarcity such entities face.

Regarding the support of an incubator for the open innovation approach of their start-ups, this study suggests three important aspects. First, the network of the incubator. In addition to this the credibility of the incubator can be an asset when interacting with the external environment. Finally, incubators can create an open environment and encourage the start-ups to engage with external partners.

**Originality**: Much of the existing research on open innovation covers the phenomenon in larger companies or SMEs. The findings of such studies might not be transferrable to start-ups, because of the nature of new ventures. Hence this study aims to contribute to the understanding of open innovation in start-ups, which is a relatively under researched field.

**Keywords**: Open innovation, start-up, incubator, innovation intermediary
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List of abbreviations and explanation of concepts

FinTech: Financial Technology

Incubatees: Start-ups situated within an incubator

IP: Intellectual property

SME: Small to Medium Enterprises
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1. Introduction

This chapter serves as an introduction to the subject. Here the importance and an explanation of the research will be elaborated upon. Further, the research gap will be explained which will be followed up by the development of the research question. Next, the structure of the thesis will be described which has been chosen in order to answer the research question. Finally, the delimitations of the topic will be described.

Innovation is a crucial part for the survival of any company. Globalization, as well as ever shorter product and technology life cycles, have put increased pressure on innovation (Schilling, 2013), and hence companies need to innovate at an ever faster pace. Innovation is one of the important factors for organizational success and survival for all sizes of companies from start-ups to large incumbents (Bigliardi & Galati, 2013). While in the past according to Chesbrough (2003) the closed innovation paradigm, meaning that the research and development were conducted within the boundaries of a company, has proven to be successful. There has been a shift on how innovation is viewed according to Chesbrough (2003), namely through the concept of open innovation. The idea of open innovation is that a company does not innovate in isolation but rather makes use of the external environment to further innovate or commercialize their product or service.

The necessary information for innovation is dispersed across many different stakeholders (such as customers, other companies, etc...) as well as environments and in dynamic industries, it is necessary to expand the reach beyond the boundaries of the company (Rothaermel, Hitt, & Jobe, 2006). Especially in light of increasing technological complexity, reduced product life cycles and an increase in competition (Chesbrough, 2003) has made the innovation increasingly dependent on the use of the external environment and sources of knowledge (Ebersberger, Bloch, Herstad, & Van de Velde, 2013). This has led to an increased focus on co-creation, collaboration, and ecosystem innovation in order to capture the value of innovation.

Since the publishing of Chesbrough’s book in 2003 the concept of open innovation has attracted increased interest from academia as well as from the business world. For instance, a Google Scholar search conducted by the investigator for open innovation results in
3,690,000 publications (April 2019). In the business area, there are numerous positions regarding open innovation such as Head of Open Innovation and Open Innovation Manager among others. This highlights the diffusion of the concept of open innovation in business as well as academia.

While much of the literature has focused on large firms there has been relatively little focus on smaller firms and even less on start-ups. However, these entities are also set to benefit from open innovation although differently than large firms (Chesbrough, 2010; Spithoven, Vanhaverbeke, & Roijakkers, 2013). One of the main reasons start-ups might benefit from open innovation is because due to their age and size they do not possess the necessary resources to rely on the development by themselves (Gruber & Henkel, 2004; van de Vrande, de Jong, Vanhaverbeke, & de Rochemont, 2009). Hence by engaging with external sources, they might be able to access important resources crucial for the survival and development of their company.

Start-ups are an important factor for economic as well as job growth. The European Start-up Monitor expects start-ups to create around 18’000 jobs during the year 2019 (Steigertahl & Mauer, 2018). Furthermore, they also find that 71,7% of start-ups engage in cooperation with other companies, which clearly highlights an open approach from start-ups.

Hence in light of the importance new ventures play and their clear tendency to engage in open innovation the aim of this thesis is to further explore this concept and to contribute to the understanding of open innovation from a start-up perspective.

### 1.1. Thesis scope

The scope of this thesis is hence to investigate the concept of open innovation from a start-up perspective and the importance of an incubator in the process.

While there exists much literature in regards to open innovation most of the studies have been focusing on large companies engaging in open innovation practices (Chesbrough, Vanhaverbeke, & West, 2006). To a lesser extent the concept has been explored for small to medium enterprises (SME) with important studies conducted by Lee, Park, Yoon, & Park,
Even to a lesser extent, the concept has been covered from a start-up perspective (Eftekhari & Bogers, 2015; Usman & Vanhaverbeke, 2016).

While there exists research on SMEs, the categorization of SMEs allows for a broad and very diverse set of companies to be considered. Spithoven et al. (2013) point out that there is more research needed on small size companies of this sample.

As Spender, Corvello, Grimaldi, & Rippa (2017) state in their review on the literature on start-ups and open innovation “How and if start-ups adopt open innovation practices, and how do they manage the knowledge flows among different partners are still an unresolved question.” (p.5).

Hence the aim of this paper is to further contribute to the growth of this research field by studying the open innovation behaviour of start-ups and how a mediating organization plays an important role in the process.

Furthermore, since open innovation is a process involving at least two parties there is also interest in parties acting as intermediaries connecting relevant organizations in the innovation process. An innovation intermediary is relatively loosely defined in the literature, and many different types of organizations can serve as innovation intermediaries such as brokers, innovation systems, university and business incubators among others (Howells, 2006). Hence this paper further aims to investigate the importance of an incubator as an innovation intermediary in the open innovation approach of start-ups.

In order to achieve this, the investigator researches the literature surrounding the topics of open innovation, incubators and innovation intermediaries to characterize and further link the important aspects.

### 1.2. Research question

In light of the research gap discussed above this thesis develops the following research questions:
1) How and why do start-ups engage in open innovation?

This first question aims at furthering the understanding of open innovation in start-ups by investigating how open innovation manifests in such entities and what are the main benefits and reasons.

2) How can an incubator support the open innovation approach of their start-ups?

This aims to understand in what ways the incubator can support and contribute to the open innovation approaches taken by their clients.

1.3. Thesis structure

The thesis will be structured in the following way in order to help the reader to better understand the research and the approach taken in order to answer the research questions.

The first part gives an introduction to the topic by highlighting the importance of the research to the understanding of open innovation from a start-up perspective. This will highlight the scientific interest of the topic. Further, it has introduced the research questions which will guide the process taken in this study.

The second part will consist of the theoretical foundation for the research which will serve as an important building stone for the collection and analysis of the data. In this part, the concepts of open innovation will be discussed first in general and then from an SME as well as start-up perspective. Further, the concepts of an innovation intermediary, as well as the incubator, will be reviewed.

The third part will serve as the description of the methodology used in order to conduct this research, covering aspects such as the philosophy of the research and the research approach.

The fourth part is an introduction to the different case studies.

The fifth part is the analysis of the empirical results. The empirical results will be evaluated through a framework based on the theoretical foundation as well as the patterns which have emerged through the empirical data collection.
The sixth part will serve as a discussion, here the most relevant findings will be summarized and presented in order to answer the research questions posed in the first part.

The seventh part will cover the conclusion of the research and the limitations in addition to further avenues for future research.

1.4. Delimitation

Open innovation as a concept comprises many different practices such as customer integration in the development process, diverse forms of collaboration, the selling and acquisition of knowledge among others. The scope of this thesis is not to cover each of these in detail but rather view them as a holistic open innovation approach also suggested by the open innovation literature.

Due to the time constraint nature of the thesis, only a select number of cases have been studied at a certain point of time, which inhibits the generalisations of the findings to a larger population.
2. Literature review

The literature review will first explain the concept of open innovation and its importance. Then the concept will be reviewed in light of smaller companies to better understand the assumptions and research surrounding smaller ventures and open innovation. Finally, the concept of open innovation intermediary and the incubator will be reviewed.

2.1. Open innovation

For the understanding of the open innovation paradigm, it is useful to contrast it with the closed innovation paradigm. According to Chesbrough (2003), the closed innovation approach relies on the internal generation of innovation through in-house R&D and has been proven to be a successful model in the past allowing companies to achieve innovation and efficiency (Chesbrough, 2003). In the closed approach, the company should rely on its own R&D for critical technologies and innovations (Chesbrough, 2003).

Huizingh (2011) note that, a fully closed innovation approach might be the exception. However, due to the changes, which will be discussed below, companies have been required to become more open in their approach.

While the closed model has led to success in the past Chesbrough (2003) argues that there are four factors which have led to the paradigm shift; (1) increased accessibility and mobility of skillful personnel, (2) growth of the venture capital market, (3) external options for ideas created within the company and (4) the increase in capability of external suppliers.

While these trends were observed by Chesbrough in 2003. New technological advances combined with globalization has further given importance to the open innovation approach (Dahlander & Gann, 2010). For instance, advances in communication and information technologies have further enabled the integration of external knowledge sources in the innovation process (e.g. customers and suppliers) (Gassmann, 2006). Industries which are characterized by complex technologies, new business models, as well as the importance of knowledge sources seem to be suited for open innovation models (Gassmann, 2006).
Ideas and innovations do not necessarily have to originate or stay within the boundaries of the company. One of the key principles of the open innovation paradigm is that knowledge is distributed beyond the boundaries of a company and is held by many different actors (Chesbrough, 2003).

Chesbrough et al. (2006) define open innovation as “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively.” (p.1).

Hence, ideas can be generated inside or outside of the company, these ideas can further also be brought to market from within the company or outside its boundaries. One approach does not create superior results to another whether the ideas were generated or brought to market externally or internally (Chesbrough, 2003). The main idea of the open innovation concept is that firms do not exist in a vacuum and that the external environment is an important source of new ideas and knowledge which can help the companies to either penetrate new markets or capture higher market shares (Spithoven et al., 2013).

