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Influence of the entrepreneurship and innovation ecosystem on university-based startups: A case study of Aalto University.

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Abstract

Nowadays, universities have started to raise their heads about creating environments, which potentially can yield innovation and foster entrepreneurial activities. In Aalto University, both the students and the university have taken action to build an entrepreneurship and innovation ecosystem (E&I), which through an environment consisting of human, social, intellectual and financial capital, would bring prosperity within the ecosystem, as well as to its surroundings; thus potentially contributing positively to the Finnish economy.

The purpose of this research was to look at the phenomena of entrepreneurship within a university environment, specifically within the Aalto University entrepreneurship and innovation ecosystem. Therefore, the aim is to contribute academically in terms of knowledge about opportunity development and entrepreneurial motivation, as well as provide practical implications for Aalto University in the form of concrete development suggestions.

In terms of entrepreneurial motivation, the results indicate that the student entrepreneurs were mostly motivated by pull-motivational factors, specifically improvement-driven factors. The specific factors were *learning and personal growth*, and *desire for independence.* Push-factors had only minimal effect, and against previous studies, these case-entrepreneurs did not regard *earning a higher income* as a motivational factor.

For the case entrepreneurs, opportunity development process had been quite straightforward and in general followed the opportunity development model proposed by Ardichvili et. al (2003). However, three changes to the model were made based on the research results: addition of *positive entrepreneurial experience* as an influencing factor, addition of *entrepreneurial motivation* as part of the model, and dividing *entrepreneurial alertness* into to two levels of activeness; *passive alertness* and *active search* for entrepreneurial opportunities. The primary influencing factors for the entrepreneurs had been *prior knowledge* and a *positive initial entrepreneurial experience*. Moreover, the importance of the team has been highlighted in this study.

Lastly, the study suggests concrete steps on how to improve the current Aalto University E&I ecosystem based on the reflections of the case-entrepreneurs. In general, all of the elements of the ecosystem had been used in the venture creation processes, however some having more weight than the others. The results indicate that the *External E&I community* had been used significantly less than the other parts of the ecosystem, in which the rest had had quite even distribution of usage

Keywords entrepreneurship, innovation, ecosystem, opportunity development, startup, entrepreneurial motivation

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1. INTRODUCTION

1.1 Background

Today there is a visible change in attitudes towards entrepreneurship in Finland, especially amongst the Finnish youth. Some of the reasons lie in the uncertainties of working opportunities and the threat of unemployment. This is a prominent shift in the university students and graduates. However, not only these factors play a role, but the working styles and desires have changed as well. Meaningful work, freedom and interesting opportunities are something people look for in addition to their daily income. In Finland, the government, educational institutions, entrepreneurship associations, as well as various other organizations are looking for ways to support this entrepreneurial movement. (Pölkki 2015, Rikama 2014: 44)

These changes in attitude do not only benefit the individuals. Studies around the world demonstrate that entrepreneurial activities and small businesses play an important role in rapid job creation, spurring innovation, increasing the nation's GDP growth, as well as long term productivity. (Isenberg 2010, Amoros et. al 2013: 13) This is important especially today when the economy has slowed down and the unemployment rates are growing. (Statistics Finland 2015) According to a special report on startups by *The Economist*, in the past, economic uncertainties and social changes have driven people towards entrepreneurship and careers in new ventures. As seen in the 2008 Economic crisis, especially people born in early 1980's have started to 'abandon hope of finding a conventional job' and look for job opportunities in startups or buid something of their own. (Siegele 2014: 2)

The good news is that in Finland today, "The Finnish start-up scene is more vibrant than ever and the startup community has gained importance in our economy," says Marjo Ilmari, the director of startup companies at Tekes. (Cord 2014) During the economic slowdown in the past years the pressure and hopes have been placed more and more towards SME's, start-ups and micro-businesses. The most current employment report of 2014 the Finnish Ministry of Employment and the Economy, explains that from a political point of view it's important to highlight the significance of growing and quickly developing companies to the Finnish Economy. Moreover, the ministry

hopes that new innovations and growth companies will boost the economy currently lacking a direction and vision. (Rikama 2014: 44)

The factors that affect startups and entrepreneurs in the environment seem to have been well established here in Finland. As Tiina Liukkonen, the chief communications officer of Slush[1] explains, "We have an exceptionally strong grassroots ecosystem for start-ups. We have high level of tech talent. We have low bureaucracy and it is easy to found a company and highly networked society, which makes recruiting more effective". Moreover, the Finnish mentality is quite persistent. When we decided to do something we will. (Cord 2014)

> *"The role played by universities in generating economic growth and prosperity is now greater than ever."* Björn O. Nilsson, President of the Royal Swedish Academy of Engineering sciences (Olsson 2014: 3)

As quoted above, Universities have the assets to improve the economy by generating growth and wealth. Graham explains that, "Governments across the world are looking to technological innovation as a driver for national grown and to universities as the incubators of this national capacity." (Graham 2014: 1) As a result, an intense competition has developed among universities to maximize the number of growth-oriented spin-offs and to look for ways to enhance their innovation and entrepreneurial activities. (Clarysse and Moray 2004: 58; Graham 2014) Aalto University[2], based in the Capital Area of Finland, has also raised its head in improving and building its innovation and entrepreneurial activities.

The different actions that have been taken towards building entrepreneurial and innovation activities in Aalto University have started to yield results. A recent study conducted by Massachusetts Institute of Technology (MIT), chose Aalto University as one of the three 'rising stars' in its actions towards creating a strong innovation and entrepreneurial ecosystem. The three other universities placed in this 'emerging leaders group' (ELG) were University of Auckland, Imperial College London and Tomsk State University of Radio electronics and Control Systems. (Graham 2014)

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[1] Slush is a non-profit startup conference held every autumn in Helsinki organized by a community of entrepreneurs, students, investors and music festival organizers. Slush brings together startups, investors, tech talent, business executives and media. In the year 2014, 14 000 people, 750 investors and 3500 companies attended the event. (http://www.slush.org)

[2] Aalto University is a university based in Helsinki and Espoo, Finland. It was established in 2010 by the merger of Helsinki School of Economics, Helsinki University of Technology and University of Art and Design Helsinki. The main campus area is situated in Otaniemi, Espoo.

