Hackathon as a platform for inbound open innovation – case study of a public hackathon

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Hackathon as a platform for co-creation and open innovation – case study of a public hackathon

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Hackathon avoimen innovoinnin alustana − tapaustutkimus julkisesta hackathonista

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Tässä opinnäytetyössä tarkastellaan avoimeen innovaatioon liittyvää ulkopuolista ideoiden hyödyntämistä julkisen hackathonin kontekstissa. Opinnäytetyön tarkoituksena on tarjota kehitysehdotuksia siitä, miten järjestää onnistunut hackathon avoimen innovoinnin näkökulmasta. Opinnäytetyötä ohjaavat seuraavat tutkimuskysymykset:

K1: Käytetäänkö julkisia hackathoneja yleisesti alustana avoimeen innovointiin liittyvään ideoiden luomiseen?
K2: Ovatko organisaatiot onnistuneet jatkojalostamaan syntyneitä ideoita omassa innovaatioprosessissaan?
K3: Mitkä ovat hackathonin kriittiset menestystekijät sellaisen organisaation näkökulmasta, joka pyrkii hydöyntämään tapahtumaa avoimeen innovointiin?

Avoimen innovoinnin ytimessä on ajatus organisaatioiden rajojen rikkomisessa innovointi-prosesseihin liittyen. Samalla avoin innovointi pyrkii tarjoamaan ratkaisun niihin haasteisiin, joita moderni maailma organisaatioille innovoinnin näkökulmasta asettaa. Näitä haasteita ovat mm. globalisaatio, teknologian nopea kehittyminen ja työvoiman aktiivinen liikkuvuus.

Avoin innovointi koostuu kolmesta erillisestä proesessista: sisäänpäin suuntauneesta, ulospäin suuntautuneesta ja yhdistetystä prosessista. Tässä opinnäytetyössä keskitytään ensisijaisesti sisäänpäin suuntautuneeseen prosessiin, joka on avoimen innovoinnin prosesseista yleisin. Sisäänpäin kääntyneessä avoimessa innovoinnissa organisaatiot hakevat ideoita ulkopuolelta jatkojalostaakseen niitä edelleen innovaatioiksi. Sisäänpäin suuntautunutta avoimen innovoinnin prosessia tutkitaan julkisen hackathonin kontekstissa.

Tutkimusstategiana käytetään tapaustutkimusta tutkittavan tapauksen ollessa ”Junction 2017 hackathon”. Tutkimusaineisto perustuu teemahaastatteluihin, jotka toteutettiin Junction 2017 kumppaniorganisaatioiden kanssa. Tutkimusaineisto on analysoitu sekä teoria- että aineistolähtöisen sisällönanalyysin mukaisesti.

Opinnäytetyön havaintojen perusteella julkisia hackathoneja käytetään yleisesti sisäänpäin suuntautuneen avoimen innovoinnin alustana. Organisaatiot ovat myös pystyneet hyödyntämään hackathonissa syntyneitä ideoita omassa innovaatioprosessissaan. Sisäänpäin suuntautunut avoin innovointi kuitenkin ollut vain suurien yritysten kiinnostuksen kohteena, ja pienemmillä organisaatioilla on ollut omat motivaationsa hackathoniin lähdön taustalla. Syntyneiden ideoiden hyödyntäminen on myös vaatinut ulkopuoliseen ideointiin integroitua innovaatioprosessia ja hackathonin liittämistä saumattomasti osaksi tätä kokonaisuutta.

Tutkimusaineiston analyysin kautta oli löytyi neljä kriittistä menestystekijää, jotka nousivat esiin avoimen innovaation näkökulmasta: 1) motivaation ja tavoitteiden määrittäminen, 2) toimeksiannon valmistelu, 3) aktiivinen ja monialainen läsnäolo tapahtumassa sekä 4) keskittyminen tapahtuman jälkihoitoon. Näiden kriittisten menestystekijöiden taustalla on useita tekijöitä, jotka vaikuttavat niiden tärkeyteen. Kriittiset menestystekijät on esitetty kehityskohteina, joihin jokainen organisaatio voi kiinnittää toiminnassaan huomiota ollessaan kiinnostunut hyödyntämään hackathonia avoimeen innovointiin.

Avainsanat: avoin innovointi, hackathon, Junction

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Abstract

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Hackathon as a platform for inbound open innovation − case study of a public hackathon

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The objective of this thesis is to study the use of inbound open innovation in a context of a hackathon and provide development ideas on how to organize a successful hackathon. The research questions that guide the study are:

Q1: Are public hackathons commonly utilized as a platform for inbound open innovation?

Q2: Have organizations succeeded in exploiting the inbound ideas in their innovation process?

Q3: What are the critical success factors of a hackathon considered from a perspective of an organization pursuing for inbound open innovation?

Open innovation as a term refers to an emerging innovation paradigm that strives to provide an answer to challenges organizations encounter in a modern world: globalization, rapid technology development and mobility of highly skilled workforce just to mention a few. The core idea of open innovation is to break the organization's boundaries in innovation processes.

Open innovation consists of totally separate processes: inbound, outbound and coupled process. In this thesis the focus is on inbound open innovation, which is the most common of all the open innovation processes. Inbound innovation is a process where an organization seek ideas from external sources to be nurtured further into innovations. The process of inbound open innovation is studied in a context of a public hackathon, which is a hackathon event where more than one organizations are as partner organizers.

The research strategy chosen to guide the qualitative research of this thesis is case study. The case studied is the "Junction 2017 hackathon" event. The research data is based on theme interviews with Junction 2017 partner organizations and the analysis of the research data is done using content analysis, both as theory-based and data-driven.

According to the findings of this thesis, public hackathons are commonly utilized for inbound open innovation. Organizations have also succeeded in using the inbound ideas born in the hackathon in their innovation process by refining them further. Still, inbound open innovation is only pursued by larger organizations, while the small organizations have other motivations in joining the hackathon. Refining the ideas needs a well-established innovation process and linking the hackathon seamlessly into that process.

From the findings of this thesis it was possible to conduct the critical success factors of a hackathon considered from the perspective of open innovation. The four success factors were: 1) defining the motivation and targets, 2) preparing for the event 3) active, multidisciplinary presence and 4) focus on after-care. In the background of these are more profound reasons why these are seen as critical factors considering the pursuit for open innovation in hackathons.

These success factors can be used in every organization that is pursuing for inbound open innovation and plans to utilize a hackathon as a platform for idea creation.

Keywords: Open Innovation, Hackathon, Junction, Inbound Open Innovation

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1 Introduction

1.1 Background

Organizations are different by nature. The type and purpose of organization sets the default on how it deals with openness, especially when it comes to development and innovation. While public and non-profit organizations usually have no reason to hide anything, enterprises have traditionally been closed and withdrawn with the development and innovation (Chesbrough 2006b, 6 – 20; Normann 2001, 1 – 36).

In previous decades the world has been a lot more withdrawn compared to the present. This has also meant closeness in organizations' innovation processes since there were no reasons in opening the borders to innovate more openly: it was thought that large organizations could hire all the best and most capable people in their industry, and by managing them to the right directon they could discover new innovations leading to new products and services. If organizations succeed in this, they could also be the first ones introducing new cutting-edge products and services to the market, gain competitive advantage and get to lead the whole market. (de Castro et. al. 2010, 1-26; Chesbrough 2006b, 1 - 20).

This *traditional paradigm for innovation* was possible in a world, where research made in universities was not aligned with the needs of organizations and where the limited amount of capable people naturally stayed with same employer for their whole career. When the surrounding world and culture set the rules, the closeness in organizations' processes was only natural. By innovating internally, the company could get the highly desired competitive advantage. (Chesbrough 2006a 21 – 42; Prahalad & Ramaswamy 2004, 5 - 17).

Even if the traditional paradigm of innovation may still be valid in some organizations in the modern world, we have seen a rapid change towards a more open, *modern paradigm of innovation*. In this modern paradigm organizations are looking outside the organizational boundaries both to find new innovations and to let the internal innovations to be utilized by other organizations. According to both Henry Chesbrough and the more recent research, the factors leading to more open innovation process are mobility of highly skilled and experienced people, training and education becoming more common and aligned with business, rise of private venture capital in funding new innovations and faster time to market demands (Chesbrough 2006a 43 – 62; Chesbrough 2006b, 1 - 20, Chesbrough 2006a, 43 - 62; Cui. et. al. 2017, 1 - 2; Frey & Luks 2016, 12; Prahalad & Ramaswamy 2004, 5 - 17).

Many researchers argue that in the current global and mobile world the traditional closed innovation model is outdated (Bingham & Spradling 2011; Chesbrough 2006a/b; Normann 2001; Winston 2014). There are several concrete signs of the rise of modern innovation paradigm in

current businesses, both in small and medium sized enterprises but also in large publicly listed companies (Duarte & Sarkar 2011, 437). For example the adaptation of design thinking and service design methods in new business development are characters of this new openness – and so are hackathons.

Hackathons are special type of events based on co-creation and open innovation – the modern paradigm of innovation – that have become popular worldwide in the first decade of the new millennium. The events have arrived in Finland step by step and in recent years they have become highly popular also in large and publicly listed companies (Industryhack 2018; Junction 2018), which traditionally have focused solely on traditional, internal and closed, development and innovation.

Even if the hackathons have become widely popular especially in large enterprises in Finland, it does not automatically mean that the modern paradigm of innovation would be a self-clarity in all these companies or industries that arrange or take part in hackathons. The concrete actions in open innovation might not be as far as the popularity of hackathons and hype of open innovation would suggest. Hackathons as events have become popular, but are these arranged purely to practice open innovation? Why are organizations eager to join the hackathon movement and are they gaining any tangible results from co-creation and open innovation?

1.2 Research objectives and mission for development

This thesis concerns the role of hackathons in organizations' innovation process. At the focus of the thesis is to find out if hackathons are commonly used as a platform for inbound open innovation or if hackathons are merely a tool for something else.

It is in the interest of this thesis to also find out if organizations have been able to utilize the hackathon results and refine the inbound ideas further towards plausible innovations, or if the inbound ideas have just remained untapped.

The following research questions are guiding the interviews and research as a whole:

Q1: Are public hackathons commonly utilized as a platform for inbound open innovation?

Q2: Have organizations succeeded in exploiting the inbound ideas in their innovation process?

Q3: What are the critical success factors of a hackathon considered from a perspective of an organization pursuing for inbound open innovation?

By answering the third research question the further aim of this study is to introduce the ingredients of a successful hackathon from the view of open innovation and provide a holistic, practical recipe for organizations' use. This recipe is to serve as a practical tool for organizational development for those organizations that are planning to arrange an internal or take part in a public hackathon in the future. This thesis will also help organizations to reflect their hackathon experiences to the findings of this study.

1.3 Structure of the thesis

The background of this thesis is based on a solid theory on open innovation model. This theoretical background and key concepts are described in chapter 2 to provide the reader a good understanding of the studied subject in its general meaning. The research strategy, methods and data used in this thesis are introduced in chapter 3.

After the introduction of the theoretical background, research strategy, methods and research data, the thesis will continue to an analysis of the data (chapter 4). The theoretical background is tightly attached in the analysis of the research data, and the analysis aims to dive deeper into the main findings by linking the previous research to findings of this thesis. The analysis follows the order of the research questions introduced in chapter 1.2, and aims to provide answers to these. The last part of the analysis introduces the success factors of a hackathon in a chronological order for those organizations that are pursuing for inbound open innovation.

The final chapter of this thesis (chapter 5) aims to conclude the findings on the analysis phase, assess the impact of the study and provide subjects for future studies combining the open innovation and hackathons.

2 Key concepts and theoretical background

2.1 Key concepts

In this chapter I will introduce the key concepts used in both the theory background and analysis of the research data. Even if the key concepts used in this thesis are strictly based on previous studies and theories, there is no common understanding in all the terms and concepts that would be used in the previous research. Thus, presenting the key concepts at the beginning of this chapter is crucial in order to understand the theory background presented

later in this chapter. In this thesis the key concepts are adapted, synthetized and described so that the use of these would be clear through the whole study.

The key concepts of this thesis are related to theories and models in innovation and studies in hackathons. There is a lot of previous research in both innovation (e.g. Christensen 2000; Schilling 2008; Shane 2008; Winston 2014) and open innovation (Chesbrough 2006a/2006b/ 2011; Lindegaard 2010; Lindegaard 2011; Linz et. al. 2017; Tidd 2014), but the previous studies in hackathons are scarce. The fact makes the interest of this thesis more attractive, but at the same time it makes it difficult to refer to previous studies considering hackathons.

The backgrounds of hackathons as a phenomenom are discussed in this chapter as introducing the hackathon as a key concept. However, the theories on open innovation are to be described on a more detailed level with the theoretical background of this thesis (chapter 2.2).