However, the use of external sources for the innovation process has existed before Henry Chesbrough in 2003 published his book. For instance, von Hippel in 1986 elaborated on how users can serve as important contributors for innovations. March in 1991 discussed exploration versus exploitation in the R&D process and Cohen and Levinthal in 1990 used the concept of absorptive capacity to describe how well a company can integrate and make use of external knowledge. Hence some scholars view the concept of open innovation more as a regrouping of other concepts and findings. Trott & Hartman (2009) refer to this as open innovation being “old wine in new bottles”.

While the idea of using external sources for the innovation process has not been invented with the open innovation paradigm, it was often considered that the company was the locus of innovation. However, the open innovation concept places equal importance on internal as well as external knowledge (Chesbrough et al., 2006).

Open innovation can in a sense be seen as a term which regroups much of already existing activities such as integrating users in the innovation process, by regrouping these terms this
allows to view the innovation strategies from a different angle (Huizingh, 2011) and can hence contribute to a better understanding.

Considering this Chesbrough et al. (2006) note that “While the contours of the new model of innovation remain obscure, it is clear that any adequate understanding will require a more externally focused perspective, involving the actions of multiple actors in a far more distributed innovation environment” (p.11).

2.1.1. **Open innovation processes**

Gassmann & Enkel (2004) identify 3 open innovation process archetypes; (1) the outside-in process, (2) the inside-out process and (3) the coupled process.

(1) **The outside-in (inbound) process** is based on the idea that a company can increase their knowledge through the use of external sources which can further the innovative capabilities of a firm (Gassmann & Enkel, 2004). This archetype is the process of opening up the innovation process of a company to different kinds of external contribution and is the type which has received the most attention in the research on open innovation (Bogers, Chesbrough, & Moedas, 2018) and also is the most practiced by the different types of companies (Chesbrough & Brunswicker, 2013; van de Vrande et al., 2009). This process can further be divided in to pecuniary and non-pecuniary, in regard to whether money is involved in the transaction or not. Sourcing is a non-pecuniary inbound open innovation process and refers to how firms leverage external sources of innovation to complement their internal R&D. The pecuniary approach is to acquire or license-in important inputs for the innovation process (Dahlander & Gann, 2010).

(2) **The inside-out (outbound) process** is the approach where ideas are exploited beyond the boundaries of the company (Gassmann & Enkel, 2004). This open innovation practice is mainly used to commercialize ideas which are not utilized through the company, this part is less researched (Bogers et al., 2018). The outbound open innovation approach can also be further divided into pecuniary and non-pecuniary. The non-pecuniary approach is revealing, where firms reveal external resources beyond their boundaries without financial
compensation for instance to gain legitimacy. The pecuniary approach is to license out or sell resources (Dahlander & Gann, 2010).

(3) The coupled process is the combination of the aforementioned processes, where the companies engage as well in the inbound process as the outbound process through the integration of external knowledge as well as the externalization of internal knowledge (Gassmann & Enkel, 2004). In order to achieve both processes companies participate in cooperation through strategic networks in order to create innovation. For instance, research collaborations or alliances are relevant instances of the coupled process (Lichtenthaler & Lichtenthaler, 2009). The coupled process can also be in the form of joint development of knowledge through the interaction with different external sources such as suppliers, customers and other firms/competitors (Gassmann & Enkel, 2004).

2.1.2. The open innovation process

While Chesbrough (2003) views open innovation as a linear approach, West & Bogers (2014), through an analysis of the literature view the open innovation process for the inbound as well as the coupled process as a four-phase model, where the linear approach is supplemented with a feedback loop. Hence this model is constituted by the following steps: (1) obtaining knowledge, (2) integrating knowledge, (3) commercializing and (4) finally the interaction/feedback with the collaborators.

Figure 2.1: Linear approach and the linear approach with feedback
2.1.3. Open Innovation practices

In their research on open innovation practices for large firms and SMEs Spithoven et al. (2013) mention the following external knowledge sources; (1) suppliers, (2) customers, (3) competitors and other firms, (4) institutional sources (commercial labs, R&D organizations), (5) universities, (6) government and public research organizations, and (7) other sources such as professional associations, trade fairs, conferences and scientific journals.

In light of open innovation practices, van de Vrande et al. (2009) differ between technology exploitation which refers to the outflow of knowledge and technology exploration which refers to the inflow of important knowledge in order to further the innovation. In their study, they focus on the following technology exploitation practices; (1) venturing, (2) out-licensing of intellectual property (IP) and (3) the involvement of workers in the innovation process. As for technology exploration, the following practices were used; (1) customer involvement, (2) networking activities, (3) the outsourcing of R&D and (4) the in-licensing of IP. The choice of the open innovation practice, as well as the source, will depend on the need for knowledge of the company (Spithoven et al., 2013).

One important study in regards to the use of different sources is the study of Laursen & Salter (2006), where they measure the breadth (number of sources) and depth of sources (intensity), for manufacturing companies in order to explain their innovative performance. They find that companies who are more open in terms of their innovation approach achieve higher levels of innovative performance. This is measured by linking turnover to different types of innovations in regards to the nature of the innovation; new to the world, new to the firm or if it is incremental product innovation. However, at one point additional search will become unproductive and will lead to decreasing returns, one reason for this is that managerial attention is a finite resource and that there is a risk of over searching. The point in their study when the use of further sources becomes unproductive is when they use more than 11 sources. In terms of search depth, the use of more than 3 sources becomes unproductive (Laursen & Salter, 2006).
Furthermore, they find that for radical innovation the use of external sources intensively, helps the innovative performance of the company, while search breath will be less effective for radical innovations (Laursen & Salter, 2006).

2.1.4. Competency perspective
In order to engage in open innovation, a company also needs certain competencies and capabilities which will depend on the open innovation process chosen (Gassmann & Enkel, 2004).

For instance, for the inbound process, a company needs the necessary absorptive capacity (Gassmann & Enkel, 2004). Absorptive capacity is the ability of a company to “to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal, 1990) (p.1). The absorptive capacity often is a result of the accumulation of previous knowledge (Cohen & Levinthal, 1990). Absorptive capacity can further be divided into the potential absorptive capacity as well as the realized absorptive capacity (Shaker & Gerard, 2002). The potential refers to the acquisition and assimilation of the knowledge, while the realized refers to the transformation and exploitation of the knowledge (Shaker & Gerard, 2002).

For the outbound process, multiplicative capability is needed which is the capability of transferring the knowledge to the external environment of the company, the company needs to be able to successfully transfer the knowledge and commercialize it (Gassmann & Enkel, 2004). Finally, in order to succeed with the coupled process, the company needs relational capacity which is the capability of a company to create and use relationships to further their innovativeness (Gassmann & Enkel, 2004).

2.1.5. Business models for open innovation
In their review of the research on open innovation West & Bogers (2014) find that there is a lack of insight in terms of the importance of the business model in open innovation. The business model is important because it is the rationale of how value is created.

Regarding open innovation, an open business model refers to how companies can create and capture value from collaboration with the external environment (Osterwalder & Pigneur, 2010).
Companies realize different outcomes from their open innovation approaches. Saebi & Foss (2015) argue that one reason for this can be the business model of the subsequent company. The reason for this is that some companies might not adapt their business model correctly to their innovation strategy (Saebi & Foss, 2015).

2.1.6. Risks of open innovation

Among the studies focusing on open innovation, the potential benefits are discussed, however potential risks or disadvantages are rarely discussed (Dahlander & Gann, 2010).

However open innovation can also bring with it costs and risks, for instance, there is a cost of coordination in terms of managing different relationships. Another cost could arise through over-searching which can have a detrimental rather than a beneficial result (Laursen & Salter, 2006).

In a case study undertaken by Lichtenthaler (2011) covering 31 medium to large sized companies, it was found that companies only experienced potential risks of opening up their innovation process too much.

Some of the potential risks identified through the study are the following: (1) limits the internal capabilities to innovate because of too much dependence on the external environment, (2) dependence on external partners without necessarily having the control, (3) loss of technology which can be used by the competition and (4) hindering the development of important complementary assets (Lichtenthaler, 2011).

2.1. Open Innovation in SMEs and start-ups

Much of the literature surrounding open innovation focuses on established companies and how they can make use of these practices in order to stay innovative in competitive markets. Less attention has been accorded to the concept of open innovation for SMEs and even less contribution has been made from a new venture perspective.

However, there is a difference in regards to the open innovation approaches between large and smaller companies (Spithoven et al., 2013; van de Vrande et al., 2009). One important difference is the access to resources, such as financial and human, in order to invest and build
organizational structures for the innovation process. For instance, large companies are in the position to scan the environment and engage with a larger number of sources than a smaller entity could (Spithoven et al., 2013). The main challenges of smaller ventures will be discussed below.

2.1.1. Challenges of SMEs and new ventures

New ventures in general face three challenges which are the liability of smallness, the liability of newness, as well as, market entry barriers (Gruber & Henkel, 2004).

Liability of smallness refers to the lack of resources small firms face, which are mainly financial and human resources. The lack of important tangible as well as intangible resources is one of the main barriers for smaller entities in innovation (Vossen, 1998). Hence SMEs need to rely on their network in order to access crucial resources (Lee et al., 2010; van de Vrande et al., 2009).

According to Stinchcombe (1965), the liability of newness refers to the weakness of new ventures in their social structure. This liability affects their internal processes as well as the external processes. For instance, internally, new venture lack structure in the company and new roles need to be learned and defined. Externally due to their lack of resources new ventures are dependent on social relations among strangers to access these (Stinchcombe, 1965).

Because of the liability of newness start-ups lack important relations with different types of stakeholders which would improve their chance of survival. These relations need to be build up. However, due to their newness, new ventures lack important characteristics such as credibility, reputation, and experience (Gruber & Henkel, 2004). The challenge is to construct these relationships with important partners without relying on the reputation and track-record an established company would possess (Michelino, Cammarano, Lamberti, & Caputo, 2017). In regards to this, legitimacy is considered as an important resource which facilitates the acquisition of other resources crucial for the success of new ventures (Zimmerman & Zeitz, 2002).
However small firms also have relative advantages over larger firms such as; quick decision-making, flexibility, the capability to learn rapidly and adapt their business accordingly, entrepreneurial mindset and focus (Chesbrough, 2010; Vossen, 1998).