All of these case universities had built their ecosystem in a 'challenging' environment. These challenges included universities placed in cultures that did not support innovation and entrepreneurship activities, were geographically isolated and/or lacked of venture capital.

There hasn't been high 'entrepreneurialism' spirit present in the Finnish universities before and in the Finnish economy in general. Much effort from the university side has previously been placed towards working in larger companies or the public sector. However, as Graham argues "Aalto's emerging reputation as an entrepreneurial environment and, in the view of many interviewees, has been the catalyst for a wider cultural change in national attitudes towards startup activities and entrepreneurship more generally," thus having a greater impact than internally in the University. (Graham 2014: 26)

> *The new strategic paradigm involves exerting leadership—not control—over communities of individuals and organizations. It involves respecting and taking advantage of the intelligence of others around you, and working together to create new innovation. It involves shaping the future, rather than simply defending the enterprises of the past.* – James Moore (Moore 2008: 167)

On its way towards a vibrant and open innovation and entrepreneurial ecosystem, both the university and the students have taken action at Aalto University. According to Tuija Pulkkinen, Vice President of Aalto University, bringing together the human, social, intellectual and financial capital creates innovation and in turn prosperity to its surroundings. Pulkkinen elaborates further that infrastructure is an important element in the equation. Infrastructure is needed to allow random encounters to occur, to promote entrepreneurship as well as reduce the need for coordination. (Pulkkinen 2014: 8) The following figure (**Figure 1**), illustrated by Graham, shows the structure of the Aalto University's internal entrepreneurial and innovation components, E&I. (Graham 2014: 57)

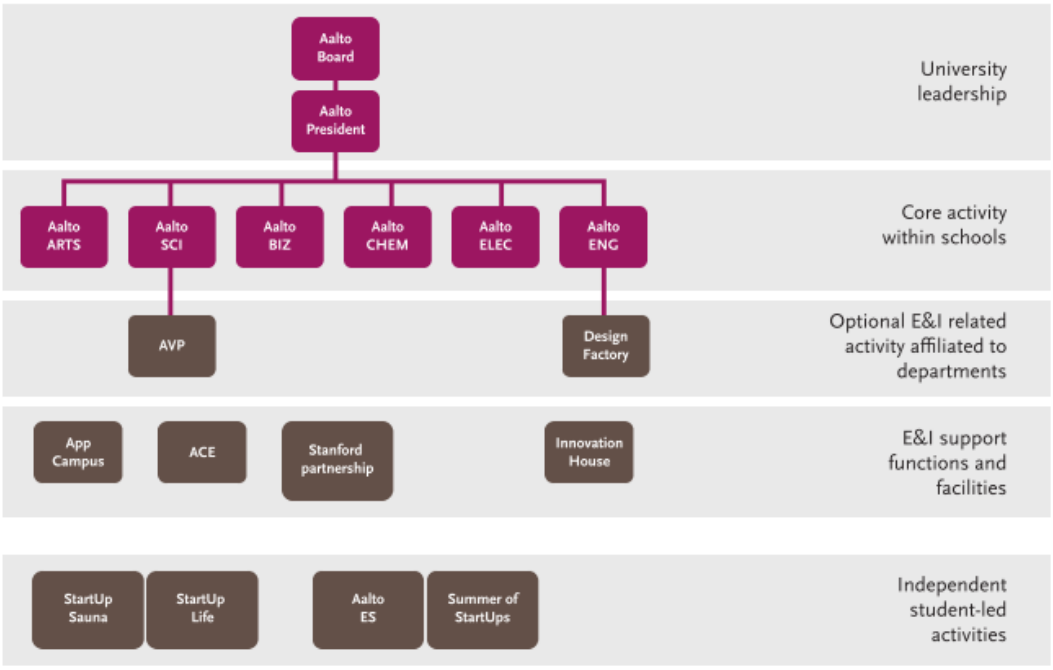

***Figure 1**: Architecture of Aalto University E&I components (university structure shown in purple, E&I support and education activities in brown) (Graham 2014: 57)*

As can be observed from the **Figure 1** above, the Aalto University E&I ecosystem consists of both student-led and university-led components, as well as support functions and facilities. The Aalto Entrepreneurship society, Aalto ES, started by a passionate group of students, as well as Design Factory were the first components of the E&I movement. Both of these were established in 2009, prior to the formal formation of the Aalto University, which was formed in 2010. Since then other parts of the ecosystem have been added. (Graham 2014: 57)

> *"Innovations are not created in isolation. Nor do they develop through a linear process where first basic and then applied research is followed by product development. In reality, innovations are created through interactions that engage both scientific and practical actors."* Vice President Tuija Pulkkinen, Aalto University (Pulkkinen 2014: 8)

Not only does the ecosystem consist of internal E&I activities. The combination of the academia, private and public sector communicating with each other, is the key for an effective ecosystem. (Pulkkinen 2014: 8) The ecosystem in the case of Aalto utilizes the surroundings with its resources and the surroundings draw knowledge, innovation and talent from the university.

As Graham explains that in the case of Aalto it is " building the ecosystem around the university rather than inside the university, regardless whether its directly affiliated or credited to the university." (Graham 2014: 55) To keep the regional ecosystem vibrant, the elements of: active co-creation, high-trust communication, openness and informality should be present. (Pulkkinen 2014: 8)

In Finland today, efforts have been placed to create jobs through entrepreneurship and innovation. One potential and interesting solution has been to create new jobs through ventures established within a university environment. These environments possess knowledge, people and infrastructure, which can potentially lead to successful and innovative businesses. As the entrepreneurial spirit amongst students and staff is rising, the role of the University should be to support this movement and build a working E&I Ecosystem. In Aalto University both students and the university have started to build an E&I Ecosystem. This study will examine how the students and startups have received these efforts.

1.2 Importance of the study

The previous chapter has explained the current situation of the entrepreneurial and innovation environment within the Finnish and Aalto University context. Universities possess assets, which can influence the entrepreneurial actions nationwide. Moreover, the Finnish government has also recognized the importance of entrepreneurship to the Finnish economy and job creation. As described, concrete measures had been taken towards creating an ecosystem in Aalto University, which aims to evoke and support innovative entrepreneurial action taken by students and staff, some of these illustrated in **Figure 1**. The question is, have the startups and innovation formed in this environment utilized these components? If so, which have been the most useful and influential? If not, does the system work as it is or should it be developed further to be more effective?