2.1.1 Concepts of innovation

Clarifying the various *concepts* and *processes* of innovation is crucial in order to avoid the potential misunderstandings in the theoretical background and analysis of this thesis. By concept I refer to the definition of the term itself and to the perception of the content of it in a broad aspect. By process I refer to a framework of actions based on previous studies and theories that can be implemented in a concrete use. For example, the concept of innovation can be elaborated in few sentences, but the innovation process describes how to use a framework of actions to innovate in a concrete level.

In this chapter I will introduce the concepts of innovation, open innovation and closed innovation. In addition, the process of innovation is described in this chapter, but the process of open innovation is described simultaneously with the theoretical background. This is natural since the innovation process itself is a prerequisite for the open and closed innovation processes and on the other hand the theoretical background is built tightly around the process of open innovation. However, the process of closed innovation in described only briefly in this chapter, since it is not a subject of interest of this thesis.

In this thesis *innovation* is defined as “an event characterized by an act of creation or invention followed by successful implementation and deployment so that the benefits of that creation may be widely enjoyed” (Bingham & Spradling 2011, 4).

According to this well-established definition, the *innovation process* is divided in two phases: creation and realization (Bingham & Spradling 2011, 4 - 5). Since this thesis focuses more on

the creation part of the definition, during the analysis emerged a need to split the phases further. In this thesis the creation phase is thus split into *idea creation* and *idea refining* (see Picture 1). This thesis argues that the innovation process is in fact a three-staged process where an idea must first be created, then refined for it to be implemented and become an innovation.

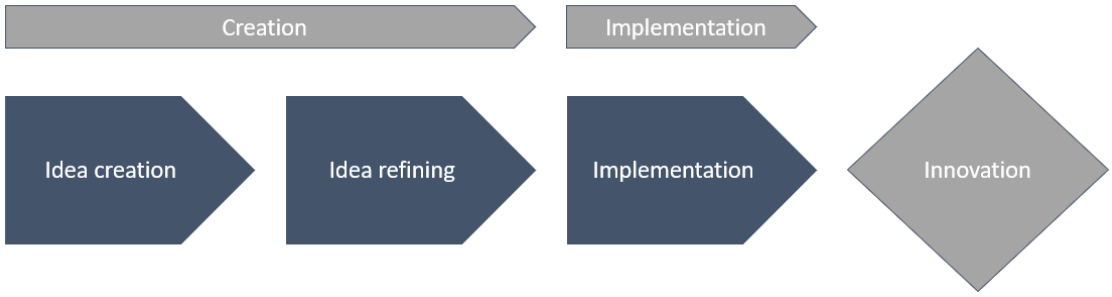

Figure 1: Innovation process (modified from the perception of Bingham & Spradling 2011).

The created idea – no matter how good it is – might not ever get refined further and implemented in use. If the idea does not get refined further, the idea might be classified as not applicable, or the innovation process might be broken so that the idea does not receive the attention it would earn and need. Only the refined ideas have the possibility to be implemented in use and become innovations as defined. (Christensen 2000, 226 – 227).

In this thesis the term *closed innovation* is practically used as parallel of the traditional paradigm of innovation that Henry Chesbrough has introduced in his books on open innovation (Chesbrough 2006a/b) and opposed to the term "open innovation". Closed innovation is an innovation model based on traditional perceptions and views on successful innovation requiring internal control and innovating strictly inside the organizations boundaries (Chesbrough 2006a, 21 - 42). Closed innovation as a term is used in this thesis to describe both the organizational mindset and organizational actions in approaching innovation, which are closed and withdrawn by nature.

The innovation process itself can be directly applied to create a *closed innovation process*. This means the innovation process can be implemented in the organization so that all the stages of the process are carried out internally according to the closed innovation model. As stated previously, the closed innovation process is not in the interest of this study and thus not described in more detail.

Open innovation is the key concept of this thesis. In contrast to “closed innovation”, open innovation is an innovation model based on the view that breaking the organizations boundaries for more open innovation process is needed in order to survive in the modern world (Chesbrough 2006b 1 - 17).

Concerning *open innovation processes*, there are three variations of these: inbound, outbound and coupled process. The three processes are described in more detail with the theoretical background of this thesis. As it can be understood from the research questions presented earlier on, the interest of this thesis is especially in inbound open innovation of all the three processes. When the term open innovation is used in this thesis, it includes all the mentioned processes together. In this thesis the actions in open innovation processes are called as *open innovation techniques*.

The open innovation processes (presented in Picture 2) are not to be mixed with general innovation process (presented on Picture 1). To summarize and clarify the relations, the general innovation process is included in all of the open innovation processes. The open innovation processes are thus build around the general innovation process.

2.1.2 Hackathon

Hackathon as a term was formed in the end of 1990s, when it was used to describe an event combining idea generation and programming to create new solutions for existing challenges in a limited timeframe. It is so strongly originated in the IT community, where multidisciplinary teams have collaborated intensively to create something new. (Chowdhury 2012, 33; Kienzler & Fontanesi 2017, 130; McGowan 2016, 272). However, the use of the word has spread quickly with the idea of similar events in other sectors, for example in education. Even if the content of technology is not always present in these events, hackathon as a term is established to describe the nature of the event. (Chowdhury 2012; Frey & Luks 2016; McGowan 2016).

The word hackathon is a combination of two words, “hack” and “marathon”, of which “hack” refers to programming and “marathon” to the limited timeframe of the event (Kolog et. al. 2016, 2). As brought up earlier, hackathons can nowadays be arranged without the technical dimension of programming, just to co-create and innovate focusing on a specified challenge or theme. In this thesis the term hackathon is used in its “original” meaning to describe a limited timeframe event for both idea creation and programming.

It is worth noticing that there are still various types of hackathons that fit into this definition. For this thesis it is especially important to differentiate between hackathons that are a) arranged privately for one organization either internally or with an organizing partner and b)

hackathons that are organized by an external organizing partner for a platform for many organizations.

For organizations that are planning to arrange hackathons just for themselves, there are organizing partners like *Industryhack* (Industryhack 2018) that help organizations to organize the hackathons and get the full potential out of these. Industryhack also creates a platform for the ideas born in hackathons to be refined further, so it is clearly concepted for open innovation. Of course, it is also possible to arrange the hackathon solely with internal resources. Hackathons organized for just one organization either by organizing partner or with purely internal resources are called *private hackathons* in this thesis.

There are also organizations like *Junction* (Junction 2018) that arrange hackathon events that several organizations can take part in. These organizations recruit partner organizations to take part in these hackathon events so that every organization has its own challenge inside the same hackathon event. The hackathons might have one common theme or several tracks with common themes, like Junction. Hackathons organized by an external organizer for several partner organizations and challenges under the same event are called *public hackathons* in this thesis.

The hackathons can be directly linked to both the idea creation phase of general innovation process and the inbound open innovation process. Whether the hackathons are private or public, these are based on solving "challenges" that the organizers put out. The hackathon teams then independently work on the same challenge to provide solutions for the challenges. Best of the solutions are usually rewarded, and the best teams have the possibility to continue the work on the challenge in co-operation with the organization that set the challenge.

The purpose behind the hackathons is thus to solve challenges with external skills and resources, which is just what inbound open innovation is about. This is why hackathons are especially interesting subjects of research and chosen as a basis of this thesis. As hackathons have quickly emerged for the use of wide range of organizations (Kolog. et. al. 3 – 4), it is an interesting subject also purely as a concept of its own.

2.2 Theoretical background

In this chapter I will present the theoretical background of this thesis. The theoretical background is tightly bound in previous theories and research on open innovation, and naturally reckons the latest studies in the field. I will start by presenting the differences in open and closed innovation, and discussing the advantages of open innovation. After this, I will continue to describe the three innovation processes included in the concept of open innovation.

As part of the theoretical background I will also discuss the adaptation of open innovation processes based on the latest research in the field.

2.2.1 From closed to open innovation

Traditional paradigm of innovation presented in the introduction of this thesis can also be called *closed innovation model*, which as a term tries to capture the traditional view that successful innovation requires internal control and that innovation is done inside the organizations boundaries (Chesbrough 2006a, 21 - 42). Chesbrough has also introduced a term for the innovation model of modern organizations, which he calls as *open innovation* (Chesbrough 2006a, 43 - 62). In contrast to closed innovation, the open innovation refers to breaking the organizations' boundaries for more open innovation process in the modern world. Chesbrough's studies in open innovation are used as a ground for practically all the current studies on the subject (Lazzarotti & Mancini 2017, 17 – 19; de Paulo et. al. 2017, 109).

As organizations prosper from the value they create for their customers, the innovation and value creation are at the core of their survival and success. The closed innovation model is based on the presumption that all the key inventions and technologies should be developed strictly within the boundaries of organizations. Innovations and new technologies are to be used only for the organization's own purposes and it would be a risk to let the innovations get out of the organization − even if these were not used for business means at all. (Prahalad & Ramaswamy 2004, 12 – 15).

In the closed innovation model the process of value creation is seen as solely internal as the company can independently decide the value it wants to create for its customers (Prahalad & Ramasvamy 2004, 12 – 13). However, in the modern world globalization is part of everyday life, development of technology is more rapid than ever, and highly skilled people are moving from one organization to another. Considering R&D, the product lifecycles are shorter than ever, and various kinds of agile development methodologies are developed to answer to this challenge. Since the world has profoundly changed in the new millennium, it can be argued that the baselines of closed innovation are no longer valid and the traditional model for innovation and value creation is outdated. (Cui et. al. 2017, 2 – 3; Inauen & Schenker-Wicki, 497; Prahalad & Ramaswamy 2004, 12 – 17; Reypens et. al. 2016, 40).

Across various industries, organizations have started to understand the limitations of closed innovation and purely internal R&D. When the change is constant and rapid, the organizations can not keep on track with all the new technologies and possibilities. In order to continue thriving in the increasingly complex and uncertain modern world, organizations need to find new ways of accessing the latest knowledge and technology. Open innovation model provides

a framework of value creation and innovation for the organizations in the modern world. (Chesbrough 2006a/b, Herzog 2008; Inauen & Schenker-Wicki, 497 - 498, Saguy & Taoukis 2016, 68 - 69).

Even if there are studies that question also the benefits of open innovation (e.g. Caputo et. al. 2016), the positive results of it seem to outnumber the negative ones: according to the latest research the closed innovation model is at the end of its lifecycle and organizations are slowly changing their approach on innovation and adapting the model of open innovation with positive results (Chesbrough 2006a, 1 - 21; Inauen & Schenker-Wicki, 497; Jarvenpaa & Wernick 2011; Saguy & Taoukis 2016, 68 - 69). After introducing the core processes of open innovation, I will continue with the adaptation of the model in more detail.

2.2.2 Core processes of open innovation

Chesbrough defines the 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. This paradigm assumes that firms can and should use external ideas, and internal and external paths to markets, as they look to advance their technology." (Chesbrough 2006c, 1).

There is also a more systematic way of understanding the content of open innovation, and that is the three processes of it. As said, the open innovation model consists of three core processes that are commonly accepted in open innovation research (e.g. Chesbrough 2006a; Gassmann & Enkel 2005; Inauen & Schenker-Wicki 2011):

1) Outside-in process (also called as *inbound* process) is the most typical of open innovation processes. In inbound open innovation organizations actively seek for outside innovations and ideas to take these aboard on the innovation process. It can be for example a new technology innovation that is bought from outside and developed further into business by the organization that bought it.

2) Inside-out process (also called as *outbound* process) means opening the organizations boundaries to allow the innovations to be utilized outside the organization. That can be for example licensing of own IP (like patents) to be used by other organizations or founding spin-offs to continue with the innovation outside the organization.

3) Coupled process means opening the innovation process with partner companies (or competitors) so that the innovation is done in co-operation. For example, an organization can join a competitor or a stakeholder to develop technology they can both use in part of their own product (e.g. development of microchips used in hardware products).