2.1.2. **Open Innovation in SMEs**

Some authors argue that the main motivation for SMEs to use open innovation is to overcome the liability of smallness. This is done by accessing resources externally which they do not possess internally. Indeed such motives can be observed as open innovation can serve as an important approach in order to reduce the costs of R&D, improve the process of product development in addition to accessing knowledge which is not located within the boundaries of the company (van de Vrande et al., 2009). However, SMEs are mainly motivated by market needs with the aim of growing their market share (van de Vrande et al., 2009).

Smaller ventures already have a more natural tendency to use external sources and hence open innovation is not alien to these entities (Lee et al., 2010), because they need to rely on the external environment for important resources.

Due to the constraints of small ventures in terms of resources, they prefer non-pecuniary activities such as the use of a network rather than activities which are inherently more complex such as licensing and acquisition of IP (Brunswicker & Vanhaverbeke, 2015).

While open innovation is often considered as a reason for small companies to look for knowledge beyond their boundaries, the lack of resources also constitutes a barrier for their open innovation approach (Spithoven et al., 2013).

For instance, Lichtenthaler & Lichtenthaler (2009) argue that small companies will not achieve the same results from open innovation as would large companies because they do not have the same capabilities to search, detect and integrate the external knowledge. Furthermore, these entities often lack the capabilities to engage in collaborative networks (Huizingh, 2011).
This lack of resources is reflected in the finding of Spithoven et al. (2013) that large companies engage in more open innovation activities while smaller companies focus more intensely on select sources.

Chesbrough (2010) identifies the following main challenges of SMEs when engaging in open innovation; (1) lower absorptive capacity due to the lack of the necessary structure to identify useful external knowledge, (2) lower absorptive capacity in terms of integrating the external knowledge mainly due to the lack of personnel, (3) small ventures are often unattractive partners for others and (4) they are not as proficient in capturing the value of the external information. One important aspect is that if they do not see the direct benefit of the external knowledge, they will most likely not invest resources in these sources (Chesbrough, 2010).

2.1.3. Open innovation in start-ups

While start-ups and SMEs share the liability of smallness, which subjects them to much of the same challenges as SMEs in terms of lack of resources and the consequences this has on the business. Start-ups further also face the liability of newness which further intensifies these challenges (Usman & Vanhaverbeke, 2016).

The survival of new ventures is dependent on the information they can acquire from different sources and how they can use it appropriately (Shepherd, Douglas, & Shanley, 2002). Which is reflected in the importance of interorganizational relationships for the innovation in small companies (Michelino et al., 2017; Parida et al., 2012).

Since in addition to facing the lack of important resources they also lack important reputation which can hinder their interaction with the external environment. This constitutes an important challenge because they need to rely on the external environment to access important resources (D. Soetanto & van Geenhuizen, 2014).

The liability of newness and smallness affect start-ups in areas such as commercialization, networking and the access to important stakeholders and knowledge sources (Eftekhari & Bogers, 2015), which are important factors of success for new ventures.
Hence for start-ups it is necessary to engage in open innovation to overcome the challenges they face in light of their age and their size (Bogers, 2011).

Eftekhari & Bogers (2015) find in their case study that new ventures which engage in open innovation through ecosystem collaboration and user involvement, has a positive influence on the short-term survival of new ventures.

2.2. Innovation Intermediary

A very broad definition of an innovation intermediary is presented by Howells (2006) as “an organization or body that acts as an agent or broker in any aspect of the innovation process between two or more parties” (p. 720). Innovation intermediaries exist in many different forms serving different goals such as knowledge brokers, regional institutions, boundary organizations as well as many other types. One important aspect is that these actors do not only help to connect different entities within the system, but also allow for the creation of new opportunities within a system (Howells, 2006).

Howells (2006) identified five important functions in the literature of innovation intermediaries namely: (1) scanning the information landscape and processing of information, (2) the usage and combination of knowledge, (3) brokering among parties, (4) validation and testing and (5) commercialization.

Companies who look to engage in open innovation can use mediators in order to facilitate the open innovation approach (Lee et al., 2010; Spithoven et al., 2013).

According to (Lee et al., 2010) an intermediary for open innovation should provide the following; (1) an existing network in order to identify important collaborators through research on markets, companies and different technologies, (2) support in the creation of a network for the parties and (3) the management of the network.

Especially for companies which by themselves might not possess the necessary resources in terms of tangible and intangible resources might benefit very much from an intermediary in their open innovation approach. In this case, we consider an incubator to be an important
innovation intermediary for start-ups since it offers important services for their incubatees which might facilitate an open innovation approach.

### 2.3. Incubator

(S. Hackett & Dilts, 2004) define an incubator as “a shared office-space facility that seeks to provide its incubatees with a strategic, value-adding intervention system of monitoring and business assistance” (p.57). The main objective of a business incubator is to support new ventures in their quest for success. Incubators are not only a supplier of office space but rather a network constituted of different parts (S. Hackett & Dilts, 2004). Smilor (1987) argues that an incubator is linking different aspects such as technology, talent, and capital in order to further the commercialization and creation of new companies. Incubators also serve to help a start-up to overcome their liabilities of newness and smallness (D. P. Soetanto & Jack, 2013).

The first incubators were mainly focused on offering office space for different tenants who sometimes enquired about business advice (S. Hackett & Dilts, 2004), however incubators have evolved and are more focused on the provision of important intangible resources related to business support and the development of the company (Patton, Warren, & Bream, 2009).

Smilor (1987) has identified four important benefits which an incubator provides to their incubatees. First, an incubator helps the start-ups to develop credibility, which is an important part of establishing relationships with stakeholders, which is crucial for the survival of a company. Second, an incubator can support the learning of the start-ups. Third, an incubator supports the solving of problems by assisting the company in finding important actors which can help with the solution. Finally, incubators offer to their incubatees access to an entrepreneurial network which can be an important contributor in linking the start-up with the market.

Incubators play an important role as intermediary entities that offer their support to firms in terms of networking in order to access important resources for their success (Bergek & Norrmn, 2008; Peters, Rice, & Sundararajan, 2004). For instance, Hansen, Chesbrough,
Nohria, & Sull (2000) argue in order to support start-ups in the new economy for a new type of incubator, namely the "networked incubator", which allows for the creation of important collaborations between start-ups and other firms. This is achieved by offering their incubatees preferential access to a network of partners and other important external sources (Hansen et al., 2000).

This is in line with Grimaldi & Grandi (2005) who argue for the emergence of new types of incubators which pay more attention to high-value services which have an influence on the learning experience of start-ups, access to competencies, networking, and synergies. For instance, important services are the development of business plans, helping in the building of teams, support the acquisition of capital and other specialized services (Grimaldi & Grandi, 2005).

There exist different types of incubators serving different needs. (Smilor, 1987) identifies four different types namely; (1) the university incubator, (2) the private incubator, (3) the community incubator and (4) the corporate incubator. These models can be sub-grouped into public and private incubator types (Grimaldi & Grandi, 2005). The different types of incubators serve different purposes, for instance, a corporate incubator can serve as an important mechanism for established companies to access innovation. While a public incubator will look to achieve growth in the economy as well as to increase the number of jobs in an industry.

2.3.1. **Incubator as a mediator in an open innovation context**

Business incubation is not only limited to the business incubation process itself but also to a wider environment which relates to an open innovation context (Fernández, Jiménez, & Juan, 2015).

A crucial role of the incubator is to act as a mediator or intermediary for their incubatees by connecting them with relevant actors from the ecosystem (Peters et al., 2004). An incubator should support the networking needs of their clients through the development of internal as well as external networks (Bøllingtoft & Ulhøi, 2005). Network support is becoming increasingly important for the incubation process (Bøllingtoft & Ulhøi, 2005; S. M. Hackett & Dilts, 2008). These networks are important for start-ups to access resources, as well as they
can help to further important capabilities of the new ventures (Hughes, Ireland, & Morgan, 2007; Lin, Li, & Chen, 2006).

The reach of these networks also differs in light of the incubator, for instance, the networks can be related to geographical factors (e.g., national/regional) or the network could be specific to an industry (Bergek & Norrman, 2008).

Business incubation has more success in an open innovation context because of the interrelation between actors of the environment and the interorganizational relationships inherent to the concept of open innovation (Chesbrough et al., 2006; Fernández et al., 2015).

Through their role as important intermediaries, incubators can play an important role in the open innovation approach of their incubatees, mainly by supporting them with important network resources (Hansen et al., 2000; D. P. Soetanto & Jack, 2013). Especially for environments of collaboration and co-creation, incubators can be an important source for innovation in light of an open innovation context, characterised by interorganisational relationships (Chesbrough et al., 2006; Fernández et al., 2015).

### 2.4. Summary of the theoretical discussion

Based on the theoretical discussion above, several important concepts have arisen, which will serve as an important part for the analysis as well as the discussion. First, it is important to understand the reasons why the companies engage in open innovation since it will reflect on the practices and the processes which the companies choose (Spithoven et al., 2013).

Since new ventures face challenges due to their newness and smallness, it is argued that an open innovation approach can help them overcome these challenges (Bogers, 2011).

Furthermore, it is important to consider that open innovation is a process as illustrated by (West & Bogers, 2014), and hence it is important to consider how this process materializes in the companies who engage in open innovation and the role the competencies play, such as the absorptive capacity (Gassmann & Enkel, 2004).