This study is very current as there already have been actions taken towards an innovation and entrepreneurial ecosystem, as well as rising enthusiasm amongst the students and the staff. The recent study conducted by MIT, pointed out that despite being a 'rising star', Aalto University has challenges that it needs to sort out in order to keep the innovation and entrepreneurial momentum going.

The relevant challenges to this study included: integration of the ecosystem components across the university departments, creating success stories of startups and innovations formed in the environment, as well as shifting attention from the gaming industry over to other innovations. (Graham 2014: 63-65)

To address these challenges presented, this study will examine case companies formed by Aalto University students within its different campuses. In addition, the sampling of the startup cases have been distributed over different fields; not focusing on high technology or gaming industry, while showing good examples of successful startups risen from Aalto University. This information and experiences from the case companies can be used to further develop the innovation and entrepreneurial ecosystem and be used as role models for new ideas.

Academically, little insight exists about entrepreneurial teams formed in university-based environments. (Clarysse and Moray 2004: 58) Research has previously focused mainly on academic spin-offs from universities and only little research is available on startups formed by current students or recent graduates (Hsu et. al 2007: 769; Åsterbro et. al 2012). Moreover, Åsterbro et. al (2012: 663) explain that little recorded information exists on the quantity and quality of startups established by recent graduates, as research has focused mostly on academic spin-offs by faculty and university staff. This research aims to look into startups formed by students within Aalto University. Both Åsterbro et. al and Hsu et. al, explain that this is a research area which is important but very little explored. They hope that in the future there would be more research done over the phenomena of student and graduate entrepreneurship. (Åsterbro et. al 2012; Hsu et. al 2007) Hsu et. al (2007; 769) highlight that universities "provide an important social setting for students and faculty to exchange ideas, including ideas on commercial entrepreneurial opportunities." Moreover, the entrepreneurial intentions and different factors that influence the process needs more research, elaborate Küttim et. al. (2014: 679)

This correlates well with this study, as the aim is to look at the impact of the Aalto University ecosystem on the recently established case companies with a focus on opportunity development process and the founders' motivational factors. One of the most important skills and capabilities of a successful entrepreneur is the creation of a thriving business, from a successful opportunity development process. (Stevenson et. al 1985 qtd. in Ardichvili et. al 2003: 106-107) In addition to studying the process of opportunity development, this study also takes into consideration the motivation of the enterprising agents.

As Shane et. al (2003: 276) argue, previous research in entrepreneurship has done extensive work at looking at the environmental influences as well as the nature of entrepreneurial opportunities, however often ignoring the important role of the human agency in the entrepreneurial process.

1.3 Research objectives and questions

As described in the previous sections, this study will examine the role of the Aalto University innovation and entrepreneurial ecosystem on startups established by Aalto University students. Moreover, the two objectives are to contribute to the research done on university based startups, as well as provide practical insight to Aalto University about the effectiveness of the current ecosystem. The following research questions will be addressed in this research:

- Question 1:
  What have been the students' main motivational factors of engaging in entrepreneurial activities?

- Question 2:
  How do opportunities develop within an entrepreneurship and innovation ecosystem?

- Question 3:
  What measures should be taken to develop the current Aalto University E&I ecosystem to evoke and support innovative business ideas?

The first research questions taps into the motivational drivers of the case entrepreneurs. More specifically the aim is to identify specific push and pull factors that have had influence over the students' engagement in entrepreneurial activities, as well as kept the motivation going throughout the venture creation process. The second research question focuses on the opportunity development process of the case startups. The path of the idea and its development during the opportunity stage will be examined. The opportunity development model proposed by Ardichvili et. al (2010) will be reflected against the opportunity development processes of the empirical data. Key factors during the process will be identified and a critical analysis will be conducted on the functioning of the model, as well as appropriate changes and additions suggested.

The third question in turn will look at the managerial implications of the findings from the first two questions, as well as the reflections that the case-entrepreneurs have had during their venture formation. As discussed in the section on importance of the study, the IE-ecosystem of Aalto University is constantly being developed to be of most use to students and faculty. Therefore, strong and weak elements of the ecosystem will be identified and concrete development suggestions will be drawn from the empirical research of the case-companies and combined with the theoretical side.

1.4 Definitions

Academic entrepreneurship: the efforts and activities that universities and their industry partners undertake in hopes of commercializing the outcomes of faculty research. (Wood 2011: 153)

Entrepreneurship: study of sources of opportunities; the process of the discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate and exploit them. (Shane and Venkataraman 2000: 218)

Entrepreneurial opportunities: potentials for profit making. (Shane et. al 2003: 262)

Innovation: creation, invention or discovery, focus upon the conception of the idea, innovation covers the whole process whereby the new idea is brought into productive use. (Adair 2009: 6)

Innovation ecosystem: an interactive and dynamic network of local actors and dynamic processes, produces solution to different challenges; thus creating innovations. (Oksanen 2014: 4)

University-based entrepreneurship ecosystem: a multi dimensional enterprise that supports entrepreneurship development through a variety of initiatives related to teaching, research and outreach. (Fetters et. al 2010: 2)

2. LITERATURE REVIEW

This section will provide the theoretical backbone of innovation and entrepreneurship. The aim is to understand and research further the concept of university entrepreneurship, entrepreneurial motivation and opportunity development processes, within an entrepreneurship and innovation ecosystem. These following concepts will be discussed generally, as well as from a university and student entrepreneurship point of view. Together these topics will form a theoretical framework, which will be studied further in the empirical side of this research. The construction of the literature review is presented below:

2.1 Entrepreneurship and innovation

Entrepreneurship and innovation often go hand in hand. Drucker (1985: 30) already in 1985 linked entrepreneurship with innovation, by explaining that entrepreneurs use innovation as a tool in their work. Moreover, there are many commonalities between novel small businesses, but in order to be entrepreneurial the venture must possess qualities that are above being new and small. There has to be something different, which emits change and modifies values. In other words, the creation must be innovative. (Drucker 1985: 30)

As innovation is the specific instrument of entrepreneurs, it is the role of the entrepreneurs to turn inventions and ideas into successful businesses, explains Drucker. (ibid) Because of the relationship between innovation and entrepreneurship, they have also been intertwined in this research.