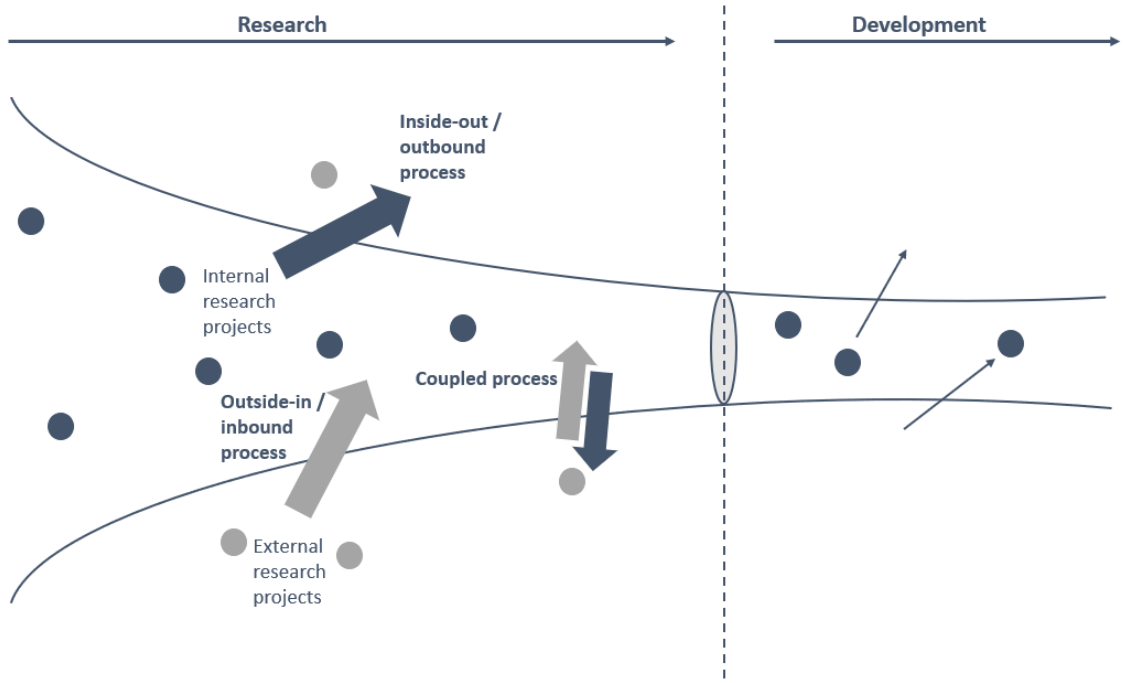

Figure 2: Open innovation processes (modified from Inauen & Schenker-Wicki 2011).

These core processes of open innovation are commonly accepted among the current research (e.g. Inauen & Schenker-Wicki 2011; Lazzarotti & Mancini 2014; Schroll & Mild 2011), but not every process is suitable for every company. According to Schroll & Mild, organizations usually focus on one of these core processes and the other processes are used to integrate elements of these on to the organizations' innovation process (Schroll & Mild 2011, 479).

The recent studies show that inbound open innovation is crucial for new product innovations and sales of new products (Duarte & Sarkar 2011, 437; Inauen & Schenker-Wicki 2011, 509). It is also recognized that exploiting the inbound open innovation activities seem to be a lot more frequent than using the techniques of outbound or coupled processes (Kutvonen 2011, 460 - 461; Schroll & Mild 2011, 488).

2.2.3 Adaptation of open innovation

European study of open innovation in internal R&D functions in 2011 discovered that 80 % of large companies, 50 % of medium sized companies and 40 % of small companies had already adopted methods for open innovation (Schroll & Mild 2011, 478). The researchers also discovered that organizations especially in high tech industries have a significant positive correlation in the adoption of open innovation methods and the performance of the organization. Open innovation seems to be particularly attractive in industries where technological turbulence and competitive intensity is high. (Lazzarotti & Mancini 2014, 30; Schroll & Mild 2011, 478 - 479).

Open innovation execution does not mean that all the internal innovation would be minimized or completely let off. Actually, vice versa: open innovation should be an accelerator for internal innovation processes and R&D. Open innovation is more of a paradigm change compared to the traditional innovation model, and research has discovered that the organizations which have adopted the open innovation model have even increased their R&D spending compared to previous. (Schroll & Mild 2011, 480).

According to previous studies, the open innovation is actually a state of mind. For example, while the use of intellectual property rights (e.g. patenting) can conflict with the idea of open innovation, it can also be an enabler. If an organization decides to restrain the intellectual property rights strictly for its own use (even if it would not use those at all), it prevents the outbound open innovation from happening. If, however, the organization decides to open the intellectual property rights for other organizations to utilize, it increases interaction with its competitors, suppliers and other stakeholders (Inauen & Schenker-Wicki 2011, 499) and thus provides a platform for open innovation. It is thus not in the actions for tight intellectual property rights, but the attitude on how to use the rights.

Even if the change in mindset might seem like a small step, the outbound and coupled processes of open innovation are also strategic decisions whatsoever (Ellis et. al. 2014, 63). According to some studies, organizations might even have the need to re-organize themselves to allow collaboration with other organizations and stakeholders that is needed for open innovation (Inauen & Schenker-Wicki 2011, 501; Bogers et. al. 2017, 218).

Still, the inbound open innovation process can be practiced in a limited area and with limited resources. Regarding purely inbound open innovation, the game is much clearer: the step is a lot easier to take and the risks are much smaller, since the level and scope of openness can easily be controlled. That explains why organizations tend to start the progress of moving towards open innovation model from smaller units, in more micro-level and with inbound open

innovation techniques (Kutvonen 2011, 460 - 461; Schroll & Mild 2011, 488). With this approach there is no need to change the whole organization structure to get forward with the process and build basic level ground for opening the innovation process. This micro-level inbound openness provides the foundations for a bigger change in an organization (Bogers et. al. 2017; 218).

However, when open innovation is executed only in micro-level and in separate units of an organization, it is impossible to achieve the full benefits of it. Organizations usually address the activities in "ad-hoc" way without systematic or strategical approach (Lazzarotti et. al. 2011). One of the main obstacles in utilizing open innovation as a whole is a lack of strategical planning (Kutvonen 2011, 460), which is especially needed in outbound and coupled processes but naturally also in inbound process if the organization wants to gain the full benefits if it. Still, there is a clear tendency for the companies that have started with the inbound open innovation techniques to adopt the other innovation techniques in use after the results from inbound open innovation (Schroll & Mild 2011, 488). When the techniques spread, it is a sign that the open innovation might be seen more as a strategical advantage.

To summarize the theory background on the adaption of open innovation techniques, it seems that while the change usually starts from micro-level inbound innovation, it continues naturally stage by stage to include all the processes of open innovation. Still, it needs a change in high level strategical thinking to get the open innovation and all its benefits in to use. It must also to be noticed, that all the processes do not fit naturally in every organization (Schroll & Mild 2011, 479). (Lazzarotti et. al. 2011).

For many reasons, the focus of this thesis is on inbound innovation process. These are for example the easy adoption and commonness of the process, but also the natural link to hackathon when considering the idea generation phase of the general innovation process.

2.2.4 Challenges in inbound open innovation

Applying the open innovation model into a practice includes also challenges and risks that need to be considered in organizations that are interested in taking open innovation processes in to use. These can be observed from the point of view of every process. In this chapter I will introduce the most common challenges and risks in inbound open innovation.

Relating to inbound open innovation, organizations do face challenges in finding the relevant knowledge sources. When applying open innovation, the recognition of these sources should be effective to be useful for the organization: if applying the techniques take more resources than they give, the benefits of it are easily lost. The risk is thus to lose more than to gain,

and so waste the valuable resources. (Tidd 2014; 7 - 9). The higher the count of external stakeholders get, the harder it becomes to manage the co-operation (Reypens et. al. 2016, 45). According to Greco et. al., organizations might even be harmed if trying to keep up with too many innovation channels (Greco et. al. 2016, 512).

When generating the ideas is the most trivial part of the innovation process (Bradshaw 2018), it is also to be planned how to use and exploit the potential external knowledge after the idea generation. Relating to inbound open innovation the external idea generation might easily be more expensive compared to doing it internally (Tidd 2014; 9). It is thus highly important to have the following stages of the innovation process in shape, so that the open innovation and idea generation would fit seamlessly into it from the beginning. If the process is broken, the expensive ideas will never get through it to be refined further and launched as innovations.

Regarding the inbound idea generation, organizations usually need to open up to get the ideas in. While opening the borders, there is always a risk that something important would be revealed to competitors. Then again, without opening up it is impossible to imagine that any valuable ideas would flow into the organization from the external sources. The more the organization opens up, the more it can gain from external resources. However, the risk has a straight correlation in how open the organization is: the more the organization opens up, the bigger the risk in revealing something critical to competitors gets. (Tidd 2014; 7 - 9). According to de Paulo et. al., truly opening the borders might be the biggest challenge for organizations in adapting the open innovation techniques (de Paulo et. al. 2017, 109).

Practicing the inbound open innovation is balancing between the possible benefits and risks of loss, and thus organizations need to consider it carefully whether the gains are bigger than the potential risks. When it gets to other innovation processes, the risks and challenges are more complicated and harder to manage (Tidd 2014; 7 - 9). That might be one of the reasons why most of the organizations start with the inbound open innovation process (Kutvonen 2011, 460 - 461; Schroll & Mild 2011, 488).

3 Research strategy, data and methods

In this chapter I will introduce the research strategy that has guided the research process of this thesis. The research process is described stage by stage in the sub-chapters, which also include a description of the research data and introduction of the method used in analyzing the data. The content of this chapter provides the structure for the whole research part of this study and the methodological ground for the analysis phase.

3.1 Case study as a research strategy

Case study is a typical research strategy for qualitative research in the field of business administration and it fits well in studies that pursue providing ideas for development (Gillham 2000, 1-5; Ojasalo et. al. 2009, 52). According to Yin, the process of case study approach starts from planning the research, and case study should be chosen as research strategy if one or more of the following rules are applied (Eriksson & Koistinen 2014, 4 - 5; Yin 2014, 9 - 15):

- Questions starting with “what”, “why” and “how” are central in the study
- Researcher does not have control for the events subject of the study
- There is only a small amount of empirical studies of the subject available
- Subject of the research is closely related to the current world.

The rules listed above are widely applied in this thesis thus making case study a natural choice for the research strategy of this thesis:

- The research questions of the thesis are based on the same idea as Yin describes
- The occurrence, or the event subject of the study, is free of any external control
- Empirical studies available of hackathons as a platform for open innovation are scarce
- Hackathon as a phenomenom is tightly connected to the current world.

Case study as a research strategy can be used in various fields of studies and in various ways (Eriksson & Koistinen 2014, 1 - 3). Even if there are many definitions of case study, there is always one common factor that seems to bind the definitions together: the case(s) in which the study is based on (e.g. Eriksson & Koistinen 2014, 1 - 3; Gillham 2000, 1 - 3; Ojasalo et. al. 2009, 52 - 54; Stake 1995, 3 - 7).

By definition, a case can be almost anything that exists here and now, is of human activity embedded in real life and can be studied and understood only in its own context. The case can be an individual, group, community – or an event (Gillham 2000, 1 - 5). In this thesis the studied case is “Junction 2017 hackathon” event (for more of Junction, see chapter 3.4.1).

Case study as a research strategy is based on chronological stages that are to be followed, but the stages vary depending on the method literature used (e.g. Ojasalo et at. 2009; Yin 2014). Yin has developed and presented a six-staged model for case study research, which is used as a baseline by many other methodologists. Yin’s model consists of the following stages: plan, design, prepare, collect, analyse and share. The model is made for straightforward, linear approach, but still it is to be an iterative process so that from every stage the researcher can return to the others. However, there are some stages in which this does not apply, which makes the model a bit stiff to use. In addition, some of the stages could easily and naturally

be combined, and the six separate stages makes it also slightly heavy, at least considering the magnitude of this thesis. (Yin 2014).

Ojasalo et. al. have presented the case study stages in a simpler way (Ojasalo et. al. 2009, 54) that seems to intervene with both the remarks I made above on the Yin's model (see Picture 3).

Figure 3: Stages of case study research (modified from Ojasalo et. al. 2009, 54).

The model is based on Yin's case study stages, but it combines some of the stages, and also presents it in a clearer way so that the iterative side of the model is simpler and more practical. Still, the Yin's stage activities are completely applied in the combined stages. Therefore, the presented four stage model will guide the case study approach in this thesis. The following chapters describe the research process used in this thesis according to these stages.

3.2 Defining the preliminary development mission

In the first stage of case study research it is crucial to make a conscious decision whether to use the case study as a research method. As discussed in the previous chapter, the research method can be chosen after the preliminary idea of the research is born, since the research strategy depends on the idea and scope of the study. Thus, defining the preliminary development mission with preliminary research questions is seen as an essential first stage in the research process. (Yin 2014, 3 - 27).

Applied to this thesis, the stage consisted in mapping the possible options for the subject of the thesis and selecting the open innovation for the main interest. After the main interest was clear, I continued to find a way to approach the subject of open innovation. In this thesis this was the first stage when the possibility to use case study as a research question came up, and the hackathons as an angle to approach the subject was chosen. That said, in this thesis both the case study as a research method and hackathon as a case had an impact on each other simultaneously. After the first stage of the research process the preliminary subject

“open innovation in hackathons” was decided upon, preliminary research questions drafted and case study as the research strategy in mind.