The incubator plays an important role in helping the start-ups overcoming the challenges of newness and smallness (D. P. Soetanto & Jack, 2013). Due to the increased focus of the
incubators on important intangible resources such as the network (Grimaldi & Grandi, 2005; Hansen et al., 2000), the incubator takes on an important role as innovation intermediary (Peters et al., 2004) which can support the open approach of their incubatees.
3. Methodology

This chapter will describe the methodological approach which has been employed in order to answer the research question. Here the approach of Saunders et al. (2009) will be followed. First, the philosophical perspective of the research will be described and justified. Second, the research design, as well as the choice of method will be justified. Thirdly, the choice of data collection methods, as well as sampling, will be discussed. Finally, potential limitations and potential biases will be assessed in light of this thesis. Hence this part will partly go through the research onion as depicted in Figure 3.1.

Figure 3.1: The research onion

![Research Onion Diagram](figure.png)

Source: (Saunders et al., 2009) (p.108)

3.1. Research philosophy

When considering the research onion it is first important to be clear about the research philosophy since this choice will influence the choice of the research strategy as well as the methods which are chosen (Saunders et al., 2009).
In management research there exist four types of research philosophies; (1) positivism, (2) realism, (3) interpretivism and (4) pragmatism. Each of these approaches makes assumptions about the ontology (the view on the nature of reality), epistemology (the view on what constitutes knowledge) and axiology (the view on the role of the values in the research).

In order to better understand the philosophical approach taken by this thesis, we will contrast the positivist and the interpretivist philosophy. Positivism is close to a natural science approach where the goal of the research “is to test theories and to provide material for the development of laws” (Bryman & Bell, 2011) (p.15). The researcher views reality as being objective and independent of social actors. The focus of this approach is put on causal relationships between variables and the creation of generalisations through the reduction of the evidence. Data collection in this case usually happens through a quantitative approach making use of a large sample and should preferably not be influenced by the values of the researcher (Saunders et al., 2009).

The interpretivist philosophy, which is the philosophy this thesis associates with, argues that the world of business is surrounded by too much complexity in order to reduce it to generalisations and create definite conclusions (Saunders et al., 2009) and hence will favour a different approach to business research. The interpretivist approach views reality as being socially constructed and that it is subject to changes. The interpretivist approach is subjective and puts more focus on the situation at hand through the elaboration of details and meanings. For this approach small samples with in-depth investigations is the most used data collection method (Saunders et al., 2009).

3.2. Research strategy & approach

The research purpose can either be exploratory, descriptive or explanatory. A study is not necessarily limited to one purpose and can serve several purposes (Saunders et al., 2009).

Exploratory studies aim to gain new insights and to examine a phenomenon from a new perspective (Saunders et al., 2009). This type of study helps to further the understanding of a problem and is often employed when there is little evidence or documentation about the
problem (Saunders et al., 2009). Hence the investigator perceives this to be the best approach in light of the chosen research question. One reason for this is that exploratory research has certain flexibility to it and will allow for the emergence of new insights and the adaptation of the research (Saunders et al., 2009).

In this research, the fact that open innovation in start-ups is a relatively under-researched phenomenon justifies a more exploratory approach in order to further the understanding of the phenomenon.

Two of the main ways of conducting exploratory research is through a thorough search of the literature as well as interviewing people with expertise within the subject which both are done in this research with the aim of answering the research question (Saunders et al., 2009).

In terms of research approach, it can either be qualitative, quantitative or a combination of both. For the purpose of the thesis, a qualitative approach has been chosen in light of the exploratory nature of the research.

Considering the research strategy a case study has been chosen by interviewing start-ups as well as the incubator management. The case study is a suited approach in order to gain a deeper understanding of the context and the research (Saunders et al., 2009), which is the purpose of this thesis.

Furthermore, several cases are studied, making it a multiple case study, which allows to apply the “replication logic” as stated by Yin (2002), where the findings are replicated in another case in order to check for robustness of the findings. This helps to analyse the phenomenon from different lenses and to not generalise initial ideas (Eisenhardt, 1989).

Yin (2002) identifies the following relevant situations for a case study:

1. Research question containing “How?” or “Why?”
2. No control over behavioural events as opposed to an experiment
3. Focus on contemporary events
3.3. Data collection and analysis

The data collection has followed mainly a deductive approach where the theory has served as an important guideline for the data collection and analysis (Yin, 2002). However, there has also been induction through the exploration of interesting concepts which have emerged during the data collection process. This can be described as an opportunistic approach to data collection which allows the investigator to take into considerations potential new interesting themes (Eisenhardt, 1989).

The primary data collection took place from February 2019 to April 2019. Several sources have served as means to get a better understanding of the phenomenon. Primary data has been gathered through the use of semi-structured interviews. Secondary data from different internet sources as well as publications of the interviewed companies have been viewed and analysed. One important benefit of using multiple sources is what Yin (2002) calls triangulation which can be done through data collection or investigator triangulation. The main benefit of triangulation is that the case study is supported by multiple sources and is not solely relying on one source of evidence (Yin, 2002).

The choice of the semi-structured interview approach is in line with the exploratory approach of the thesis according to Saunders et al. (2009). In the interview guide, some general topics, as well as general questions, were used. However, the interview process still had some flexibility. Depending on the interview the guide was followed either more stringent or less stringent. The flexibility has allowed the investigator to further explore interesting points which were not present in the interview guide.

Before the interview a case study report was constructed as advised by Yin (2002), this case study report highlights the most important information which should be extracted by the data collection.

The interviews were between 30-60 minutes. All the interviews, except for one, were recorded which has allowed to pay closer attention to the listening process. The following day the interviews were transcribed. The transcripts each have a length of 6-10 pages depending on the interviews.
Selection criteria

The selection of the cases has not been random but rather selected in light of their usefulness. The reason for this is because the cases are considered theoretically useful and can help to contribute to the reinforcement or contribute to the understanding of theory (Eisenhardt, 1989). During the data collection period, 11 incubator programs have been contacted as well as several start-ups independently. The cases were selected in light of the concept of open innovation, hence a focus was put on cases which view the network and the interaction with the external environment as important factors of their incubation program or other indications relating to open innovation.

For those who were willing a preliminary interview was conducted in order to better understand their organization. It was decided to focus on start-ups within the chosen incubators. The selection of the start-ups was made through the help of the incubators which after a preliminary interview recommended different start-ups which due to their business model as well as the progression during the incubation period were relevant cases for the research questions as well as propositions discussed during the preliminary interview.

The interview partners were all either CEO and/or part of the founding team of the subsequent start-ups.

Below is a table with the different interview partners and the type of interview.

Table 3.2: Interview partners

<table>
<thead>
<tr>
<th>Interview Partner</th>
<th>Type: Interview Partner</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mads Tingsgård</td>
<td>Head of FinTech intelligence at Copenhagen Fintech</td>
<td>In-person</td>
</tr>
<tr>
<td>Charlotte Rønje</td>
<td>Founder of JamiiPay</td>
<td>Skype</td>
</tr>
<tr>
<td>Henrik Boensvang</td>
<td>Founder of Clareply</td>
<td>In-person</td>
</tr>
<tr>
<td>Sofia Mayans</td>
<td>Founder of Inficure</td>
<td>Skype</td>
</tr>
</tbody>
</table>
3.4. Quality of research

Yin (2002) has identified four concepts which can be used for the evaluation of empirical research such as a case study; construct validity, internal validity, external validity, and reliability. These will shortly be discussed in light of this thesis.

3.4.1. Construct validity

One of the criticisms of case studies is the subjectivism which underlies the data collection (Yin, 2002). It relates to the question if a measure which has emerged is an accurate reflection of the concept it should be describing (Bryman & Bell, 2011). Hence, construct validity aims at reducing the subjectivity during the data collection, in this study construct validity is achieved through interviewing several cases, as well as also interviewing the incubator management. Since the use of multiple sources of evidence can be used to increase the construct validity (Yin, 2002).

3.4.2. Internal validity

Internal validity is concerned with the causality of the research and is important for explanatory studies, here it is important to be clear if one event x leads to an event y (Yin, 2002). Since this research is more of an exploratory research in terms of how start-ups engage in open innovation as well as how an incubator can support this process the internal validity is not of great importance, as it would be for an explanatory study.

3.4.3. External validity

External validity refers to the idea if the results of the case study can serve as generalisation beyond the case study, and how the results of this case can compare to similar contexts (Yin, 2002). This aspect of the validity of case studies has attracted most discussions (Bryman & Bell, 2011). As opposed to quantitative research which can lead to statistical generalisations, the generalisations in case studies are based on analytical generalisation (Yin, 2002). In this
case this relates to if the open innovation behaviour of the start-ups, as well as the support of the incubator, can be applied to another incubator and start-ups. Since the research has only covered a small number of companies, it would be wrong to draw conclusions for an entire population.

3.4.4. Reliability
The extent to which a case study can be repeated and generate the same results is referred to as reliability. Which means if a future study following the same research approach and strategy could generate the same findings (Yin, 2002). One important aspect for the replication of the case is documentation of the procedures followed which have led to the results (Yin, 2002). In light of this while a case study protocol and interview guide were developed to better understand how the results were obtained it might still be difficult to produce the same results.
4. Case studies

This section will give a case description of the different organizations. An overview of the two incubators will be given as well as a short case description of the start-ups. This will help the understanding of the different contexts this case study has taken place in.

4.1. Copenhagen FinTech

Copenhagen FinTech is a public organization, which is bringing together important stakeholders in the Financial Technology (FinTech) industry. This has led them to create an ecosystem where they connect and combine the ideas of the entrepreneurs, the financial institutions, the public sector as well as the universities (Copenhagen Fintech, 2019).

FinTech can be defined as the innovations driven by the use of new technology and the use of novel business models within the financial services (Dhar & Stein, 2016). Often behind these innovations are new ventures creating new solutions in different sections of the financial industry such as Kickstarter for funding or Transferwise in the money transfer segment (Chishti & Barberis, 2016).

The main goal of Copenhagen FinTech is to create jobs within the FinTech industry in Denmark. The idea came along when their CEO visited San Francisco and saw that they had different hubs for different sectors. When he came back to Denmark and proposed the idea to the responsible Danish Authorities, the idea materialized into the creation of Copenhagen FinTech (M. Tingsgård, March 2019).