The word innovation stems from *innovare*, which translates into 'to make something new'. (Bessant et. al 2001: 66) Moreover, innovation is about resources that have been underused, combines these resources and in turn creates more value. (Moore 1998) Innovation is often confused with the concept of *invention*. Where as ideas are formed through creation, invention or discovery, innovation means that these ideas are then brought into a productive use. (Adair 2009: 9) Bessant et. al (2001: 67) give a good example of this by noting that it is not the inventors of goods that are remembered, it is the ones that brought the inventions into commercial use. So there are always ideas, good and bad out there, but innovation is to use these ideas well.

The research area of entrepreneurship has traditionally been two sided; the other looking at the individuals or acting agents, and the other studying the economic system and its entrepreneurial activities. (McMullen and Shepherd 2006) In the system level, economists such as Kizner (1973) and Schumpeter (1934) have argued that in order for the economy to thrive, there must enterprising individual pursuing opportunities; entrepreneurial action being very important. Where as, Schumpeter (1943) has stated that entrepreneurs are the destructive force stirring the existing marketplace with their innovations and creativity, in Kizner's research (1978), the role of the entrepreneur has been to look for and utilize the gaps and unused resources in the economy.

While the system-level looks at the phenomena from a wider perspective, the individual-level focuses on the actions of the individuals pursuing opportunities, and why some individuals act on opportunities, while others don't. (McMullen and Shepherd 2006) Shane and Venkataraman (2000: 218), in their work *The Promise of Entrepreneurship as a Field of Research*, explain entrepreneurship as the combination of entrepreneurial opportunities and the presence of enterprising individuals or entrepreneurs. More specifically, the research area of entrepreneurship being the "study of sources of opportunities; the process of the discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate and exploit them." (Shane and Venkataraman 2000: 218) As in this study entrepreneurship is studied from an individual or team level within a special environmental context, this definition presents a good base for this study. However, it is incomplete in terms of leaving out the effects of the environment.

Shane and Venkataraman (2006) have explained that they have limited their study solely on the influence of individuals and opportunities, instead of focusing on environmental antecedents and their consequences.

Many individuals may choose to become solo entrepreneurs, however today a great amount of startups are built over teams of enterprising individuals. (Ruef et. al 2003; Kamm et. al 1990) Many classical 'lone hero'-emphasized definitions exist, however more recently there has been a notion of discussing entrepreneurship as a collective effort. (Ruef et. al 2003; Harper 2006) Harper (2008: 617) explains that entrepreneurial problem solving should be a social process, where entrepreneurs can collectively develop and test out new ideas. Therefore, in this study both individuals as well as teams have been recognized as entrepreneurial agents.

2.1.1 University entrepreneurship

When entrepreneurship research has been combined with the university environment, in the past mainly two types of studies have been conducted. Other side has looked at the value and effect of entrepreneurship courses and programs on students' motivation, and competences to launch a business, while the other focus has been on commercialization of research-based innovations from the academia. **Table 1** below, gives a summary of recent studies conducted over university and student entrepreneurship.

***Table 1**: Summary of recent studies conducted over university and student entrepreneurship*

Name of the study	**Year**	**Authors**	**Main findings**
Entrepreneurs from technology based universities: Evidence from MIT	2007	Hsu et. al	-New business formation of the MIT alumni has grown drastically -Business formation of the alumni correlates with the changes of the external entrepreneurial and business environment
The impact of entrepreneurial capacity, experience and organizational support on academic entrepreneurship.	2011	Clarysse et. al	-Individual attributes and experiences are the most important predictors of academic entrepreneurship -Second important contributor is the social environment -Technology Transfer Offices (TTO) play only a marginal role in academic entrepreneurship
A process model of academic entrepreneurship.	2011	Wood	-A process model of academic entrepreneurship -An identification of the key activities, actors and success factors for each stage of the process

Startups by recent university graduates and their faculty: Implications for university entrepreneurship policy.	2012	Åsterbro	-Recent graduates are twice as likely to establish startup companies than university faculty members -Transforming university policy and goals towards academic entrepreneurship vs. student and graduate entrepreneurship, might not be the most effective way to stimulate entrepreneurial economic development
Entrepreneurship Education at University Level and Students' Entrepreneurial Intentions	2014	Küttim et. al	-Entrepreneurship education has a positive impact over students' entrepreneurial intentions -During these courses students expected more coaching and networking activities, while the universities were more focused on traditional lecturing and seminars
Factors Influencing Students' Venture Creation Process	2014	Venesaar et. al	-On average in Europe, students are starting their businesses during their undergraduate studies -Students studying business and economics, as well as natural sciences were more likely to start their businesses than students studying social sciences -Students' previous working experiences play an important part in finding the business idea, contacts and resources, as well as the knowledge, skills and attitude -In terms of the venture building process, value creation and resource accumulation were the most important parts of the process
Developing the next generation of entrepreneurs: Giving students the opportunity to gain experience and thrive	2015	Bell	-The addition of applied activities to traditional university entrepreneurship teaching, improved the students' satisfaction, engagement and entrepreneurial traits -Activities such as pitching of ideas, presenting findings and reflections, and engaging with the wider community, developed the students' self-confidence

According to Åsterbro (2102), research regarding startups and entrepreneurial activities rising from university environment has mainly focused on university spin-offs created by faculty and staff, almost completely ignoring and leaving out students as the entrepreneurs. From this type of research, known as *academic entrepreneurship,* universities and their partners hope to gain commercializable outcomes from academic research. (Wood 2011: 153) Within the research in academic entrepreneurship, the subject of study has been often the role of Technology Transfer Offices (TTO) on stimulating and facilitating entrepreneurial activities. (Clarysse et. al 2011: 1084) However, in recent studies the effect of the TTOs have been questioned, while individuals' traits and ability to recognize opportunities has been given attention. (Clarysse et. al 2011: 1084)

In terms of the offerings of entrepreneurial courses and programs in Universities, there has been a considerable rise in the amount of entrepreneurial education available to students. (Bell 2015: 37) This type of entrepreneurial education, according to Wilson (2008 qtd. in Bell 2015: 37), can be defined as "the development of attitudes, behaviors, and capabilities that can be applied during an individual's career as an entrepreneur." Not only can these courses prepare students for a career as an entrepreneur, but provide skills for contemporary work and today's living environment through 'enterprising behavior'. (Küttim et. al 2014: 658) However, there has been a debate whether this type of education is effective and successful, as well as what would the appropriate teaching methods be. (Bell 2015: 37) Aalto University holds entrepreneurial and innovation courses across departments, as well as has an own study program on Entrepreneurship. Thus this should be noted as possibly an important factor and component in the E&I Ecosystem in this study.