3.3 Familiarizing with the phenomenom & specifying the development mission

After the preliminary definition the research process continues with familiarizing with the phenomenon and specifying the development mission. According to Yin, at this stage it is important to identify the case that is the subject of the study and establish a logic that will guide the case study research in further stages. By logic Yin means binding the theory background tightly together with the research questions so that the scope of the study is clear and logical all the way through. (Yin 2014, 27 - 67).

In this thesis the hackathon event was identified for a case that is the subject of the study. This stage consisted also of a profound exploration of and acquaintance with the previous research and theories both in open innovation and hackathons. As the big picture of the field was starting to take shape, I began to iterate the preliminary research questions to their final form and narrowed the interest of the research to inbound open innovation of all the three open innovation processes. At this stage the amount of research questions stabilized to three and the forms of the research questions were locked for the following stages. In addition, I specified the development mission of this thesis to establishing a recipe for a successful hackathon experience from the open innovation point of view. Together with the research questions, the development mission was locked to guide the following research stages.

At this point it was necessary to reflect whether the case study as a research strategy still fitted to the specified development mission and research questions. As described in chapter 3.1, this was a perfect match for the purpose of the study.

3.4 Collection & analysis of the research data

The data collection and analysis stage is the most extensive stage of all the stages. Compared to Yin’s six staged model (Yin 2014, 1), this stage in this thesis is interpreted to include three of these stages: preparing the data collection, actual data collection and data analysis. It can be argued that the stage should be divided as Yin has done (Yin 2014), but for this thesis it was more natural to combine the stages: as there was a lot of iteration between these stages and the work fitted into the same timeframe, so it was also clearer to perceive these stages as a one solid unity. Combining the stages emphasizes the iterative nature of this stage and gives an honest picture of the actual research process practiced in this thesis.

3.4.1 Theme interviews as a research data

After specifying the research questions and development mission it was clear that the data collection would need to be done by interviewing. Familiarizing with the field of open innovation and hackathons revealed that there are various types of hackathons (e.g. difference between public and private hackathons, see chapter 2.1.2) that potentially differ from each other significantly. Because of this, it was decided that the data should be collected from similar events. After a lookout for various possibilities for interviews, it was recognized that the biggest public hackathon event in Europe, Junction, had recently been organized and that it could be extremely fruitful to interview the partner organizations with current experiences on the subject.

In addition to the possibility to get the latest experiences of the subject, the platform for the event would be the same for every partner organization. That means that the practicalities of arranging the hackathon would be the same for every organization and that there would be no variables in these. This would make it a lot easier and more reliable to analyse the data, since there would be no extra variables to take into account when making the analysis.

The interviews were decided to be held as theme interviews, also called as semi-structured interviews. The theme interviews are structured in clear main themes, but the questions inside the themes can vary depending on the interview. In theme interviews the interviewees' perceptions and insights of the researched unity are on a spotlight. (Tuomi & Sarajärvi 2002, 77 - 78; Vilkka 2005, 101 - 102). According to Gillham, theme interviewing is the most important form of interviewing when it comes to case study research, and the richest single source of data (Gillham 2000, 65).

The richness of the data is also the topmost reason why the research data was decided to be collected by theme interviews. There are two groups that are interviewed for this thesis that are introduced on the following chapters.

3.4.2 Interviews with Junction 2017 partner organizations

Junction in an organization that arranges yearly hackathon event under the same name. The yearly hackathon event is the biggest hackathon in Europe, and is organized in Helsinki Finland. In 2017 Junction had over 60 partner companies and 1500 participants with background of almost 100 nationalities (Junction 2018).

Junction hackathon is a two-day event which provides a common ground for the partner companies. The partner companies might come from diverse backgrounds, but all the practical arrangements for the partner companies and participants are the same. Junction as an organizing partner provides a hackathon experience that companies can join relatively easily compared to a hackathon arranged by only internal resources. According to the definitions of hackathon in this thesis (see chapter 2.1.2), Junction is classified as a public hackathon.

The main research data in this thesis is based on the interviews with companies that have partnered with Junction organization and joined the hackathon event in 2017 as partners. Each of these partner organizations has had their own challenge in the event. The companies selected for the interviews to include both publicly listed and privately-owned companies, since the presumption behind this study differentiates in how these companies have adopted the open innovation methods in their daily operations. Inauen & Schenker-Wicki have made the same presumption that considering open innovation the nature of the company matters (whether it is listed or not). In their study, they have studied open innovation in the R&S functions of only stock-listed companies (Inauen & Schenker-Wicki 2011).

Contacting of the organizations was conducted by email in co-operation with the Junction organization. Junction organization sent an email to eight (8) partners that were hand-picked from the group of all partners to include both private and publicly listed companies in various fields. In the email it was told that they would get an invitation for a Master's thesis interview and that the Master's thesis is about studying hackathons as a platform for open innovation and co-creation. Seven of the eight partner companies agreed to an interview and one declined with specified reason. One of the companies that already agreed on the interview declined it later on. Thus in total six (6) partner organizations were interviewed.

The interviewees had all been contact persons in the co-operation with Junction, and had a crucial role in executing the hackathon from the partner organizations' behalf. The length of the interviews varied from approximately 40 to 60 minutes. Two of the interviews were held in English (Company C & Company E) and four in Finnish (Company A, Company B, Company D and Company F). The interviews kept in Finnish seemed to last slightly longer, but there were no deviations recognized in the quality of the interview data. The interviews were transcribed of applicable parts, and the analyses were done based on the transcriptions. The interviews kept in Finnish were transcribed in the same language but translated into English in those parts that were cited in this thesis.

The interviews were conducted as theme interviews with five themes. These themes were derived from the research questions of this thesis and the themes were:

1) Background of the organization and its culture
2) Motivation behind partnering with Junction
3) Targets set for the hackathon
4) Results of the hackathon and continuing of the development
5) Experiences in Junction and hackathon as a concept.

The basic backgrounds of the organizations interviewed are presented in Table 1. Instead of using the official names of the organizations, I will refer to these as capital letters from A to F.

Organization	Privately-owned / Publicly listed	Size (small < 100, medium < 500, large > 500 employees)
A	Privately-owned	Medium
B	Publicly listed	Large
C	Privately-owned	Small
D	Privately-owned	Large
E	Publicly listed	Large
F	Publicly listed	Large

Table 1: Backgrounds of the organizations interviewed

As described earlier, the interviewed Junction partner organizations are divided in privately-owned and publicly listed companies. In addition, I have divided the companies based on the size that is derived from the count of employees. The division is made in small (< 100), medium (<500) and large (>500) companies. In this case, all the large companies presented in the Table 1 had over 2500 employees.

3.4.3 Interviews with hackathon experts

Even if Gillham states that the quantity of interviews is not nearly as important as the quality (Gillham 2000, 65-66), the six interviews with the Junction 2017 partner organizations were recognized as a bit limited research group. Still, the collected data already seemed to start to saturate (Eskola & Suoranta 2000, 62 – 64; Vilkka 2005, 127 - 128) and the data received from the last interviews gave only a little additional information. However, at this point it was noticed that the availability of background data on hackathons − meaning previous studies and research − was highly limited and that there was an emerging need to gather more background data on these.

According to Tuomi & Sarajärvi only one out of a hundred theses can be considered as a scientifically significant (Tuomi & Sarajärvi 2002, 87). This is mainly because of the background data, which is not expected to be on the same level than in higher level studies. From the point of view of this thesis, it would not have been significant to increase the amount of Junction partner organizations' interviews, since the quantity of interviews would still have been relatively small, and the gathered interview data already showed signs of saturation.

To increase the volume of background data and to get the most out of this thesis it was concluded that instead of just obtaining new interviewees from the same group, it would be more useful to interview general hackathon experts that have diverse experience in hackathons and thus might be able to share critical point of views on hackathons and open innovation in practice. Using multiple sources also constructs validity for the research (Yin 2014, 45 - 50).

The general hackathon experts selected to be interviewed were Mike Bradshaw and Henri Malkki. Bradshaw is the Head Coach of Startup Sauna, which is an organization accelerating startups and coaching startup's founders. Bradshaw has a wide experience in hackathons in various roles all over the world. (Bradshaw 2018). Malkki for his part is the CEO and co-founder of Perfektio, a company that is founded to participate in open innovation challenges in hackathons. He has gained experience in tens of hackathons in various fields as a participant and leads a company with more than a hundred hackathon participations. (Malkki 2018).

Malkki was interviewed in Finnish and Bradshaw in English. Both the interviews lasted for approximately 60 minutes and were conducted as theme interviews. The themes used in the interviews were:

1) Background and personal experience in hackathons
2) Potential of hackathons
3) Harnessing hackathons for open innovation
4) Hackathon success factors

3.4.4 Content analysis

The research data − meaning the interviews − is analysed according to content analysis method. Content analysis is a method for analysing any kind of qualitative data and it can be used in various ways depending on the research. There are three main ways on using it: the analysis can be 1) *data-driven*, 2) *theory-based* or 3) *theory-bound* (Tuomi & Sarajärvi 2002, 93, 95 - 100).

In this thesis I am using content analysis both as data-driven and as theory-based. Using two different analysis methods is a somewhat exceptional approach to analyse the data, but I argue it is clearly justifiable in this case. The theory introduced in this thesis (see chapter 2) is restricted only to part of the scope of this thesis and thus can be used only partly in the analysis of the data. When the theory cannot − or is not justified to − be used as guidance of the analysis, the data will be analysed according to data-driven approach on content analysis.

Theory-based content analysis is based on an existing theory framework that is presented in the study. Compared to data-driven analysis the logic of reasoning is thus done from common to single, and so the method can be called as deductive. The theory guides the analysis and provides the possibility to link the analysis in previous studies already in the phase of the analysis. (Tuomi & Sarajärvi 2002, 97 - 100, 116 - 119.).

Theory-based content analysis fits well for the certain parts of this thesis, since there is a clear framework of thinking behind the study. Even if the existing framework does give guidelines to the analysis, it is not strictly binding the research or the analysis like it would in theory-bound analysis method. (Tuomi & Sarajärvi 2002, 116 - 117.)

According to theory-based content analysis the first phase of the analysis is classification of the data and it continues with simplification (Tuomi & Sarajärvi 2002, 116 - 117). Analysis can also be quantified, which means counting the appearances of the same units in the research data (Tuomi & Sarajärvi 2002, 117 - 119). Because of the relatively small count of interviews, quantifying the data is not applied in this thesis.

Data-driven content analysis means that the analysis is purely driven in terms of the research data. It can also be called a inductive analysis method, since the logic of reasoning starts from single and continues to common. The analysis of the data pursues to create a theoretical framework from the research data. (Tuomi & Sarajärvi 2002, 95 - 98, 110 - 115.).

Most of the research data in this thesis will be analysed according to data-driven content analysis, which means that the classification of the research data is based solely on the research data and there is no other framework to guide the analysis. Since the theoretical framework behind this study does not carry in the interviewees motivation behind partnering the Junction nor the targets set for the event, it is natural to do this part of the analysis solely as data-driven. Because of the relatively small amount of previous studies on the field, it could even be potentially harmful to bind the thesis fully on existing theories. This thesis in its extent cannot prove any theories wrong, but at its best it can provide new insights on the subject and question the existing theories. Data-driven approach is thus also a way to guarantee the maximum benefits of this thesis for future studies on the subject.

According to data-driven content analysis there are three phases in analysing the data:

1) Simplifying the data. This means that the original expressions in the data are simplified to a clearer form to help the further analysis and to find common expressions in their simplified form.
2) Grouping the data. The grouping process helps to simplify the data even further to find common sub-classes from the data. In other words, this means grouping the simplified expressions to larger groups that have a common factor.
3) Classifying the data. This means continuing with the grouping so that the ultimate main classes − or main groups − of the data can be formed. (Tuomi & Sarajärvi 2002, 110 - 115.)

As we see from the descriptions of the phases, the focus of data-driven content analysis is to simplify the data further and further so that at the end the data is classified in as large groups as possible so that the groups still have a common factor.

3.5 Sharing the ideas for development

The last stage in case study research process is sharing the theory or ideas for development to be utilized in the future. As Gillham put it in his description of case study research: "What you're looking for is what all researchers in all disciplines are concerned with: evidence; theory" (Gillham 2000, 12). According to Ojasalo et. al. the objective of a case study research is not only to provide new theory on the field of study, but also practical improvements and solutions to be used in practice (Ojasalo et. al. 2009, 19; Vilkka 2005, 23). One of the topmost missions of a case study research is thus to provide new information and adapt it to be utilized further in practice.