This has evolved into the vision of developing Copenhagen as one of the leading Fintech Hubs in the financial service industry by lending important support to the different innovators within the ecosystem (Copenhagen Fintech, 2019).

Apart from connecting the different stakeholders in the Danish FinTech industry they also offer support for start-ups which can either be co-working spaces or different programs, in order to further support the growth of new ventures within this sector. Among those programs are the following; early stage, nordic fast track, an accelerator program, and a global scale-up program. Below the early stage program will be described as well as a quick introduction to their co-working space.
1. The Fintech Lab
This is a co-working space which is solely envisioned for FinTech start-ups and entrepreneurs, where the tenants can choose between different memberships depending on their needs. Every member gets access to their events as well as business opportunities (Copenhagen FinTech Lab, 2019).

2. Early-Stage
This is a 3-month program where they help the companies to go from the ideation stage to commercialization phase by ensuring that when they finish the program, they at least have a minimum viable product (MVP) and a paying customer (M. Tingsgård, March 2019). During this program, they participate in 4 co-designed workshops covering different topics from pitching to sales consultation. They assist in weekly coaching meetings where they can discuss their challenges as well as successes they have experienced (M. Tingsgård, March 2019).

They also get access to the Connect programs which are companies/experts in different domains who offer free advice for the start-ups. The different connect programs are catered to the following aspects: law, human resources, and audit and advisory. They also get access to a mentor which are 30 senior industry experts mostly within corporate large companies but also some entrepreneurs (M. Tingsgård, March 2019).

The incubation program has run two times with the first round constituted of four companies and the second round constituted of five companies (Copenhagen FinTech Lab, 2019). However, for the coming cycle, they have chosen to only focus on two start-ups in order to better be able to provide specific services to the start-ups (M. Tingsgård, March 2019).

They furthermore get a free seat in the Copenhagen Fintech Lab where they join 50 other start-ups. At the end of the process, they can pitch their idea to selected partners as well as venture capitalists.
The following two case companies were analysed in this early stage incubation program.

4.1.1. **Jamiipay**

*Founded: August 2018*

Number of employees: 4 full-time employees and 2 part-time employees

Jamiipay has developed a product to further the financial inclusion of unbanked communities in Africa. Through their product, they help the unbanked communities to access loans from financial institutions. They are able to create alternative credit rating based on information and data which is collected in these communities, which then facilitates the access to loans.

Charlotte the founder joined the incubation program only with the idea after having participated in a competition (Finclusion) organised by the incubator. During the incubation process they have been able to build a prototype and test it in Ghana in April 2019. Throughout this process JamiiPay has interacted with their customers in the communities to better understand them and their needs and how the product can be adopted accordingly. Furthermore, they have collaborated with NGOs in the geographical locations to better understand and get access to their customers.

4.1.2. **Clareply**

*Founded: November 2017*

Number of employees: 3

The three founders joined the incubation with a platform that helps the onboarding process of new clients for law firms. This process aims at making the onboarding of clients more efficient and to ensure that this is in accordance with anti-money laundering (AML) directives. However, they have also expanded their offering to other customers such as accountants.

To develop their solution, they have collaborated with different law firms as well as with the end-customers, who are the people who will use the onboarding service. Furthermore, they have also collaborated with a consultancy group on a research project on how human
behaviour influences the onboarding process. All of these have played an important role in the development of their company.

4.2. Umeå Biotech Incubator

The Umeå Biotech incubator is an organization established by Professor Tor Ny of the Umeå university because he thought that the innovation support at the time was not adapted to the needs of the life science industry (Ekbeck, 2019a). The life science industry is challenging because of the business models, the regulation and the IP protection which require much attention (J. Ekbeck, April 2019). While in the beginning, it was a combined incubator for the entire university the choice was made to create a separate incubator for the life science industry because of the complexity surrounding this sector.

They offer their start-up's important resources in terms of office and laboratory space and knowledge in different areas in order to help entrepreneurs test, verify and develop their business to the point where they attract external investors (UBI, 2019). Through their structured incubation process with clearly defined milestones, they want to achieve the goal of further developing the Scandinavian life science industry and contributing to local as well as national growth (UBI, 2019).

Since the inception in 2004, the incubator has offered their services to more than 23 companies, which have displayed much success in attracting funding from different financiers. A measure of success is that 90% of their companies are able to secure funding (UBI, 2019).

They do not take any stake in the companies and the financing they offer their companies is based on the contributions of their financiers and partners. Among their partners are important foundations such as the Erling-Persson Family Foundation, Vinnova which is an agency of the Swedish government funding research and development, and also the Umeå University (UBI, 2019).

The financing helps to support the venture in the early stages and allows them to engage in the necessary activities to further develop their company.
Their incubation process is divided into six steps; (1) Evaluate, (2) Preincubate, (3) Verify 1, (4) Verify 2, (5) Finance and (6) Growth. In the Figure 4.1 the different offerings for each of the phases are described.

Figure 4.1: The different phases of the Umeå Biotech incubator

<table>
<thead>
<tr>
<th>Evaluate</th>
<th>Preincubate</th>
<th>Verify 1</th>
<th>Verify 2</th>
<th>Finance</th>
<th>Grow</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identify the feasibility and robustness of the idea</td>
<td>• Facilities in terms of office space and laboratory space</td>
<td>• Business administration support</td>
<td>• Preparation for the meeting of investors</td>
<td>• Access to a network of investors in the life science industry</td>
<td>• Assistance with HR</td>
</tr>
<tr>
<td>• Consultancy with experts</td>
<td>• Access to network contacts</td>
<td>• Approval of the business accompanied by an action plan and financed budget</td>
<td>• HR support</td>
<td>• Coaching in the sales process</td>
<td>• Coaching in the sales process</td>
</tr>
<tr>
<td></td>
<td>• Market analysis and customer need verification</td>
<td>• Connection of the case with an external partner</td>
<td>• Partner meetings</td>
<td>• Professional mentoring for the CEO</td>
<td></td>
</tr>
</tbody>
</table>

Own illustration based on information of (UBI, 2019)

This step by step approach ensures that necessary processes can be chosen in light of the needs of the different companies. Furthermore, it is also important to verify the concepts with investors and large companies to ensure the credibility and the attractiveness of the new ventures (Ekbeck, 2019a).

Due to the lack of an existing life science industry in Umeå, they have constructed international as well as national networks of opinion leaders, experts, large companies and investors around the life science industry in Umeå (Ekbeck, 2019a)

In terms of events, they host among others, the “Meet Umeå Life Science” and the “Biotech Umeå Investment Day”. In the first important stakeholders of the industry come together to exchange ideas and inquire about possible collaborations, hence this is a networking event where the start-ups can expand their network. The latter is an event where the start-ups engage in 20-minute meetings with investors (UBI, 2019).

The two start-ups which are part of the case study are the following:
4.2.1. **Lipum**

Founded: 2010

Number of employees: 4

Lipum has developed an antibody for the treatment of chronic inflammatory diseases. Currently, the company is in the preclinical stage of their drug development meaning that they have not yet tested their drug on humans. In the development of the drug they have collaborated on a joint research project with the Science for Life Lab (SciLifeLab) and collaborated with the university.

Furthermore, they also actively publish research papers to further the interest surrounding their molecule and hope to create fruitful collaborations through this approach.

4.2.2. **Inicure**

Founded: 2013

Number of employees: 4

They offer a drug validation service for pharmaceutical companies based on a mouse model. Currently they are on the market with their first model and generate some revenue. However, they are still in the development of other indications in this model. They collaborate with their customers, which are different type of pharmaceutical companies ranging from start-ups to bigger companies. Furthermore, they have collaborations with other companies who offer them important services.
5. Analysis

The analysis of this thesis is based on important concepts which have been derived from the theoretical framework as well as from the empirical data collection, through a categorization process. In a first instance, the concept of open innovation will be analysed to further the understanding of how open innovation materializes in start-ups. Then the importance of the incubator for an open approach will be elaborated on. In the next chapter, a discussion of the main findings will follow and be compared to the existing literature.

5.1. Open innovation in start-ups

5.1.1. Open innovation a natural part of a start-up
All the start-ups in this sample have engaged in open innovation to a certain extent. There seems to be an agreement among the case studies that an open innovation approach is natural or even necessary because of the lack of resources which they face.

“The start-up has scarcity in almost any sense and that hones how you attack the problem” (H. Boensvang, March 2019)

5.1.2. The reasons and benefits of open innovation in start-ups
Open innovation is considered as a mean to get access to resources for small ventures, which they do not possess internally or are in the position to acquire themselves. All the start-ups agreed that the lack of resources is one of the challenges of being a start-up, notably the financial part.

“It is always about the money. Of course, I would prefer to have more money and then we can do the development faster” (S. Mayans, April 2019)

Open innovation can, in this case, serve as a way to access important resources, whether these are tangible or intangible. The following are some of the main reasons and the benefits that come along with an open innovation approach which have emerged in this study.

Access to tangible resources
One important aspect is the access to tangible resources which they do not possess themselves. Three of the interviewees view the access of tangible resources as an important motivation and benefit to engage in open innovation. For instance, in the case of Lipum it has helped them significantly reduce the cost and the effort needed in the development of their drug.

“To get all these resources either you have to buy these services along the road from a commercial provider and then you need to involve a number of providers or you went along this line, through an academic collaboration with the SciLifeLab” (E. Pontén, April 2019)

A start-up can also need resources which are important for the development of the product and can only be accessed by collaborations because other companies hold these resources, as in the case of Clareply.

“We had them write a letter of intent where we get to know their processes and computer systems” (H. Boensvang, March 2019)

**Access to intangible resources**

Access to external knowledge has been an important reason for three of the start-ups. They realize the importance of the knowledge external sources can hold. For instance, in the cases of Clareply and JamiiPay the knowledge their customers hold, is a crucial resource for the development of their product.