Recently there has been rising research interest in entrepreneurship amongst students and recent graduates. The phenomena has been spreading across different parts of the world and according to Åsterbro (2012: 675), when compared with university faculty, recent graduates are twice as likely to engage in entrepreneurial activities. Küttim et. al (2014: 678), studied how entrepreneurship is executed amongst Finnish, Estonian and Hungarian students, with a specific focus on the venture creation process, as well as what support have the higher education institutions provided to the students during this process. The key findings in relation to student entrepreneurship in Finnish institutions were that majority of the student founded enterprises were in the service sector and the students' prior work experience influenced the finding of the business idea, gathering resources and networking, as well as had provided the necessary skills to execute the business idea further. Interestingly, in this study the interviewees rated the influence of the universities and higher educational institutions as not having a major impact on entrepreneurship. (Küttim et. al 2014: 687)

2.2 Motivation and incentives of engaging in entrepreneurial activity

Entrepreneurial activity occurs when there is a plausible combination of appropriate opportunity structures, as well as individuals with entrepreneurial motivation and access to needed resources. (Shane et. al 2003: 258) As mentioned in the earlier section (1.2), when we study the opportunities and the influences of the environment, the motivations of the individual agents should

not be undermined. There are various steps in the opportunity development process, which require decision-making and the willingness of the individuals to play the 'entrepreneurial game'. (Shane et. al 2003: 258) In this section, the different motives of engaging in entrepreneurial activities have been looked into. There are various way to categorize these, however dividing the motivational factors into *push-* and *pull-factors*, seemed to be a common way in the entrepreneurship literature. (Kirkwood 2009; Karhunen et. al 2011; Dawson 2012)

As for the entrepreneurs' motivation, push-factors refer to events internally or externally, which literally push or force individuals to entrepreneurship. In turn, pull-factors refer to those influences, which pull individuals towards entrepreneurship. (Kirkwood 2009: 346; Amoros et. al 2013: 32) The Global Entrepreneurial Monitor program (GEM) has also used the descriptive terms of *necessity-driven* (push) and *opportunity-based* (pull) for these factors. (Amoros et. al 2013) In addition, Amoros et. al, have also identified a third term *improvement-driven opportunity* as type of a pull-factor This means that an individual engages in entrepreneurial activities as a means of earning more money or gaining more independence, opposed maintaining a steady income. (Amoros et. al 2013: 32)

In the literature regarding motivational factors, push-factors have included the following: unemployment, lack of jobs or prospective careers, dissatisfaction with one's current job, assistance from previous employer (for example becoming a freelancer for the company), redundancy and family obligations. (Dawson et. al 2012; Kirkwood 2009; Karhunen et. al 2011) In general, push-factors tend to be associated with negative reasons of pursuing entrepreneurship. (Kirkwood 2009: 346) Pull-factors in the other hand, include: recognized opportunities from the environment, availability of resources, desire for autonomy, lifestyle changes, monetary motivation or having more challenging work tasks. (Dawson et. al 2012; Kirkwood 2009; Karhunen et. al 2011) In **Figure 2**, Dawson et. al (2012: 714) have shown how the push- and pull-factors relate to one's choice in entering entrepreneurial activity.

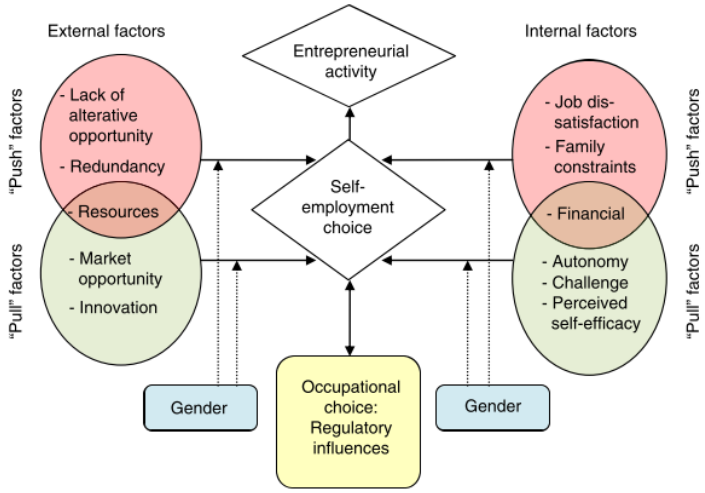

***Figure 2**: Push and pull factors of entrepreneurship motivation (Dawson et. al 2012: 714)*

As shown in **Figure 2**, even if there seems to be a very clear cut between these motivational factors, in some cases it is not very clear if an individual has been pushed or pulled into entrepreneurship. For example, in some cases individuals are pulled to self-employment in desire of higher financial income, while in some cases individuals are pushed into it because of a low income of a current job or unemployment. This is why in this model (**Figure 2**) some factors have been identified as both push- and pull-factors. (Dawson 2012: 701) This implies, that these factors must be looked at case by case and it is the job of the researcher to interpret which category does the motivation factor belong to. Moreover, it is important to note that pull-factors are far more common sources of motivation and innovation for entrepreneurship, than push-factors. (Kirkwood 2009: 346; Dawson 2010: 699) In the study conducted by Kirkwood (2009: 357), an interesting finding was that the factors affecting entrepreneurs are often a combination of many factors, both push- and pull-factors, suggesting that entrepreneurial motivation in a complex and intertwined matter.