In this thesis idea sharing is tightly linked to the development mission to introduce a recipe for a successful hackathon. The ingredients of a successful hackathon are derived from the observations and conclusions of the analysis stage, and also from the straight comments of the interviewees'. Since this thesis has a great interest in the mission for development, the development stage has its own chapter at the end of this thesis (chapter 4.4).

4 Analysis, findings and results

4.1 Innovation culture and use of inbound open innovation techniques

The analysis of the research data is guided by the research questions (see chapter 1.2) and executed following the structure of both the interviews and the research questions. The first

theme of the interviews covered the general organizational and innovation culture of organizations interviewed to be able to recognize the use of open innovation − especially inbound open innovation − techniques in use. The approach to this theme is on a relatively high level compared to other themes, since the purpose if this theme is only to enrich the background information of the organizations and to provide value for analyzing the data against the research questions.

The theme of organizations' innovation culture was approached from inbound innovation's point of view and the theme was analyzed according to the theory-based content analysis, in a deductive manner. Without making any direct questions on the subject of inbound open innovation, the interview circled around the theme the whole duration. The information gained during the other themes of the interviews was also considered when making the analysis on the organizations' use of open innovation techniques in general. This did not provide any new information but supported the information gained from the first theme. The findings are presented in Table 2.

Company	Use of inbound open innovation techniques
A	x
B	x
C	
D	
E	x
F	x

Table 2: Use of inbound open innovation techniques in organizations interviewed

Classification of the companies shows that four of the companies interviewed were found to be using inbound open innovation process in general while two of the companies did not use the techniques at all. When comparing the results to the other background information of the organizations (see Table 1), the findings seem to be highly surprising at a first glance: it could be easily thought that the private, small and medium sized companies would be more open, and the publicly listed, larger organizations more closed. This is a perception that has also been present when choosing the organizations for the interviews and consciously making the division between private and publicly owned organizations. Still, the classification based on interviews with the studied Junction partner organizations draws a totally different kind of picture of the situation, since all the publicly listed companies are classified as open innovators while only one of the private companies has the same classification.

It is to be noticed, that the findings are based on just one interview with one person from the organization. As described earlier, inbound open innovation is easy to practice on a micro-level. In this case it means that it could be utilized in elsewhere of the organization without the interviewees' knowing about it. However, the size of the organizations that were found not to be using the inbound open innovation techniques is relatively small and cultures open, so it is unlikely that the interviewees would not know about that. In addition, there were no signs that the interviewees would not have the information regarding the subject.

The interview with Startup Sauna's Head Coach Mike Bradshaw gives a clear explanation for the results found. According to him, publicly owned big companies usually find it harder to innovate, so they have to open up the innovation channels to get innovations inside the company. People working at these companies tend to lack the innovation and ideas, or the culture does not support standing up with those ideas and innovations. At the same time the new startup minded companies are usually founded by people that are naturally highly innovative, and the culture tends to draw the same minded people to the company. (Bradshaw 2018). Exactly the same view was also provided by some of the interviewees from the partner organizations (Company A; Company C).

The need to find the sources for innovation outside the company refers directly to the definition of inbound open innovation process, the most common of open innovation processes (see Picture 2). According to the findings of this thesis, the commonness of it might thus refer to the lack of internal ideas and innovations in organizations, which makes it natural for them to focus on the inbound innovation of all the possible options in open innovation. The other innovation processes can be utilized only if there are ideas that can be refined further in the innovation process (see Picture 1), so the importance of the inbound process is undeniable.

Even if it does not fit into the exact scope of this study, an interesting finding was that the privately-owned smaller company which used the inbound open innovation techniques in general had also adapted outbound open innovation techniques in use. During the interview it became clear that these techniques are used in very different situations compared to each other. Like Schroll & Mild have previously found, all the processes might not fit in every organization (Schroll & Mild 2011, 479), but they also need to be fitted for purpose in organizations.

It is also notable, that as presented in the theory background of this thesis, only 40 % of the smaller companies have adapted the open innovation practices as a part of their innovation process compared to 80 % of the larger companies (Schroll & Mild 2011, 478 - 479). While Schroll & Mild could not discuss the reasons of this difference, this thesis gives a good hint of where this could be derived from.

The finding on the innovation culture and use of the inbound innovation techniques thus gives interesting new perspective considering the open innovation theory frameworks: after all the openness of organizations' innovation culture might not say anything about the true innovations inside the company. When many research provide the view that open innovation is crucial in the modern world for every organization (Bingham & Spradling 2011; Chesbrough 2006a/b; Normann 2001; Winston 2014), the finding of this study gives reason to question this perception: the open innovation – at least when it comes to inbound open innovation – might not be necessary or even important at all to the organizations that do not have problems with the lack of ideas and innovations. Like the interviewee of one of the smaller privately-owned companies told, "We do not have problems in creating ideas, but we have a problem in how can we take all the internal good ideas in process" (Company C). This was a problem encountered also by another small company interviewed (Company A).

The theories on open innovation are mostly based on studies on large organizations, so the perception of necessity for open innovation is a natural outcome. However, the open innovation theories and best practices might not apply at all to the new startup minded companies or companies that have the internal innovation process in shape on in general. The value in open innovation is based on the true value the innovations bring to the business or operations. If the same value can be generated through internal closed innovation process, there is no justification in valuing the open innovation higher than the closed innovation.

Based on the previously stated it is not surprising that according to the interviews of this thesis the small organizations seem to be more closed in their innovation culture than the publicly listed companies. Set against the open innovation theories this is only natural and supports Bradshaw's statement of the innovation capabilities of organizations on a general level (Bradshaw 2018). Still the finding is rather interesting: do the theories of open innovation apply only for the bigger companies that do not get innovations naturally from inside the company since the employees are not innovative by nature or the culture and practices killed the possibility to innovate internally? According to Popa et. al., organizations innovation culture means an environment where creativity, risk propensity and personal growth are fostered (Popa et. al. 2017, 136). Is it so that the missing innovation culture in large companies leads them to seek innovations outside the organization?

Also, according to the interviews with the Junction partners, the privately-owned companies thought that they already have everything needed from the innovation point of view, and they saw a little benefits in opening the innovation process (Company A; Company C; Company D). The publicly listed companies both had their own innovation departments and were

highly interested in the possibility of external ideas and innovations (Company B; Company E; Company F).

4.2 Motivation and targets

4.2.1 Motivation in partnering with Junction

The next themes of the interviews considered the organizations' motivations in joining Junction and the targets set for the event. With these themes the aim was to answer the first research question the thesis is based on:

Q1: Are public hackathons commonly utilized as a platform for inbound open innovation?

Since the question is one of the main interests of this study, it was approached from viewpoint of both motivation and targets of the event to make sure of the reliability (e.g. Tuomi & Sarajärvi 2002, 133 – 134; Vilkka 2005, 158 – 159; Yin 2014, 45-50) of the results. The motivation was approached with straightforward questions of the motivation behind the decisions in partnering with Junction. Targets set for the event were asked on a more detailed level, and the specific answers were analyzed further according to data-driven content analysis to find the main classes for the targets set.

To assure the reliability of the findings, the motivations are compared to the targets set for the event to see if there is any correlation between these. If the correlation is found, the findings are interpreted as reliable, and without any correlation both the motivation and the targets need to be questioned. It is also in the interest of this study to find out if there is any correlation between the motivations and targets and the findings on the innovation culture and use of inbound open innovation techniques in the Junction partner organizations interviewed.

The organizations' motivations for partnering with Junction and joining the hackathon are described in the following table (Table 3).

Company	Motivation behind joining the hackathon event (primary reason marked with x, secondary with o)			
	Open innovation		Marketing	Recruiting
	Inbound	Outbound		
A		o	x	
B	x		o	o
C			x	o
D	o		x	o
E	x		o	o
F	x		o	o

Table 3: Motivation behind joining the hackathon event

As described in the Table 3, the motivation behind partnering with Junction and joining the hackathon event is divided in primary reasons (marked with x) and secondary reasons (marked with o). While there can be only one primary reason, the amount of secondary reasons is not limited. All the reasons that are not primary reasons are handled as secondary reasons without making any further hierarchy on these.

Use of secondary reasons in the analysis is necessary, since most of the interviewed organizations had more than one reason for joining the hackathon. Even if the organizations had more than one reason behind their motivation in joining the event, there was always a clear primary reason behind the decision that was confirmed at the interview. It is possible that the final decision in partnering with Junction might have emphasized the secondary reasons ahead of the primary reason after all (for example if the final decision has been made in organizations management, which have emphasized marketing over open innovation after all), but this thesis did not dive deeper in to that discussion. In further studies it could be interesting to find out more of the decision making and how the arguments are emphasized in different levels of decision making in case of joining the hackathon. In Schroll and Mild's study of open innovation usage in R&D, they have recognized the same interest towards the decision making in adopting open innovation activities (Schroll & Mild 2011, 476).

The findings on organizations' motivation behind joining the Junction hackathon are in line with the findings on use of inbound open innovation techniques in the Junction partner organizations. Compared to these backgrounds of the organizations (see Table 2) we can see that the same large, publicly listed companies have inbound open innovation as a primary reason when making the decision to join Junction. This is interesting especially since only one of the privately-owned companies had the inbound open innovation as a secondary reason in joining

the hackathon (Company D), and the other two did not have motivations in open innovation at all (Company A; Company C).

This seems to link well with the findings on chapter 4.1 of this thesis when discussing the organizations' interest in inbound open innovation in general. As previously with the open innovation, these observations are also in line with Startup Sauna's Head Coach Mike Bradshaw, who argued that the smaller companies with effective internal innovation are using hackathons more as a platform for marketing than for open innovation and co-creation (Bradshaw 2018). As an observation this supports the view of Bradshaw that naturally innovative companies do not have a motivation for opening their innovation process. Perfektio's CEO Henri Malkki presented a view that public hackathons as a whole do usually serve more as a platform for marketing and recruiting than idea creation for the base of open innovation (Malkki 2018). In addition, also previous studies on open innovation (e.g. Inauen & Schenker-Wicki 2011, 499) have discovered that large companies are more likely to adopt the open innovation model than small companies, at least when it comes to inbound open innovation. This is also noticed by Schroll & Wicki, who use it as a baseline of their research hypothesis (Schroll & Mild, 2011; 480). These do give a reason for the popularity of marketing and recruiting as both primary and secondary motivations.

According to Bradshaw, ideas are trivial in innovation since there are a lot more to do to get the ideas to innovations and innovations into business. Innovation phases presented in Picture 1 do support this view, as the idea creation is only the first phase of the three-phased innovation process. Since the time for development in hackathons is highly limited, it is practically impossible to get true innovations out of it, and the outcomes are usually merely good ideas that can be fostered into innovations after the hackathon. This was also experienced by the Junction partners and brought up in the interviews (Company A; Company B; Company C; Company D). In addition, refining the idea further needs both the development team and the organization with a challenge to be interested in continuing to work further with the idea.

Nevertheless, the publicly listed companies interviewed for this study have shown that the hackathons can be harnessed to serve as a source for ideas that can be further developed into innovations and new business. These companies have a systemized way on how they approach hackathons so that they can get the ideas born in the hackathon into further development and see if the ideas will refine to true innovations that will either support the current business or create new business. (Company B; Company E).

These two companies also clearly had a vision that the open innovation provides new value to the company and is complementing the internal innovation. Junction as a hackathon was seen interesting since it draws a diverse group of tech-savy participants, who most likely have out

of the box ideas that might have not already invented inside the company. Both of these companies also had clear internal development programs ongoing, and the challenge in hackathon was tightly attached to these (Company B; Company E). Even if the other two companies with a motivation in inbound open innovation had linked the challenge to existing development focus areas (Company D; Company F), the link was significantly tighter with the previously mentioned companies.

Apart from the inbound open innovation, analysis of the interviews shows that the main reason in partnering with Junction was marketing. While the three privately-owned companies had the marketing as their main motivation, the three publicly listed companies had marketing as their secondary reason in joining the Junction. This means that every company interviewed for this thesis had the marketing as a source of motivation in some degree (see Table 3). In addition, Company A had a secondary motivation in outbound open innovation. This had a strong link to marketing a new technology for the participants that were seen as potential utilizers of the technology product (Company A).

According to Bradshaw and Malkki, companies can approach hackathons from various angles. If the companies lack internal innovation, they might want to join the hackathon to get ideas that could be refined to innovations. If the companies do not have difficulties with innovation, they can approach the event from marketing or recruiting point of view. (Bradshaw 2018; Malkki 2018). As presented in Table 3, these three main options that came up in the interviews with the hackathon experts were all present in the interview with Junction 2017 partner organizations interviewed for this thesis.