“It is the most important part of the development of our product and it will also continue to be, we are a very customer-centric company and we have to be otherwise we will fail” (C. Rønje, March 2019)

Another aspect is that external sources can hold important expertise in domains, in which the start-ups themselves might not possess the necessary knowledge. This, for instance, is reflected in the case of Lipum, where their researchers come from a different field, then the one their current product is in. Their research collaboration has helped them to access important knowledge in the subsequent field (E. Pontén, April 2019).
Market validation

It has emerged that by engaging with the open environment this can serve as market validation, by understanding the needs of the market and actually test the product. Notably, two start-ups view this as an important benefit of an open approach.

“We have collaborated with several NGOs the purpose of this collaboration has been accessing customers, business validation and testing, and of course getting their input because they’re also sort of our customers and partners” (C. Rønje, March 2019)

Reputation and credibility

Since start-ups are young organizations, they lack the track record which gives them credibility and reputation. All of the start-ups find that the gain of credibility is an important benefit of an open approach. This allows them to interact with the external environment and in the process build their reputation.

“It has further given credibility it is kind of this conservative branch of lawyer firms so if you take one of the bigger the other will follow, and we have interacted with one of the biggest law firms, and now we have expanded our collaborations” (H. Boensvang, March 2019)

Furthermore, the credibility gained through collaborations or other open innovation practices can further the market entry potential of the product. This gives the new ventures reputation which can serve as an important signal in the reduction of risk for external partners when interacting with a start-up.

“This partnership reflects well on the quality and potential of the model we have developed. Prospective partners often ask about who else we are working with. We are very proud to be able to now advise that we are working with one of the world’s leading biotech companies” (Mayans, 2018)
5.1.3. **Open innovation practices**

Among the start-ups interviewed the most common practices have been the use of customer interaction, networking as well as the use of collaboration with different sources. In the table 5.1 below the main practices which have emerged through this case study will be presented. While the inbound and coupled process are the predominant practices, the two life science start-ups also have engaged in outbound open innovation through the publishing of research papers.

Table 5.1 Open innovation practices in the start-ups analysed

<table>
<thead>
<tr>
<th>Company</th>
<th>Clareply</th>
<th>JamiiPay</th>
<th>Inficure</th>
<th>Lipum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>FinTech</td>
<td>FinTech</td>
<td>Life science</td>
<td>Life science</td>
</tr>
<tr>
<td>Stage</td>
<td>Validation</td>
<td>Validation</td>
<td>Product development</td>
<td>Product development</td>
</tr>
<tr>
<td>Main reason</td>
<td>Access to systems and processes and information on customers</td>
<td>Access to customers, and customer information</td>
<td>Access to expertise and knowledge</td>
<td>Access to important knowledge and resources</td>
</tr>
<tr>
<td>Practices</td>
<td>Collaboration with law firms, customer interaction, technology sourcing and networking</td>
<td>Collaboration with NGOs, Customer interaction, Technology sourcing and networking</td>
<td>Collaboration with service providers, customer interaction, publishing of research papers and networking</td>
<td>Research collaboration, publishing of research papers and networking</td>
</tr>
<tr>
<td>Sources</td>
<td>Law firms, customers, consultants, IBM</td>
<td>NGOs, customers, IBM</td>
<td>Service providers, customers</td>
<td>Research organization, university</td>
</tr>
</tbody>
</table>

5.1.4. **The process of open innovation**

**Selection of the partner**

In many of the cases for their collaborative efforts, an intermediary has played a role in the process of searching and/or connecting the start-ups with important partners. Different types of intermediary organizations have played a role, among these the incubator.

**Competition or hackathon**

For instance, JamiiPay and Clareply entered into contact with their partners or important contacts through participation in a competition or hackathon. This has allowed them to partake in an event which gathers stakeholders around a common topic.
“It was through Copenhagen Fintech, at least some of it because they had put up a competition with the subject of financial inclusion (...) one of the ladies she really liked us and she became an advisory board member and introduced us to several NGOs” (C. Rønje, March 2019)

Incubator

In three of the cases, the incubator has been of assistance when entering into contact with the partner. For instance, through a partnership between Copenhagen Fintech with IBM, the two start-ups in the Copenhagen Fintech incubator have also entered into partnerships with IBM (Rasmussen, 2019). In another case, the incubator has played an important role in the identification of important opportunities and pushed the company to make an application for a research collaboration.

“What the incubator has done that has been very good is that they have been coaching the three founders through different steps and pushed them to make applications” (E. Pontén, April 2019)

Integration of the knowledge

In terms of integration of the knowledge, start-ups seem to be aware of the challenges of integrating the information collected. This is mainly observed in the case where information has been collected from the customers, in the case of JamiiPay and Clareply.

“Integration of the information can be complicated, but we have prioritised the customer experience, so we have a full-time UX (User Experience) designer with 15 years’ experience” (C. Rønje, March 2019)

Furthermore, by being smaller entities the use of the information can be achieved more directly because the communication flow is easier. This is an aspect all except for one interviewee explicitly see as an advantage of being a small company. Once the company starts to grow, they also recognize the need for more structure and specialization.

“It was just easier when we were having one developer because he had it all in his head and he could just program and now we have another developer so we need
documentation and a system so that they can actually work on it together” (H. Boensvang, March 2019)

Use of the knowledge

In two of the cases, we can see that in order to use and verify their knowledge they go out and test it with the external environment. Notably, this is the case for the information gathered about their customers and this testing approach is clearly employed by JamiiPay and Clareply. This further highlights the flexibility of the start-ups in regard to the use of the knowledge.

“One thing is talking, and another thing is actually testing the product which we are doing now and being completely open to understanding that this is 20% wrong or 80% wrong. And when it is 80% wrong, then we go from there” (C. Rønje, March 2019)

5.1.5. Risks and challenges of open innovation

Risks

While all the interviewees saw some benefits in the open innovation approach, they have different stances on the risk involved with such practices. Notably, the start-ups operating in the life-science industry are more aware of the risk surrounding their IP.

“You don’t want to think about risk because when it is a blockbuster there will directly be copycats” (E. Pontén, April 2019)

While the other two start-ups do not explicitly express the existence of concrete risks or are not aware of the potential risks of opening up their innovation process.

“In terms of risk, I don’t think that there have been any (...) I think when you are inexperienced start-upper there is always something you can lie awake about” (H. Boensvang, March 2019)
Challenges

Different challenges have emerged in the different cases, one challenge which seems to be prevalent is that due to their lack of reputation they are hindered in their interactions with potential sources.

“It is a huge challenge to get them to choose something new (...) that is one of the biggest challenges coming as a no-name company” (S. Mayans, April 2019)

In terms of the challenges, two start-ups explicitly state the challenge of finding relevant partners with whom to collaborate and who to contact within big organizations.

“We have talked with numerous start-up scouts and they haven't been able to find an interesting match as of yet. There is a good amount of luck and persistence that helps to figure out how you are going to find a collaboration” (H. Boensvang, March 2019)

The network is a crucial part to locate important partners and hence start-ups which have a sufficiently developed network will find it easier to identify and enter into contact with the relevant parties.

“It is hard when it is a new area but since we have been in research for a long time, we have a lot of contacts so when it comes to that part there is no problem” (S. Mayans, April 2019)

Another challenge or cost of open innovation is that the process can be time-consuming, which in light of the size of a start-up can be a significant challenge because it can consume much of the attention of a founder or team member. This is notably one of the challenges as observed by one of the start-ups.

“You need to motivate yourself all the time to please the partners or customers, but you also need to persist through all these agonizing problems of knowing whether it is the right thing or the wrong thing” (H. Boensvang, March 2019)

Another aspect is that you need to find reliable partners because you need a certain commitment of your partners.
“But one risk is that for instance if they don't do what they tell us, and all of a sudden, maybe they lose the sectioning, that would be a disaster, so that is a risk we take since we do not do it in-house” (S. Mayans, April 2019)

5.2. The importance of an incubator for the process

It has become clear that open innovation approaches have been undertaken by the different entities considered in this case study. The following part will look at the importance of the incubator in the process.

5.2.1. Main benefits of the incubator

In general, all the cases agree on the importance of the incubator for the development of their company. Among the main reasons to join the incubator are the access to tangible resources such as office space but also intangible resources such as the network or the access to business coaching.

“The main reason is being a start-up resources are scarce so free office and access to the network are very valuable” (H. Boensvang, March 2019)

Services and workshops

In the case of the Copenhagen FinTech incubator where they offer four different workshops to their clients. These are not considered to be very important by the cases who have participated.

“The workshops have been maybe a 4, on a scale from 1 to 10, they are good but not detrimental” (C. Rønje, March 2019)

What has been more important for the cases have been the more specialized services such as the individual business coaching, notably in the case when the entrepreneurs are lacking important business insights.

“Both me and the other founder we just have a background in research, so we have no idea how to commercialize anything” (S. Mayans, April 2019)
5.2.2. **Network**

One important aspect in open innovation is the network which allows the new ventures to enter into contact with important stakeholders and potential partners. In this study, all start-ups agree on the importance of the network of the incubator.

“The network of Copenhagen FinTech is very valuable so that is why we applied”

(C. Rønje, March 2019)

Both incubators expose their start-ups to their network through formalized procedures such as events where the start-ups are able to enter into contact with different important stakeholders such as potential partners or financiers.

However, the start-up itself can also rely on its own network if this one is sufficiently developed for their needs. This is notably the case for Lipum and Inficure, which have existed longer than the other two start-ups.

“we build our own network when it comes to customers and opinion leaders (...) but in the beginning, it was very good because when you come from research you don’t really have the network to do business” (S. Mayans, April 2019)

In regards to the internal network, all the interviewees agreed that it is beneficial in terms of interacting with other people who are in a similar situation. Although much of it is informal and serves mainly to exchange best practices. By being part of an incubation program and notably being in a shared office space allows for interaction between the different start-ups.