In the 2013 Global Entrepreneurship Monitor (GEM) -report, it was reported that in innovation-driven economies, including Finland, the motives of engaging in entrepreneurial activity were mainly due to opportunity-driven (pull) motives. Moreover, the specific factors identified were the desire for higher incomes and levels of independence. Necessity-driven (push) entrepreneurial activity in Scandinavian economies was only in 10% of the cases. (Amoros et. al 2013: 32) Karhunen et. al (2011: 11), also ended up with similar results when studying creative entrepreneurs' motivations. They found out that the specifically the main pull-factors in Finland and Sweden were self-realization, freedom and independence, however role models in the entrepreneurs' families or amongst their friends also played a part.

There are several factors affecting the motivation of individuals engaging in entrepreneurial activities. One factor that the 2013 GEM -report identified as a key influencer was the perception in the media over entrepreneurship. (Amoros et. al 2013) This factor should be noted in this study, as the aim of educational institutions has also been to influence the students' perception of entrepreneurship as great career option. Venesaar et. al (2014: 681) explain that cultural influences have an effect on the motives for starting a company and the university offerings influence student's opinions about entrepreneurship. In general, the students in Finland, according to Venesaar et. al's findings, found entrepreneurship as an attractive career choice. The main motivational factors for these students were the ability to realize their dreams, achieve something, financial motivations as well as the challenge associated with entrepreneurial activity. (Venesaar et. al 2014: 682)

2.3 Entrepreneurial opportunities and the opportunity development process

According to Davidsson (2015), no perfect model or theory exists at the moment for the opportunity development process. There are various differences amongst researchers over what nature of opportunities are, and whether they are discovered or created. (Davidsson 2015; Venkataraman et. al 2012) These two different approaches have also been discussed in terms of a realist approach (discovery) and the constructionist approach (creation). (Alvarez et. al 2010) Alvarez and Barney (2007: 13) explain that both of these theories (discovery and creation) agree on the exploitation of entrepreneurial opportunities by enterprising individuals, which have risen from the imperfections of the market. However, the main difference of these theories is the way they analyze the origin of opportunities.

Discovery theory assumes that due to shifts in the market and economic structures, opportunities rise and wait to be discovered and exploited by entrepreneurial agents. (Kizner 1987; Shane and Venkataraman 2003) As Shane and Venkataraman (2003: 220) state "entrepreneurial discovery occurs when someone makes the conjecture that a set of resources is not put to its best use." The creation theory on the other hand believes that entrepreneurial opportunities are created by the skills of creative enterprising agents, not waiting for opportunities to rise. Through recognition and learning, these agents act and observe the reactions of the market and the customers while developing the opportunity further. (Alvarez and Barney 2007: 15) This theory explains that parts or 'seeds' of the opportunity can lie in the existing products, services and markets, but

opportunities do not exist without an agent building them further. (Alvarez and Barney 2007: 15) Ardichvili et. al (2003) state simply that "while elements of the opportunities may be 'recognized', opportunities are made not found."

For this study the aim was to find a model that would work with the innovation and entrepreneurship environment present in Aalto University. Due to this, there was a decision to work with a model that recognizes the creation of opportunities. The reason being the shortness of the time students spend time in the university environment, possibility of opportunities being found during courses and projects, as well as the encouragement towards creative thinking and innovation within the environment. However, it is also important to realize that opportunities may also be born through a sudden discovery.

Therefore, the Ardichvili et. al's model T*he model and units for the opportunity identification and development theory* had the basic requirements, to study opportunity development process amongst the case-startups, within the innovation and entrepreneurial context. This model assumes that elements of the opportunity may be recognized or discovered, but generally alert enterprising agents create them; thus touching bases with the creation theory. (Ardichvili et. al 2003) Especially in a fast paced world and the rising enthusiasm towards entrepreneurship, it can be assumed that there is no time to wait for opportunities to rise from the surroundings. The opportunity process should be an active one and 'looking outside the box' for new innovations and markets. While this model is not perfect, it allows us to see the development process combined with the necessary influencing factors. (Ardichvili et. al 2003) In this study it was important to look at the different pieces of the opportunity development and how they have been affected by the innovation and entrepreneurial ecosystem. In the following sections, the units of this theory will be discussed.

2.3.1 Ardichvili et. al's model and units for the opportunity identification and development theory

Ardichvili et. al (2003: 118) state that in order for the business to be successful, there should be a successful opportunity development process behind it. Ardichvili et. al's *Model and units for the opportunity identification and development theory* in **Figure 3**, consists of the combination of the core process and key factors that affecting it.

In this model the opportunity development process begins when the entrepreneurial alertness exceeds a certain threshold level due to the stimulation of the affecting factors. The key elements of a thorough and iterative opportunity development process are: opportunity recognition, development and evaluation. This process leads to new venture formation, additional businesses or termination of initial opportunity. (Ardichvili et. al 2003: 118) Major factors affecting the core opportunity process are: personality traits, social networks, prior knowledge, entrepreneurial alertness as well as the opportunity itself.

This process will be one of the key elements in the theoretical framework, serving as a guideline for this study. Moreover, the second research question specifically examines which way the university startups and entrepreneurs have recognized their opportunities, and which factors have been the most influential. In the next sections the influencing factors of the entrepreneur (personality traits, social networks, prior knowledge, entrepreneurial alertness), types of opportunities and the core process will be looked in detail.