4.2.2 Targets set for the hackathon event

As described earlier, the first research question of this thesis was approached from two sides to make sure that the core findings are reliable. The analysis of targets set for the event was done according to the data-driven content analysis method. First the expressions of the targets set for the event were simplified and categorized into larger entities. The categorization continued until the main class was initially found, meaning that any new categories could not be created to include more than one of the already created categories. The result of the analysis is shown in Table 4.

Targets set for the hackathon event			
Simplified expression	Sub-class	Class	Main class
”…to seek ideas outside the organization” (Company B, D, E, F).	Idea generation	Inbound open innovation	Open innovation
“…to invest in innovative teams or acquire them” (Company E).	Investing in teams		
“…to introduce the new product for developers” (Company A).	Idea sharing	Outbound open innovation	
“…to be present for the tech community” (Company C).		Being part of tech community	Marketing
“…to give a positive and innovative image of the company to the participants” (Company B, C, D, E, F).		Employer branding	
“…to give a better picture of our offering and what we really do” (Company A, B, C, D, E, F). “…to be remembered” (Company B, C, D, F).		General marketing of the company	
“…to recruit talented people” (Company B, C, D, E, F).		Seeking talented individuals	Recruiting

Table 4: Targets set for the hackathon event

According to the analysis, the targets set for the event are well aligned with the motivation in partnering with Junction and joining the hackathon event. As Startup Sauna’s Head Coach Mike Bradshaw put it, one of the most important ingredients of a successful hackathon from organizer’s point of view is to set clear targets for the event (Bradshaw 2018). This was also something that many the Junction partners mentioned, when asked what they could have done differently or better as organizers (Company A; Company D; Company F).

As the analysis show, the targets set for the event are rather general by nature. There were no numeric, quantified targets set for the event, whether the motivation behind joining the hackathon was marketing, recruiting or open innovation. This might be because of the nature of the event, since it can be hard to measure the success in these by numbers. For example, being part of the tech community and being present as a brand are targets that are difficult to quantify. It is also hard to measure whether the targets set are achieved or not, even if

those are measured in a qualitative manner. This also came forth in many interviews (Company B; Company C; Company D; Company F).

The lack of clear targets and measurement might also stem from the nature of Junction as an event. Even if it did not come up as a target, companies might want to join the Junction with casual and easygoing mentality to be easily approached, since that is after all the nature of the whole event. Some of the companies expressed in the interviews that they were especially proud of how they looked after and cared for the teams (Company B; Company F). The partner organizations thus might have seen this as enough of a target just to join the event and to create positive atmosphere among the participants in the event.

However, the findings in analysis do support the results of organizations' motivations for partnering with Junction and have a straight correlation with these. This supports the reliability and eligibility of the results presented in the chapter 4.2.1.

4.3 Results realized from the event

The last themes of the interviews contained questions on how the organizations had achieved the targets they set for the event. The questions also covered the possible further steps of the process, meaning both further development of the ideas and co-operation with the hackathon development teams that participated in the challenges. The purpose of this theme was to provide information for the background of the second research question of this thesis:

Q2: Have organizations succeeded in exploiting the inbound ideas in their innovation process?

When asked about the results realized, all the interviewees told that in terms of success the overall feeling of the event was positive. Still, it seemed hard for every organization to reflect whether they had achieved the targets they had set for the event. Based on this, the interview might have been the first place for many organizations to reflect the participation at all. This gives a picture that just the presence in the hackathon is seen as a value that justifies the partnership with Junction.

According to the research questions, the interest of this thesis is on inbound open innovation, and this guides all the analysis done. However, since the research data related to both marketing and recruiting provide interesting information that supports the further analysis of the results in open innovations, also these are partly recognized in the analysis of the results realized.

When reflecting the results realized on the targets set for the event, the targets for marketing seemed to be hardest to verify. In most of the cases, presence in the event was seen as enough, since the event itself provided visibility for its partner organizations. The interviewed companies tend to measure the success comparing the presence to other partner organizations, which is natural when the numeric individual targets are hard to measure quantitatively, e.g.:

> *"We gave away a lot of t-shirts and other marketing stuff, these run quickly and participants were lining to get those."* (Company B).

> *"We had a really good place for our stand right next to the entrance so everyone had to see us with all the big companies."* (Company C).

> *"We had a superb stand compared to others. When others came to the event with give-away-candies, we had a full set of technical equipment to show for the participants. People were amazed of this technology we had."* (Company D).

Only one of the organizations had tried to quantify the results reporting the visitors of its products website, but the other comments in reaching the results in marketing were on a higher level:

> *"We had a peak in our *new product* website during and immediately after the event."* (Company A).

The targets on recruiting were a bit clearer and easier to measure. Many of the organizations associated the success in these targets in the interviews and conversations that they had had with the participants, e.g.:

> *"We had our HR present and they did a lot of interviewing at the event. I'm not sure whether the interviews have resulted in anything."* (Company E).

> *"We succeeded in doing lot of interviews in the event."* (Company C).

The previous examples give a picture of the potential of a public hackathon for partner organizations. However, the focus of this thesis is on how organizations have utilized the hackathons for inbound open innovation and thus the highest interest is on the results related to inbound open innovation. As defined earlier, the path to true innovation starts from idea creation, continues with idea refining and leads to the implementation. Only after implementations the idea becomes an innovation (see Picture 1).

Reflecting the results for open innovation seemed to be on a deeper level in general than the reflection of the results related to other targets. As an observation this suggests that the results of open innovation have been more actively followed by the organizations and that reflecting between the targets and results have been done also in another context. As stated earlier, reflecting the other targets and results seemed to be on a level that gave an impression that the interview would be the first time where this had been done.

In total four of the organizations interviewed had their motivation and targets on open innovation in either primarily or secondarily. Three of the organizations were publicly listed companies that had their own innovation departments. These companies also had the primary motivation in inbound open innovation. Two of these companies seemed to have a clear model on how to connect the hackathon as an idea platform to their own innovation management model, and the readiness in working further with the ideas was on an exceptional level (Company B; Company E), since according to Malkki's experience, it is really uncommon that organizations have this kind of readiness (Malkki 2018). The two companies measured the results on how they had managed to continue with the ideas from the hackathon and how many of the ideas were moving forward in co-operations with the hackathon teams even if they had not quantified the targets on these. These organizations had clear action plans for the time after the hackathon, and they had prepared themselves for many possible ways of continuing the development of the ideas:

> *"We did get ideas from the event. We arranged an internal pitching possibility for the best teams so that our managers and decision makers internationally could hear these ideas. Every team joined in this event and were eager to pitch their idea. At least one of these ideas got support so that it is now continued in co-operation with one of our business units, and I guess one team of younger participants will be employed for the summer."* (Company B).

> *"We have various options on how to continue with the ideas born in hackathons. In this case the idea refining continued in a business unit, but I'm not sure if this has resulted in anything concrete yet."* (Company E).

These two companies that had the open innovation as a main motivation also had thoughtfully planned how to integrate the hackathon on the innovation process and how to take along the participants of hackathon challenge winners to continue developing the ideas. These companies also had taken along the business units and decision makers as stakeholders that have the true interest in continuing with the ideas. This is an important finding, since the idea refinement seem to need taking the critical stakeholders along to the process as soon as possible.

According to Bradshaw, one of the most important things when trying to get ideas and innovation out of hackathons is to plan how to continue with the teams to refine the ideas to innovations (Bradshaw 2018). Associating this with the innovation phases presented on Picture 1, it is highly important to understand that the idea creation is only the first step in the innovation process. In addition, according to Bradshaw the idea creation is trivial (Bradshaw 2018), so the following phases should be seen in an important light and these are just the phases where companies usually have problems considering hackathons (Company C; Malkki 2018).

It was clearly visible in the interviews that these two companies had genuinely considered the time after the hackathon to continue developing the ideas further, which also seemed to correlate with how eager the participants were to continue with refining the ideas and participate in further meetings. As quoted earlier, one of the companies had organized an opportunity for the hackathon development teams to present their ideas from the hackathon to a larger audience, which consisted of the management and decision makers of the company internationally. Every team invited to this event joined in, and the work with the teams continued if there were people in the audience that saw the idea as potential and were willing to continue to develop it further with the original team. This event also got good feedback from the teams who got the possibility to continue with the ideas. (Company B).

If the companies had not planned on how to foster the ideas born in hackathons any further, also the participant teams seemed to withdraw themselves. For example, one of the companies included some kind of organized visit to their office premises, but it was clearly hard to get the teams interested. (Company C; Company D; Company F).

All the three largest companies interviewed had their own innovation departments with their main focus on fostering innovations and innovation culture in the organization. Based on the findings of this thesis I argue that the existence of the innovation department has a correlation on the need for inbound open innovation techniques. While the small and medium sized organizations might innovate comprehensively inside the organization, the large companies need to have their own departments that look after the innovations. It is natural that these departments also look after the external possibilities, that is open innovation. It is also to be noticed, that the processes of open innovation need resources to practice (Greco et. al. 2016, 512; Tidd 2014; 7 - 9). In addition to the fact that the small and medium sized companies might be more innovative by nature, there might be a causality with having the own innovation departments and practicing open innovation. The open innovation might thus need sufficient resources with high interest in innovation practices to be initiated as a process.

To summarize, the findings of this thesis suggest that organizations that have had the open innovation as their motivation in partnering with Junction and thus have joined the public hackathon, have been able to harness the hackathon as a platform for open innovation so that they have also been able to refine the ideas further according to the innovation phases. Organizations have thus been able to use the results of the hackathon in their own innovation processes. The organizations that have succeeded in this, have their own innovation departments that have been actively engaged with the Junction hackathon. In these organizations the challenge is tightly integrated in existing development programs and there have been clear plans on how to continue with the ideas after the actual hackathon event. It is extremely important to notice that hackathon is only the first phase used for idea creation in the innovation process, and the following phases after the hackathon are highly important. If the focus is solely on the hackathon event and there are no plans on how to progress with the ideas that come up in the hackathon event, the ideas will most probably die in the lack of interest.

4.4 Recipe for a successful hackathon

At the end of each interview the interviewees were asked what they could have done better and what they did well considering the hackathon and the times before and after the event. Based on the answers of the interviews and the findings of the previous chapters, the objective of this chapter is to provide answers for the third research question of this thesis:

Q3: What are the critical success factors of a hackathon considered from a perspective of an organization pursuing for inbound open innovation?

By answering this question, the further aim of this chapter is to provide development ideas, or a recipe for a successful hackathon, for the organizations that are either considering arranging a private hackathon or joining a public one like Junction. These ideas can also be utilized in organizations that consider their position and approach towards open innovation or reflect their actions in hackathons that they have experienced.

The next sub-chapters will introduce the four success factors of a hackathon from open innovation point of view. The success factors are put in chronological order and each of the success factors forms its own chapter. Every success factor is approached from various angles that can be called as ingredients that form the full recipe of a successful hackathon.

4.4.1 Definition of motivation and targets before engaging in a hackathon

Even if every partner organization interviewed was considering the hackathon as a success, it clearly came up that there were a lot of small things that many of them would have done differently. Defining the motivation and fitting the targets to support the motivation came up as one of the key success factors. Why?

This thesis is a case study of a public hackathon, which presumably differs a lot from private hackathons. As it came up both in the views of the partner organizations and the hackathon experts, public hackathons can be seen more as a platform for marketing and recruiting (Bradshaw 2018; Malkki 2018). The support that public hackathons gives for the objectives of open innovation is practically non-existent, and this is what some of the companies with open innovation as their agenda commented strongly, e.g.:

> *"There were no guidance or practices how to continue with the hackathon teams after the hackathon. The teams with their ideas seemed to scatter all over. I have already given feedback that some kind of incubator or accelerator for the hackathon teams would be useful and it would also support the partner organizations to continue working with the teams."* (Company E).

The partner organizations also openly reflected their ideas of arranging or participating in hackathons in the future. From these comments it can be seen that the open innovators are preferring other concepts than public hackathons in the future, e.g.:

> *"We have not made a decision in joining the Junction 2018 yet. What we are thinking is that we could hop on straight to the next stage and arrange an internal hackathon."* (Company D).

> *"We have had plans that we would have internal hackathons to not only create the ideas but foster these further as ready concepts internally. The hackathon-way of working would suite that well, but in public hackathons it is impossible to have the same results as internally. We do not lack the ideas, but the time to take these further."* (Company A).

According to the views of the partner organizations a public hackathon might thus not be the right choice of hackathons if the motivation in joining is purely on open innovation. The hackathon expert also strongly had the same view:

> *"To be straight, some public hackathons have a reputation of recruiting fairs. The open innovation is secondary."* (Malkki 2018).

> *"It depends on what you are looking for. If you are a small company that needs to build the reputation, the public hackathons might be just the place. If you are looking for ideas and open innovation, there might be better options, like private hacks".* (Bradshaw 2018).