Three of the interviewees agree that the internal network is important mainly to exchange on best practices or to share experiences.

“We helped each other at the incubator, and it was nice being part of a class (...)
The cohort became friends and network together” (H. Boensvang, March 2019)

Both incubators organize events to further the internal network. In the case of Umeå Biotech, they host monthly community breakfasts where the start-ups can socialize and share their experiences (UBI, 2019). The Copenhagen Fintech incubator also fosters the internal network through similar initiatives.
“For internal networking, they use their internal communication channel, which is a big thing, where they can share their ideas. Every Friday, they have an event where every start-up can share the news of the last week” (M. Tingsgård, March 2019)

5.2.3. Credibility

One of the challenges of start-ups is that they have not yet established much credibility because they are new to the world, which can hinder their interaction with the external environment.

Three of the participants agree that being part of the incubation program gives them credibility which is an important asset when interacting with their external environment.

“We are located in the incubator and then they know that this is a company that someone has control of” (E. Pontén, April 2019)

However, for the participation to actually increase the reputation and facilitate the interaction with external sources, the incubator needs itself to have a certain reputation among the external environment with which the start-up is interacting.

“Most of our clients are in the US so they couldn't care less about Umeå and the incubator here” (S. Mayans, April 2019)

Furthermore, an incubator can also support the start-up to attract visibility which can further their credibility among the ecosystem surrounding the incubator. For instance, by creating visibility in the news as well as organizing events can allow for the creation of visibility for their clients which has been observed in the cases.

“They also promoted us very much, so we were not only a passive member, but they promoted us in any context. This could be a Linkedin post or through events.” (C. Rønje, March 2019)

One of the main approaches to further the visibility and also further create reputation for their start-ups is through the publications of their achievements in the news.
“We have a great network within the Tech media (...) where we give our start-ups a lot of visibility, which gives them some weight when they want to connect with other potential partners” (M. Tingsgård, March 2019)

5.2.4. The open environment of the incubator

In both incubators, the start-ups are actively encouraged to engage with the external environment as well as with the internal environment. In addition, both incubators look to foster a very collaborative mindset.

“In addition to developing our business support service the project will create opportunities for people to come together and exchange knowledge, experiences and resources. Together we are stronger” (Ekbeck, 2019b)

The open environment is also appreciated by the start-ups, which allows them to look for help and express their ideas.

“It is kind of nice to have an environment where you invite crazy people which are interested in the same thing and there is a safe zone to see if crazy ideas can live” (H. Boensvang, March 2019)

In addition, to further the open environment internally, Copenhagen FinTech also tries to further the openness of the entire ecosystem.

“The workshop for the sponsors and partners it is mostly to teach the larger companies what a good partnership is and how they can build such” (M. Tingsgård, March 2019)
6. Discussion

The following chapter will discuss the findings which have been presented in the analysis section. After this chapter, the concluding chapter will illustrate the main conclusions as well as limitations and further research.

6.1. Open innovation in start-ups

From the case study, it has emerged that start-ups engage in open innovation and that this plays an important role in the development of their company. Van de Vrande et al. (2009) in their study on SMEs purposively exclude start-ups (microenterprises) since they assume that these entities have “no real or identifiable innovation activities” (p.427). However, in this case, this assumption seems to be erroneous as it has clearly emerged that the start-ups in this sample have engaged in open innovation.

However, the reasons for the start-ups differ from the reasons identified in other types of companies, since in the case of start-ups the scarcity seems to be the main motivator. For instance one of the reasons for large companies is to explore trends (Chesbrough & Brunswicker, 2013). For SMEs, their main motivation is to keep up with the market (van de Vrande et al., 2009).

It has emerged that start-ups view open innovation as a natural part of a new venture because of the lack of resources. This is also suggested by Lee et al. (2010), who argue for a natural tendency in smaller companies to engage in open innovation in order to gain access to resources. The start-ups are aware that the lack of resources makes them dependent on the external environment to access these.

It is interesting to note that none of the participants of this case study were familiar with the concept of open innovation. However, the actions and practices taken can be considered to be open innovation practices because of the externalization of internal knowledge and internalization of external knowledge which has taken place in the different instances.
6.1.1. Reasons and benefits of an open approach

This study suggests that through open innovation the start-ups can access important tangible as well as intangible resources and also further their credibility.

In terms of smallness, one of the main arguments for SMEs to engage in open innovation is to access important resources which they do not possess themselves (Lee et al., 2010). Indeed, this is among the motives of the start-ups to engage in open innovation in this case.

In light of the liability of newness, the start-ups see the benefits of increased reputation from an open innovation approach which can help them in their further quest and search for potential partners. This is aligned with the argument that legitimacy is an important asset for the acquisition of further resources (Zimmerman & Zeitz, 2002). Credibility can also be the main motivator for an open approach, as in the case of the life science start-ups where they publish their research in journals in order to gain credibility. However, in general, credibility seems to be more of a by-product and not necessarily the main reason to engage in open innovation.

One disadvantage of smaller companies is that they are not attractive partners according to Chesbrough (2010), the attractiveness can be increased through an open innovation approach as illustrated in this case.

Overall open innovation can serve as an important way to overcome the liability of smallness and newness a start-up faces.

6.1.2. Open innovation practices

In this case study, all of the start-ups have at least to some extent engaged in open innovation. This has materialized through different practices as well as through the use of different sources.

Laursen & Salter (2006) suggest that the number of sources used can reflect on the strategy of the companies, a more open strategy would take into consideration more sources. In terms of the number of sources consulted the two Fintech start-ups, have engaged with more. While Inficure seems to take a more closed approach, and Lipum heavily engages in research collaborations.
In regard to the discussion above, it is further interesting to look at the different business models. As discussed earlier JamiiPay and Clareply engage with more sources and seem to be more open, following the logic of Laursen & Salter, (2006).

One important aspect of the business model as according to Osterwalder & Pigneur (2010) are the key resources. For JamiiPay and Clareply among their key resources is the collaboration they have with their customers. While for the two life science start-ups their main key resource is the drug or the model which they have developed. Hence, if the resources of an external partner are among the key resources, it seems to be evident that this will result in a more open approach, as is observed.

It is interesting to note that most of the practices are either inbound or coupled processes. Since many of the start-ups are still in a validation or development phase it, however, seems to be normal that they engage more in explorative (inbound & coupled) open innovation practices, since such practices further the exploration of the innovation (Gassmann, 2006; van de Vrande et al., 2009). The only exception is the revealing (outbound practice) in the case of the life science start-ups, but this is a normal aspect of the life science industry, where the publications help to accord credibility to the product. The predominance of the inbound practices has also been noted in other studies covering SMEs as well as large companies (Chesbrough & Brunswicker, 2013; van de Vrande et al., 2009).

Furthermore, the majority of the practices have been non-pecuniary, this is in line with the argumentation of Brunswicker & Vanhaverbeke (2015) that small ventures prefer non-pecuniary practices. Since start-ups are characterised by the lack of resources, they might be reluctant to invest into pecuniary open innovation approaches, notably because of the uncertainty of the potential returns, which is also argued by Chesbrough (2010).

### 6.1.3. The process of open innovation

**Selection of the partner**

The findings of this case study show that in much of the collaborative efforts undertaken by the start-ups there has been an intermediary organization involved in the process of connecting important entities. Lee et al. (2010) also, argue for the importance of an intermediary for the open innovation approach of small ventures.
One argument of the literature is that due to their lack of resources, mainly in terms of personnel, small ventures will not be able to scan the environment as successfully as larger entities would (Spithoven et al., 2013). However, while the lack of resources is a constraint for start-ups, the main barrier in this case study is related to the newness of the firm which affects their reputation in the market.

Due to their lack of credibility, the start-ups find it challenging to engage with prospective partners and here an intermediary can play an important role, which is also identified to be one of the benefits of being part of an incubation program.

While Chesbrough (2010) suggests that smaller companies lack important absorptive capacity in identifying relevant external knowledge. This study suggests that the start-ups mainly face challenges in the acquisition of knowledge because of their liability of newness and not necessarily in the identification of such.

**Integration of the knowledge**

Furthermore, the literature also suggests that small companies do not possess the necessary absorptive capacity to integrate the knowledge because of their size (Chesbrough, 2010; Lichtenthaler & Lichtenthaler, 2009).

However, this study suggests that their small size is a relative advantage. As opposed to hindering them there is an agreement among the start-ups that through their size, they are able to better use the information and adapt their business accordingly. Mainly because of the lack of much structure, which facilitates communication. This brings along a certain flexibility which seems to play an important role for the integration of the knowledge. Hence this finding is more aligned with the suggestions of Parida et al. (2012) who argue that small companies have benefits in light of their size, because of the simplicity in regards to their processes and the adaptability of their business.

The integration of knowledge mainly seems to play an important role in the inbound practices such as customer involvement in the case of Clareply and JamiiPay. Gassmann & Enkel (2004) also suggest that the absorptive capacity is important for the inbound innovation practices. Since in such cases the information still needs to be transformed. As
argued by Winter (1983) the information obtained by the external environment is often fragmented and hence this information still needs to be assimilated correctly.

The approach to integrate and use the knowledge in the case of Clareply and JamiiPay is also marked by the flexibility as well as the capability to quickly adapt to market needs. This is done through testing the changes made for the product/service with their customers to see if they got it right, this is closely related to the concept of the lean start-up approach developed by Ries (2011). The lean start-up approach consists of building hypothesis and then exploring these with the external environment and learn from the feedback (Ries, 2011).

While the literature suggests different effects of the size of a company on the absorptive capacity, some who argue for advantages, Parida et al. (2012), and those who argue for disadvantages, Lichtenthaler & Lichtenthaler (2009) among others. This study suggests that in terms of the acquisition part of the knowledge the start-ups are mainly challenged by their lack of reputation. While however for the integration of the knowledge at least in the two cases discussed above, their size and the flexibility which comes along, has facilitated the use and integration of the knowledge.