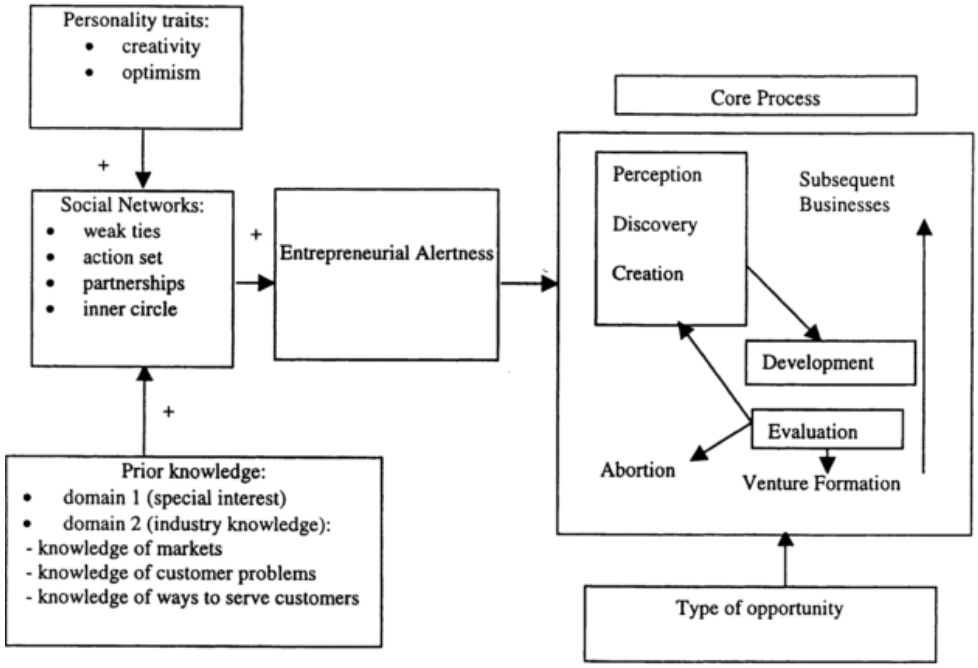

***Figure 3**: Model and units for the opportunity identification and development theory (Ardichvili et. al 2003: 118)*

2.3.2 Influencing factors

In order to initiate the opportunity development process, there needs to be a certain level of entrepreneurial alertness present in the individuals; thus making this one of the core elements of the model. *Entrepreneurial alertness* which argued, by Ardichvili et. al, depends on the influence of personality traits, social networks and prior knowledge. According to Kizner (1997: 72), entrepreneurial alertness refers to 'an attitude of receptiveness to available opportunities', which are often overlooked. Moreover, this entrepreneurial alertness causes the entrepreneur to be constantly on the lookout for new opportunities in its environment.

Personality traits of entrepreneurs and the effect on the success over entrepreneurial activity have been research in various cognitive studies. The two distinctive personality traits, which have shown to influence the opportunity development stage are optimism (Shane and Venkataraman 2000: 223) and creativity. (Ardichvili et. al 2003: 116) Alvarez and Barney (2007: 16) explain in relation to the 'creation theory' that entrepreneurs might not possess traits differing from non-entrepreneurs prior to engaging in entrepreneurial activities for the first time. However, when they do, overconfidence, generalization from small samples as well as positivism, are characteristics that seem to associate with 'creationist' entrepreneurs.

There are several reasons why *Social networks* is an important factor in opportunity recognition. For opportunity recognition, a large network constructed especially of weak ties, provides access to information that an individual does not obtain through the strong ties or close contacts, which the individual is connected more deeply and frequently. (Hills et. al 1997 qtd. in Ardichvili et. al 2003: 115; De Koning 1999: 11) In addition to the importance of weak ties to opportunity recognition, De Koning (1999: 12) has explained the role of an *inner circle*, an *active set*, as well as *entrepreneurial partnerships*. Inner circle refers to the close relationships of the entrepreneur, who are not formally part of the venture, but with whom the entrepreneur shares openly ideas and information during all stages of the venture development. Action set in turn is used to prove the needed resources for the opportunity development process. For example, people selected for the action set could provide the needed financial or technical resources. Lastly, *entrepreneurial partnerships* refer to individuals who are brought into the opportunity development process as co-founders. (De Koning 1999: 12-13)

The last influencing factor, *prior knowledge*, identified by Shane and Venkataraman (2000: 222) as a possession of information stocks, connects prior knowledge to potential opportunities triggering the development process. There are three types of prior knowledge according to Shane (2000): prior knowledge of markets, prior knowledge of way to serve markets and prior knowledge of customer problems. Entrepreneurs use these when recognizing elements opportunity, evaluating and building the idea further into a business. (Shane 2000; Shane and Venkataraman 2000: 222) Another aspect shown in the model (domain 1 and 2) assumes that entrepreneurs seek to opportunities that they are fascinated and interested, or they have been exposed to them for example through long working career. In both cases the individual has gained enormous amount of knowledge. (Sigrist 1999 qtd. in Ardichvili et. al 2003: 114)

2.3.3 Types of opportunities

There are numerous studies done about opportunities and various definitions of what entrepreneurial opportunities are. (Davidsson 2015) Shane and Venkataraman (2000: 220) base their definition on Casson (1982) to explain entrepreneurial opportunities as 'Those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production." Simply explained as potentials for profit making. (Shane et. al 2003: 262) In Kizner's theory (1978), entrepreneurial opportunities as pieces that fill the gaps and connect with unused resources in the economy. In Ardichvili et. al's theory, opportunities begin as unformed and develop with time to a more precise concept. (Ardichvili et. al 2003: 108)

Different types of entrepreneurial opportunities exist. Drucker (1985: check) has categorized them as: creation of new information together with invention of new technologies, opportunities that result from market inefficiencies, and reaction to shifts in the usage and costs of alternative resources, as a result from political, regulatory, or demographic change. Ardichvili et. al argue that entrepreneurial opportunities are not found, but made by creative input of individuals. Thus their view on the types of opportunities depend on whether the value creation capability is undefined or defined, or the value sought is identified or not. (Ardichvili et. al 2003: 116) **Figure 4** shows the matrix of the types of opportunities found in Ardichvili et. al's research.