However, from the marketing and recruiting perspective the situation is another, as Bradshaw stated. If the motivation is purely or mainly in marketing and recruiting (or in some other function that did not came up in this thesis), a public hackathon might be just the right place to take part in. This is also something that came up in the interviews, e.g.:

> *"Being part of the tech community is an integral part of hackathons. Just being present and letting people tinker with new technologies on your challenge is does it".* (Company C 2018).

Based on the findings of this thesis I argue that one of the main success factors is to have a clear motivation and aligned targets. This step needs to be done before the decision to join any specific hackathon, and only after these are set and agreed, it is should be decided which kind of hackathon event would support the motivation and targets in the best possible way – this is as important a step as defining the targets. As it came up in the interviews, just joining the hackathon takes a lot of resources and is thus a significant investment from the organization. To get the most out of the investment, I suggest the organizations pay special attention to motivation and targets they have and choose the right kind of hackathon to support these. If the decision to join is made without a clear vision of the motivation and targets, the hackathon investment and experience can easily be a failure.

4.4.2 Preparations for the event to support the motivation and targets

When the decision in joining the hackathon event has been done following the guidelines on the previous chapter, the preparations for the event should be started as soon as possible. Many of the organizations brought up that they were in a hurry with the preparations and that this stage should have been done better considering it a lesson learned. For some of the organizations the resources needed for the preparations was also a surprise:

> *"We did the preparations and planning on a tight schedule with only a small team. That is when we began to understand that there is a lot of things to plan and even the smallest things need to be taken care of. This really took a lot of time and we could have started the work earlier."* (Company F).

With the necessary time given, there are various important factors to be considered in the preparation phase that correlates with the success of the event itself. First, the challenge for the participants needs to be considered well to align with the targets set. If the motivation and targets are on open innovation, this should be of the highest importance of all the preparations: without a proper challenge for the participants it is impossible to imagine that the challenge would lead to any plausible ideas to refine further. Without an interesting challenge the image the company creates of itself during the event will not be good in marketing or recruiting purposes either.

So, the motivation and targets should guide the definition of the challenge. If the focus is solely on marketing and recruiting, it is important that the challenge would be both highly interesting and easy to approach. The objective of the challenge is thus to create a desirable image of the organization and to attract as much people to take part in the challenge as possible. However, if the motivation is purely on inbound open innovation the companies should link the challenge to their innovation process so that it would support the internal innovation accordingly. These are something that some of the companies had considered when defining the challenge and that also came up when reflecting the results of the hackathon, e.g.:

> *"We thought a lot about the challenge. We did not want it to be too specific, because that would have diminished the attractiveness of it. We linked it to one of our development focus areas, but left a lot of room around it."* (Company D).

> *"We have a specific development program in *the field* that we linked the challenge into. This is how we tried to make sure that we could potentially also use the ideas."* (Company B).

Secondly, the stand or the venue should be considered and planned to support the organization's presence in the event. Some of the interviewed companies had put special effort in building a stand that supported the challenge, and this was considered as a success factor at least in general marketing purposes:

> *"Even if we had limited resources, we really put effort on the stand we had at the venue. We set it up as a storage room, since the challenge of ours was linked to the smart storage decisions. Since we are generally known just as a *field* company, we wanted show that what we also do a lot of other things".* (Company F).

Third, the practical preparations to serve the whole audience need to be considered well. As one of the interviewees with also previous experience from hackathons put it:

> *"Some of the participants are there for just the prices and others want to just tinker with a new technology and have fun. You have to serve both audiences to succeed in a hackathon."* (Company C*).*

Many of the companies for example had marketing accessories that they gave away for the participants: t-shirts, hoodies etcetera. According to the interviews this had a major role in creating a positive image of the organizations.

Practical preparations include also tasks to support the actual challenge. This was a lesson learned for some of the companies:

> *"We run out of the accessories since there were so many participants and teams working on our challenge. That is of course a thing we would do better next time."* (Company A).

> *"We had to do thorough technical documentation that got us hurried in preparations. That is something we don't need internally, but the participants of the hackathon need to get into the systems."* (Company D).

To summarize, there is a lot of practicalities that need to be taken care of when preparing for the hackathon. According to the interviews with Junction 2017 partner organizations the preparations do take more time than would be expected. Based on these interviews, three various areas of preparations came up that correlate with the success of the hackathon: preparing the challenge to support the targets set for the event, preparing the stand at the venue to back up the previous and preparing the various types of practicalities that need to be taken care of. These preparations are to be done with proper time and severity to support the targets set for the event.

4.4.3 Active and multidisciplinary presence to release the potential

In almost every interview the physical presence in the actual hackathon event was raised up either as a lesson learned or a realized success factor. Considering the personnel present at the hackathon event, the need for the right people came up in all the interviews. Some of the organizations had prepared themselves for this (Company A; Company B; Company E), and for some of the organizations recognized the needs during the event trying to react to the need, e.g.:

> *"When we were present at the event we recognized that we could have brought people in from other functions also. For the second day we managed to get HR on the premises for recruiting purposes".* (Company F).

The need for the right people in the event was guided by the potential of the hackathon, and the potential in this case seemed to be exactly the same as the sources for motivation: recruiting, marketing and open innovation. These were also brought up by both of the hackathon experts interviewed (Bradshaw 2018, Malkki 2018). From the open innovation point of view the need was for personnel who could answer the questions from both the business and technology aspects and help the participants to tackle the possible obstacles they faced with the challenge, for example technical issues faced during the development. From the viewpoint of recruiting there was a needed for both HR and business personnel to promote the organization and to interview the people participating in the event, since a lot of organizations did interviews at the event. The need from marketing side was to have people actively present, taking good care of the participants and generally creating a good atmosphere during the event.

Also, the means on how the personnel were present came up in the interviews and this relates especially to marketing. In this case activeness and positive attitude was seen as critical, since according to the interviews the participants of the event were all over the place and the partners could not even know which ones of the groups were taking part in their challenge. This means the organizations had to be both easy to approach and active in approaching the participants to support them actively.

The presence in the event is the culmination of all the preparations and planning. Based on the findings of the interviews I argue that the personnel present should be chosen carefully and there should be clear instructions for the personnel at the event on how they are supposed to act. There should be various roles and expertise present to fulfil the various needs and interests of the participants.

4.4.4 Focus on after-care to nurture the results

The presented development ideas have all focused on the time before and during the hackathon event. These timeframes were also the ones where the partner organizations put the most of their energy into. When asked about the results of the hackathon and time after the hackathon it became clear that only few of the companies had put any significant efforts on this (Company B; Company E).

The organizations that had their main focus on marketing or recruiting all saw it natural that the participants of the hackathon disperse after the actual event, and that there is no need for special plans for the time after the hackathon:

> *"I have experienced many times, as a participant and now as an organizer, that it's really hard to get the people interested of the idea after the hackathons. It's not the lack of interest, but the fact that people get back their own places and the atmosphere of the hackathon vanishes. When the team members are in different locations, it is really hard to reorganize themselves on the subject".* (Company C).

However, an interesting finding was that all the organizations with an interest in inbound open innovation brought up the need for after-care of the hackathon results and interest in refining the ideas further with the hackathon teams. According to the interviews, there was no model for the after-care provided by Junction organization, but few of the organizations had their own process or actions for this. One of these companies had an exceptional way of continuing the inbound open innovation process after the hackathon to refine the ideas further that is described earlier in chapter 4.3 (Company B).

In the interviews almost every company with the agenda on open innovation suggested that the hackathon organizer − Junction in this case − should focus more on the after-care actions and support the partner organizations on this. As suggested in the interviews, this could for example mean some kind of incubator or accelerator program that could be arranged for the hackathon teams that have succeeded in the hackathon challenges (Company D; Company E). According to the experiences from Junction 2017, all the responsibility on the after-care fell into the laps of the partner organizations.

I argue that the time after the hackathon with proper after-care actions is as important as the time and actions before and during the hackathon event. As a suggestion for development, every organization joining a hackathon with a focus on open innovation should consider the fact of how they are planning to do the after-care actions if the possible organizing partner do not have any model on this. If the focus is truly in open innovation, all the good work before and during the hackathon will be useless, since the potential ideas will not continue in the innovation process and have the possibility to be refined and developed into innovations − that is the main focus on the inbound open innovation after all.

To summarize, the findings of this thesis resulted in concrete success factors put in four chronological stages. These success factors serve as development ideas for organizations that are planning to organize or take part in a hackathon pursuing for open innovation. These are:

1) Definition of motivation and targets before engaging in a hackathon,
2) Preparations for the event to support the motivation and targets,
3) Active and multidisciplinary presence to release the potential of the event,
4) Focus on after-care to nurture the ideas.

I argue that following these chronologically presented guidelines the organizations can get the most out of a hackathon. The presented success factors together with the single ingredients formulate a clear and concrete recipe that can be followed by the organizations that want to harness hackathons for open innovation purposes. The success factors of the recipe do also recognize some actions that can be done to exploit both marketing and recruiting potential of the hackathon events. Even if the recipe is a result of the case study of a public hackathon, the single ingredients can easily be adjusted according to the need and applied to various hackathon contexts.

5 Conclusions

In this thesis I have studied inbound open innovation in the context of a public hackathon. The research is guided by case study practices and the research is qualitative on its nature. The case studied is “Junction 2017 hackathon” and the research data is collected by semi-structured interviews that have been arranged with six Junction 2017 partner organizations. These partner organizations chosen included all small, medium sized and large companies, with a majority in large companies. Half of the organizations chosen for the interview are privately-owned while the other half of the organizations are publicly owned, listed companies. The presumption when choosing the participants was that there are differences on how companies of different size and with deviant ownership backgrounds approach the open innovation techniques.

In addition to the interviews with Junction 2017 partner organizations, two hackathon experts were interviewed to support the background data based on previous studies and theories. While there are plenty of research in open innovation, previous studies in hackathons are scarce − this is where the mentioned interviews with hackathon experts come to help. Using multiple sources in collecting the data also contributed to the validity of the research (Yin 2014, 45 - 50).

In open innovation most of the studies are at some level based on the groundwork or Henry Chesbrough, who has created the first theories in open innovation in the beginning of 2000.

Since the open innovation as a phenomenom is happening here and now, it has also been a subject for many researchers in the field of innovation and R&D (for the description of the popularity, see e.g. Lazzarotti & Mancini 2017).

Using the term open innovation is becoming more and more popular in various contexts and the hype of open innovation as a concept is on a rise. However, when open innovation research recognizes three separate processes in open innovation, the term generally used in practice focuses on only one of these (e.g. Open Innovation Meetup 2018), which is the inbound open innovation process. This easily gives a too simple meaning for the complex phenomenon that open innovation all in all is. Since the three open innovation processes differ from each other significantly, it would be useful to clarify the meaning when talking about open innovation in general.

The three open innovation processes – inbound, outbound and coupled process – are described in detail in chapter 2.2.2 and Picture 2 on this study. The interest of this thesis is focused especially on inbound open innovation. To summarize, the inbound open innovation process is the most common of all the processes and can easily be experimented without a need for a change in strategical mindset of the organization. This is also the process where the general use of the term open innovation often points to: using external resources in idea creation.

The theme interviews were based on the research questions and research mission defined for this thesis. The research questions that guide the analysis were:

Q1: Are public hackathons commonly utilized as a platform for inbound open innovation?

Q2: Have organizations succeeded in exploiting the inbound ideas in their innovation process?

Q3: What are the critical success factors of a hackathon considered from a perspective of an organization pursuing for inbound open innovation?

The development mission of this thesis was to introduce the ingredients of a successful hackathon from the view of open innovation and provide a holistic, practical recipe for organizations' use. The provided recipe is to serve as a practical tool for organizational development for those organizations that are planning to arrange an internal hackathon or take part in public hackathon in future. This aim of this thesis is also to help organizations to reflect their hackathon experiences to the findings of this study.

The first theme of the interviews consisted of questions related to background and culture of the organizations' interviewed. This information was used in the analysis to get a better picture of the organizations as a whole, but also to group the organizations according to their use of inbound open innovation techniques. This information was not directly used to answer the research questions, but it was used as a critical background information for making the further analysis of the interviews.

The findings of this classification were surprising. When choosing both publicly listed and privately-owned companies to be interviewed in this thesis, there was a perception that the privately-owned companies would be more agile and modern in their operations, and thus they would also be in the frontline with utilizing open innovation practices, especially in inbound open innovation. This perception was however proved wrong by the results of the analysis. As seen in Table 1 of this study, all the three publicly listed companies were found using inbound open innovation techniques, but only one of the privately-owned companies did the same.