However, there is also an agreement that when they grow more structure will be needed which can inhibit the flexibility they benefit from now. Suggesting there is a certain threshold where they will need to invest in more structure and specialization, which will lead to a reduction in flexibility.

6.1.4. Risks and challenges of open innovation

In terms of risk, this study finds different stances on the overall perception of risk in an open approach. It is important to note that there only have been perceived risks and that none of the start-ups have suffered negative consequences from their open approach, which is the same as Lichtenthaler (2011) finds in his study on risks in open innovation.

The two start-ups who were more concerned about the risk were the two life science start-ups. These operate in an industry where IP protection is a crucial part.
While the IP plays an important role in the life science industry, the companies involved in
the financial services view their competitive advantage as something which might be more
difficult to copy and hence tend to take a more open approach as one interviewee of a
FinTech start-up puts it; “just because I tell you that the most important aspect of my
company is being customer-centric (...) I don't think the next day you can go out and make my
company”.

As opposed to the reasons and benefits discussed above it seems that there is no clear
agreement on the risk when engaging in open innovation. Several factors which can influence
this could be the nature of the product, the view on the competitive advantage, the business
model and the importance of IP.

6.2. The importance of the incubator

By definition, the concept of open innovation is related to the establishment of relationships
with other stakeholders (Chesbrough et al., 2006) and hence the network is a crucial aspect
for an open approach. The shift of the incubator to a “networked incubator” as argued by
Hansen et al. (2000) further closely relates to the concept of open innovation, through the
idea that the incubator acts as a boundary spanner connecting important entities, allowing
for collaborations.

6.2.1. The network of the incubator

Networking is an important aspect of both incubators. They have both constructed a network
surrounding their respective industry acting as a boundary spanner connecting many
important stakeholders (e.g. partners, financiers, universities, etc...). Fernández et al. (2015)
advance the argument that the specialization of the network is important to help the start-
ups. Indeed, this is observed as both incubators see a benefit in their network specialization.

Bøllingtoft & Ulhøi (2005) suggest that it is relevant to take into consideration the internal as
well as the external network.

While there is a general agreement on the importance of the network among the case
studies. This study finds that the external network is more valuable for newer ventures
because they are more affected by the challenge of newness. In light of this, the network provided by the incubator is an important aspect which allows them to overcome their own deficiency and interact with different stakeholders. Interactions with other entities and persons provided by the incubator is an important aspect of further building the social capital of new ventures (Hughes et al., 2007).

Lee et al. (2010) argue one important aspect of an intermediary organization is to provide and help the start-ups to construct their own network. This is the case in the two incubators where they offer for instance events which allow the ventures to enter into contact with important stakeholders such as potential partners or financiers.

In light of open innovation, the network has a twofold importance. On the one hand the external network can help to enter into contact with potential partners, but on the other hand the building up of the relational capabilities through the interaction with other stakeholders can also influence their future success in entering into collaborations, since the relational capabilities are important for the creation and maintaining of relationships (Gassmann & Enkel, 2004).

Further Bøllingtoft & Ulhøi (2005) argue that the incubator should also develop the internal network which can help to create collaborations (Hansen et al., 2000). While the internal network has played an important role for the start-ups this has mainly been for the exchange of best practices, and the sharing of entrepreneurial experiences. There have been no collaborations which have materialized in the case study. Except for one case where JamiiPay joined forces with another microfinance company to go on a trip to Africa to collect important information about their customers. Hence this finding is more aligned with Pettersen, Aarstad, Høvig, & Tobiassen (2015) who suggest that the main benefit of the internal network is the sharing of entrepreneurial experiences.

### 6.2.2. Credibility

Smilor (1987) discusses the importance of the credibility an incubator can give to its clients. In regards to open innovation in start-ups, credibility is an important asset, and the lack thereof is one of the challenges of start-ups in open innovation as shown by this study. The credibility accorded by the incubator is considered to be an important signal for the external
environment and the start-ups in this case study have to some extent benefited from this credibility when engaging with the external sources.

However, this study also highlights that it is important for the incubator to have credibility among the stakeholders with whom the start-ups want to interact. Here it could be advantageous to focus on a specific industry.

One way both incubators look to further the credibility and visibility of their start-ups is to promote them in the news as well as expose them through different events. The creation of interest for the start-ups is argued to be an important role by Lundberg (2013) for organizations acting as boundary spanners.

6.2.3. The open environment of the incubator
One important aspect for the survival of new ventures is the access to important information according to Shepherd et al. (2002), and hence the acquisition of such information is crucial. An open environment such as provided by the incubators can further support this acquisition by bringing together important parties and allowing for the sharing of knowledge.

Since both incubators provide coaches, consultants in different areas, a partner network and an internal network, this expands the breadth of the knowledge pool in which the start-ups can search. The exchange of knowledge and expertise is also an important aspect highlighted by Eftekhari & Bogers (2015) for an open environment.

Furthermore, an important aspect is that both incubators actively encourage their start-ups to engage with the external environment, notably when it comes to testing their offering with their customers.

This is mainly done by creating an environment where the start-ups feel comfortable to share and to look for solutions within the network of the incubator. As one interviewee put it; “the main takeaway was that it is okay to ask for help, and to just call up a person and ask them”

6.2.4. Incubator as an open innovation intermediary
The definition of Howells (2006) of an innovation intermediary is a very broad one, allowing for much room for interpretation. In this case study, it has emerged that an incubator takes on the following important roles of an innovation intermediary as argued by (Howells, 2006).
(1) Scanning and processing external information, in this case, this materializes because both incubators through the construction of a network surrounding their respective industry need to be aware of important partners in the external environment. This also helps them in the (2) combination of the knowledge, which is another role of an intermediary (Howells, 2006). Since they have a good understanding of the need of their start-ups and have information on other stakeholders, incubators are in an important position to combine knowledge and create opportunities. Finally, (3) brokering among parties is another role an intermediary can play. In the incubators, this mainly materializes through the creation of events.

6.3. Overview

What this study finds is that indeed start-ups engage in open innovation. How this materializes in the separate cases is different and most likely contingent on factors such as the business model, the industry, the perception of risk, among others. In terms of the barriers and challenges of being a small company, this study finds that due to their lack of reputation they face significant challenges when searching for partners. However, the integration of the knowledge at least for the inbound practices as described by the two cases seems not to suffer because of their size, but rather the size seems beneficial for the integration and testing of the knowledge. While different attitudes towards risks have been uncovered, there are similarities in light of the reasons why the start-ups engage in open innovation. The main reasons for the studied case are aligned with the suggestions of the literature that open innovation can help the start-ups overcome the liabilities they face due to their age and size. In regard to the incubator, this study finds that an incubator plays an important role. Notably, the network seems to be of importance especially for the newer ventures which can help and accelerate the accumulation of social capital and allow for the creation of collaborations. Furthermore, the credibility accorded by an incubator can further help the interaction with external partners and can hence further facilitate an open innovation approach. Finally, this study also suggests the importance of encouragement for an open environment, in order to encourage the start-ups to engage with external sources.
7. Conclusion

The purpose of this study has been to contribute to the understanding of open innovation in start-ups which is a relatively under-researched field (Spender et al., 2017; Spithoven et al., 2013) and how an incubator can support the process. This has been achieved by choosing a case study approach with four start-ups situated in two different incubators, the empirical data, which arose from these case studies has subsequently been analysed and was discussed in the chapter above. Based on this the following conclusions are drawn.

1) How and why do start-ups engage in open innovation?

The main reasons for start-ups are related to the scarcity these entities face due to their age and their size. Hence, by engaging in open innovation the start-ups are able to access important tangible as well as intangible resources. In addition to this, the interaction with the external environment can increase the reputation of the start-up, reducing the challenge of newness.

In terms of how start-ups engage in open innovation, this study finds that the practices, as well as the sources, differ. However, the inbound and coupled processes seem to be the dominant open innovation approaches taken by start-ups in this case.

2) How can an incubator support the open innovation approach of start-ups?

This study views three important aspects which can support the open innovation approach of start-ups. First, the network of the incubator is an important source for connecting with potential partners and an opportunity to build their own network, which is important to locate open innovation partners. In terms of the credibility accorded by the incubator, this can facilitate the interaction with the external environment. Finally, the incubators encourage and look to foster an open environment, which can facilitate the open innovation approach of their clients.
7.1. Implications and contributions

For Start-ups

For new ventures, this study can help them to further understand the concept of open innovation. Since the interaction with the external environment can reduce the challenges a start-up faces, start-ups can adapt their strategy accordingly.

Furthermore, it highlights the importance of the incubator. Hence this can help start-ups to choose support organizations, which are aligned with their open innovation needs. For instance, if external partners are a crucial aspect of the business model, a start-up could choose the program based on the reputation and the network of the incubator.

For the Incubator

For the incubator, it is important to realize that for start-ups open innovation is an important aspect of overcoming the challenges of smallness and newness and hence incubators can further adapt their offerings to facilitate the acquisition of important resources. Furthermore, considering the importance of credibility for new ventures, they can focus on strategies to further the credibility of their clients. In terms of the network, an active approach can help to encourage knowledge sharing, especially among the start-ups within the incubator.

7.2. Limitations and further research

This case study contributes to the overall understanding of open innovation in regards to start-ups and incubators. Nevertheless, the findings of this study need to be considered taking into account potential limitations of the study.

Among the limitations is the sample size, which inhibits the generalisation of the results to a larger population. Hence future studies could study the phenomenon taking into consideration larger samples in order to create more representative results through a quantitative approach. Such an approach could be important to produce more robust
findings which could further contribute to the lack of research of open innovation from a start-up perspective.

Another limitation is that due to the time constraint only a picture of the current context could be studied. For some of the cases they were only at the beginning of their company and hence a longitudinal study could further shed light on the understanding of how their open innovation choices have influenced the development of their business. This also opens up for interesting future research.
8. References


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