The research question if hackathons are utilized as a platform for inbound open innovation was approached from two sides: from the view of organizations' motivation in partnering with Junction 2017 and from the targets that organizations set for the hackathon event. The two-sided approach was chosen to make sure the findings are reliable, since the question is in the core of the entire thesis. Reliability of these findings is a pre-requisite for the rest of the study.

Analysis of the organizations' motivations in partnering with Junction 2017 revealed that two of the organizations interviewed were attending the hackathon solely on other purposes than inbound open innovation, while half of the partner organizations had open innovation as their main interest and one as a secondary source of motivation. Since every organization had more than one sources of motivation in partnering with Junction, it was necessary to divide the sources of motivation as primary and secondary motivations. All the companies that had the main motivation in open innovation also had other motivations in partnering with Junction, and all these companies were publicly listed ones.

All in all, there were three separate motivations that organizations had on joining the hackathon: 1) marketing, 2) recruiting and 3) open innovation. Marketing was the most popular motivation with half of the interviewed organizations having it as their main interest in joining and the other half as a secondary reason. That means that every organization had marketing somehow on mind when making the decision in partnering with Junction. The secondary common motivation was recruiting as five of the organizations had in as their secondary motivation, but none of the organizations had in as a main interest. Open innovation as motivation was divided in inbound and outbound open innovation, since one of the companies clearly had

the outbound open innovation as a secondary motivation source. As said previously, only three companies had the inbound open innovation as their main interest and one as a secondary – this makes the inbound open innovation the least common motivation source for joining the hackathon in this case.

The most interesting finding was that the three organizations that had open innovation as their main source of motivation in partnering with Junction were all publicly listed companies while all the other interviewed organizations were privately-owned companies. When choosing both publicly listed and privately-owned companies to be interviewed in this thesis, there was a perception that the privately-owned companies would be more agile and modern in their operations, and thus they would also be in the frontline with utilizing open innovation practices. This perception was however proved wrong by the results of the analysis.

According to Mike Bradshaw, one of the hackathon experts interviewed, publicly owned big companies usually find it harder to innovate, so they have to open up the innovation channels to get innovations inside the company. People working at these companies tend to lack the innovation and ideas, or the culture does not support standing up with those ideas and innovations. At the same time the new startup minded companies are usually founded by people that are highly innovative by nature, and the culture tends to draw the same minded people to the company. (Bradshaw 2018). The same view was also provided by one of the interviewees of the partner organizations, who had diverse experience in hackathons (Company C).

The finding on the innovation culture and use of the inbound innovation techniques were found to give new perspective considering the open innovation: after all the openness of organizations' innovation culture might not correlate at all with the innovativeness of the organization. When Chesbrough (Chesbrough 2006a/b) provides the view that open innovation is crucial in the modern world for every organization, the finding of this study gives a reason to question this perception: the open innovation – at least when it comes to inbound open innovation – might not be necessary or even important at all to the organizations that do not have problems with the lack of ideas and innovations.

The theories on open innovation are mostly based on studies of large organizations and the theories have been generalized to apply all organizations whether it is large or small, modern or traditional. According to the findings of this thesis, the open innovation theories and best practices might not apply at all to the new startup-minded companies or companies, that have the internal innovation process working. The value in open innovation is based on the true value the innovations bring to the business or operations. If the same value can be generated through internal closed innovation process, there is no justification in valuing the open innovation higher than the closed innovation.

These findings were supported by analyzing the targets that organizations had set for the event, since the targets correlated straight with the motivation. The correlation gives credibility to the findings presented above.

Answering the first research question, based on the analysis of the interviews with Junction partner organizations hackathons are used as a platform for inbound open innovation, but that is not the only value a hackathon can provide to an organization. With regards to the other motivations and reasons in joining the Junction, it can be seen also as pure marketing and recruiting event for some organizations.

When making conclusions, worth noticing is that the research data of this thesis was purely based on interviews related to experience in public hackathons. Considering the different natures of private and public hackathons, it is highly probable that the companies arranging private hackathons would be more interested in harnessing the hackathon in idea creation for the basis of open innovation, and that the focus on both the marketing and recruiting would be a lot smaller. This came up in some of the interviews with Junction partner organizations and in both of the interviews with hackathon experts (Bradshaw 2018; Company A; Company D; Malkki 2018). Some of the organizations mentioned private hackathons as a possibility for their next hackathon, since these were seen more potential for the open innovation purposes (Company A; Company C). In this thesis the research data was based on interviews solely from organizations that had participated in Junction, a public hackathon. There is a strong presumption that closed hackathons would be focused more on pure idea creation for the basis of open innovation. This presumption is supported by the views of the interviewed hackathon experts since according to both Bradshaw and Malkki, public hackathons are normally utilized more for marketing and recruiting purposes (Bradshaw 2018; Malkki 2018).

The second research question of the thesis was interested if organizations have been able to use the results of hackathon in their innovation process so that the ideas would have had the possibility to be refined further and grow to true innovations. According to the interviews with the Junction partner companies, it is possible to harness the hackathon event for a platform for inbound open innovation. This however requires a lot from the partner companies, since according to the interviews the Junction does not provide much support for the partner companies in this (Company D; Company E), and the same situation applies presumably also in other public hackathons. Junction can so serve as an event providing the external expertise and knowledge to provide ideas on how to tackle the given challenge, but from this on the company has to take the responsibility to continue with the participants to refine the idea further. As presented in this thesis (see chapter 2.1.1) the idea creation is just the first of

three phases of innovation: to get the idea to the stage of innovation it has to be refined further and implemented into use to provide potential value.

According to the interviews, only the organizations that have had their innovation processes in such a condition that it also supports open innovation − inbound open innovation especially − have been able to continue the innovation process to the next steps. This observation might be highly dependent on the nature of the hackathon, and as one of the interviewed hackathon experts put it, there are external hackathon organizers like Industryhack that help companies especially with the next stages of the innovation process (Industryhack 2018). According to the interviews with the Junction partner organizations, it was just these next steps that they encountered problems with. Two of the four companies that had their motivation of joining Junction in open innovation even presented a view that Junction could have some kind of accelerator for the participant teams to get further with the ideas with the support of the partner organizations (Company D; Company E).

However, it is possible for the organizations to continue the innovation process around the ideas that are born in public hackathons. According to this thesis, it requires a clear plan on how to take the next steps. This plan must be done before the actual hackathon event so it can be communicated to the participants and the process continues seamlessly. If the organizations starts the planning only after the hackathon event it is too late since the gap between the idea and the refinement actions easily grows too big.

The third research question of this thesis was interested in the ingredients of a successful hackathon from open innovation's point of view and the development mission of this thesis was to introduce a recipe of a successful hackathon for organizations that are planning to arrange or take part in hackathon pursuing for open innovation.

The findings of this thesis highlighted four separate success factors of a hackathon from the open innovation point of view. These are presented chronologically to help the practical use of these. Every success factor can be approached from various angles that can be called as single ingredients in the full recipe of a successful hackathon.

The first success factor was definition of motivation and targets before engaging in a hackathon (chapter 4.4.1). The main finding in this was a fact that almost every organization had made the decision to join the hackathon before giving a thorough thought on the motivations and targets. Even if public hackathons according to this thesis can be used for various purposes, I argue that if the motivation for joining the hackathon is solely on open innovation, a public hackathon like Junction is not the best option for these organizations. There are two main reasons in this: the lack of organizing partner's support in the after-care and disunity of

the teams that are built on the spot. For example, it is hard to continue refining the idea with a team with members from various countries who already have a job of their own (example given by Company C). When the organizations have the motivations clear before making the decision to join a hackathon, it would help the organizations to reason the right kind of hackathon for them. A lot of potential is missed if this is done upside down and the decision to join a specific hackathon is made before considering the primary motivations.

The second success factor found was a need for thorough preparations to support the motivation and targets (chapter 4.4.2). This success factor also included the need for other preparations for the actual event to get the full potential out of it. In addition of all the practical preparations that need to be done carefully to provide a pursued experience for the participants, it is highly important to plan and prepare the actual challenge that the teams will work on during the hackathon event. The challenge should be well aligned with the motivations and targets set for the hackathon. If the primary motivation and targets are on marketing or recruiting, the challenge should be as interesting as possible to both attract as much teams to work with it as possible and to provide a positive image of the organization. However, if the primary motivation is on open innovation, the challenge should be based on a concrete case so that the hackathon results could be integrated into the organizations innovation process and the ideas born in hackathon can easily be taken into refinement process. Still it is important to plan the challenge so that it is intriguing enough to get teams to work on it. The other practical preparations and planning the stand at the venue should support the challenge. Practical preparations include for example preparing the technical environments and documentation to help the participants to grab the challenge from fly, since often this needs special attention (example given by Company D). The stand at the venue should be attractive and visual to help the participants to perceive the operational environment of a challenge: one of the interviewed organization had for example build their stand to resemble a storage to support the challenge which affiliated with smart storages (Company F). Many of the interviewed organizations felt that they could have done better with the preparations and that it would have resulted in better presence at the event (e.g. Company D; Company F).

The third success factor found was active and multidisciplinary presence in the hackathon event (chapter 4.4.3) to release the full potential of the event. According to most of the interviews, the hackathon event required active presence since the participants and teams of the hackathon dispersed all over the premises. To some organizations it even came to a surprise that some teams had worked for their challenge, since there were no possibilities to track the teams (example given by Company D). From the partner organizations this required activeness in approaching the participants and being proactively present for them. Multidisciplinary presence helps to exploit all the potential of the hackathon event. From open innova-

tion's point of view, it is important to have people present who can concretely help the participants with understanding both the technical aspects and business environment, and can guide the teams in these. From a recruiting perspective it is important to have recruiters or managers present at the event to be able to interview the participants and to provide initial feedback on the possible further actions. From a marketing perspective it would be recommendable to have active personnel present to answer the overall questions about the company, distribute the marketing material and serve the participants in other ways. Even if the organization's motivation would be purely in open innovation, it would be waste to not utilize the full potential provided by the event. On the other hand, if the organizations lack the right personnel and attitude at the event, it can even lead to negative results compared on the targets set for the event. The presence in the event is a clear success factor that came up in the findings of this thesis.

The fourth and last one of the success factors found was focus on after-care (chapter 4.4.4) to nurture the results of hackathon further into potential innovations. From open innovations point of view the time after the actual hackathon event is highly critical and this especially came up in the context of a public hackathon. According to the interviews, Junction as an organizing partner had no model in helping the partner organizations in after-care of the results, but this was solely on the shoulders of the partner organizations. As described in the second success factor found, it is crucial to have plans also for the time after the hackathon on how to integrate the hackathon on the innovation processes that companies have. Only two of the companies interviewed had clearly planned the after-care actions, and both of these organizations were able to take ideas from the hackathon to refinement process after the hackathon event. In contrast, one of the organizations with primary motivation in open innovation had no plans for the after-care, and thus the ideas had died and the hackathon teams dispersed after the hackathon. Given that both the organization and the participants would have been interested in refining the ideas further, the whole process with preparations, planning and presence in hackathon has mostly been a waste of time for all. Observed from marketing point of view, it does not give too good picture of a company use all the energy of both sides to not continue with the process at all. Thus, the focus on after-care is a success factor that culminates the whole process and is an enabler for the true open innovation to be happened in hackathons.

The background of this thesis provides a clear framework of both hackathons and open innovation practices. With this background information organizations can have a practical, theory supported approach on the subject. The findings of this thesis help organizations in choosing the right way of utilizing the potential of hackathons. This thesis also gives practical guidance on how to succeed in hackathons and to recognize the most critical success factors from the open innovation's point of view.

This thesis also gives new perspective on open innovation. An interesting finding that was supported also by the interviewed hackathon experts was that the companies that are innovative by nature do not see the inbound open innovations as useful, since they already have their backlogs full of development ideas created inside the organization. These organizations bolster the innovation of employees and the ideas are born naturally. In case of the large organizations interviewed, the interest in open innovation was high. As a conclusion these companies find it harder to innovate internally, and thus the need for inbound open innovation is high. However, this finding concerned only inbound open innovation.

This thesis creates also needs for future research on the subject. It would be interesting to compare the use of other open innovation techniques in these companies, since a strong perception is that smaller companies would be using these more than the large ones as it easily requires agile strategic level decisions considering the business models. It would also be interesting to research the decision process and the possible change of motivation and targets during the process, since there were hints that the motivation might have changed during the decision process of the organizations interviewed for this thesis.

All in all, this thesis brings together a lot of information regarding both open innovation and hackathons providing interesting insights on the subject. In addition, the thesis provides clear development ideas for organizations to use in practice. However, a lot of interesting and important questions of the combination of hackathons and open innovation remains untouched – there is still a plenty of room in the sandbox.

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