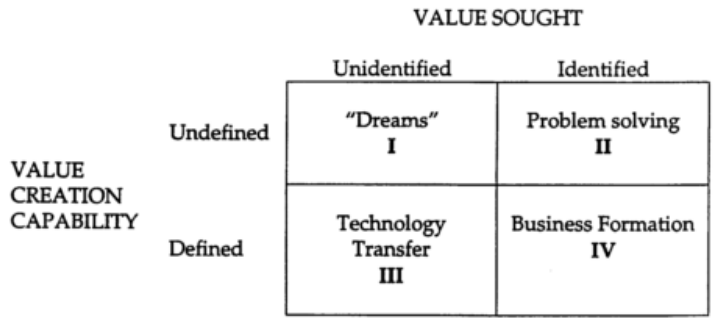

***Figure 4**: Types of opportunities (Ardichvili et. al 2003: 117)*

In the left upper corner, opportunities referred to as *Dreams* occur when both value sought and creation capabilities are undefined and unidentified. This is often associated with artists and innovators pushing technologies and current knowledge past its boundaries. Opportunities in relation to *Problem Solving*, in the upper right corner means situations where the problem is known, but the solution is not. This is where there is a need in the market, which has to be filled with an unknown solution. *Technology Transfer* refers to opportunities in which the solution is known, but there is no identifiable problem. For example, situations in universities where new type of material is created, but the application is still unknown. Lastly, *Business Formation* means that there are matching needs in the market and the capability to respond to those needs. (Ardichvili et. al 2003: 117)

2.3.4 Core opportunity development process

The core opportunity development in this model is composed of three parts: *opportunity recognition* (perception, discovery, creation), *development* and *evaluation*, which lead to a *new venture*, *abortion* of the idea or *subsequent businesses*. These elements are often found in other types opportunity development processes (Venkataraman 1997; Bhave 1994), as well as been recognized as being part of the innovation front-end as well. (Koen et. al 1990) The different units of the process as described below rarely occur in an orderly manner. (Ardichvili et. al 2003: 109)

Ardichvili et. al (2003: 109-110) explain that what usually is regarded as *opportunity recognition* actually consists of three components: perception of a market or underemployed resources, discovering the fit between this perceived gap and available resources, and creating the fit between the market need and specific resources.

Perception of opportunities in the form of market needs or underemployed requires a certain trait of sensitivity to recognize and see potential value, however even if there is a recognized need the individual might not yet know the required resources to fill the gap. For example, an inventor might create something from underused resources but the application is yet to be found. *Discovery* means that an individual sees a connection between a need and the available resources. As Shane and Venkataraman (2000: 222) state "people must be able to identify new means-ends relationships that are generated by a given change in order to discover entrepreneurial opportunities", thus it's not enough to perceive an opportunity, but to be able to also match the fitting resources to create value. (Ardichvili et. al 2003: 110) *Creation* refers to recombining and reorganizing resources to match the need and create more value than is currently visible. (Ardichvili et. al 2003: 111)

This theory assumes *opportunity development* as important and as a constantly evolving process, where opportunities begin as unformed ideas and become more elaborate during the development process. (Ardichvili et. al 2003: 109) De Koning states (1999: 9,14) that important actions during the development stage are reflection, discussion and research done alone and with others, as well as gaining feedback and gathering resources. As these units of the process do not necessarily flow in an orderly manner, the concept of *opportunity evaluation* is present in all of the stages and there might be revisions or even abortions of the initial idea at any time. Moreover, this evaluation might not be articulated or even very formal, but be an individual's' reflection of the resources and the needs. (Timmons et. al 1987 qtd. in Ardichvili et. al 2003: 111) As more time and resources are invested in the development of the opportunity, the more formal the evaluation may become. Ardichvili et. al (2003: 112), use the stage-gate model as an example of a formal evaluation process. In this stage-gate approach, the opportunity is evaluated after each stage, and as a result revised or aborted. One of the key characteristics of the *creation theory* is that there is continuous iteration and learning, which is fueled by the evaluation and feedback.

2.4 Entrepreneurship and innovation ecosystem

In the previous sections the concepts of university entrepreneurship, motivation of engaging in entrepreneurial activities as well as opportunity development process have been looked into. In the following section the concept of an entrepreneurship and innovation ecosystem (E&I), as well as the university-based entrepreneurial ecosystem will be discussed.
By identifying the important elements of an innovation and entrepreneurial ecosystem, the existing ecosystem elements of Aalto University can be identified.

2.4.1 Entrepreneurship and innovation ecosystem

Moore in 1993 was one of the first researchers to introduce the concept of an ecosystem in relation to the business environment. Moore (1993: 76) defined business ecosystem as "a loosely interconnected network of companies and other entities that co-evolve capabilities around a shared set of technologies, knowledge, or skills, and work cooperatively and competitively to develop new products and services." Similarly from an innovation point of view, Oksanen describes an innovation ecosystem as a system, which through an interactive and dynamic network of local actors and dynamic processes, produces solution to different challenges; thus creates innovations. (Oksanen 2014: 4) In both of these descriptions, an ecosystem consists of actors and processes, which through shared resources and cooperation, create solutions and innovations.

Within an innovation ecosystems there are various key characteristics and actions, which keep the ecosystem active and vibrant. (Moore 1998; Porter 1998; Isenberg 2010; Oksanen 2014) The core of the ecosystem is composed of interactive companies, in-between ideas and people are recycled. In other words there is a "continuous movement of ideas and people," explains Oksanen. (2014: 4) In addition to cooperation and sharing of resources, competition and its effect on the motivation of the entrepreneurs is important to drive innovation and force the stakeholders to develop. (Moore 1998; Porter 1998) Being part of a *cluster* has also many benefits for new venture formation. For example, new ventures formed within an ecosystem have better access to employees and suppliers, higher motivation and access to specialized information through the network. (Porter 1998: 84-85) Even if Porter's theory does not specifically focus on ecosystems, there is a point made about the high concentration of different actors and resources in a specific location.

In the core of the entrepreneurial ecosystems, are the different units that the system is composed of and how they affect entrepreneurship. (Isenberg 2011: 6) Moore (1998: 168) identified key stakeholders of the ecosystem to include: customers, suppliers, lead producers, as well as financial stakeholders, standard bodies, labor unions and governmental institutions. This served as a good starting point of looking into the composition of an ecosystem and has been developed further by other researchers. Isenberg's entrepreneurship ecosystem model (2011: 7), *Domains of the Entrepreneurship Ecosystem* identifies twelve elements, which have been categorized into six domains: markets, human capital, supports, culture, finance and policy. These are all important for the successful formation and running of business ventures. Isenberg (2011: 6) elaborates that, even if these factors occur in a unique and complex way, each of these factors needs to be present in order to have self-sustaining entrepreneurship.

2.4.2 University-based entrepreneurial and innovation ecosystem

Moving from a regional and national innovation and entrepreneurial ecosystems, to ecosystems specific to a university environment. University ecosystems have specific elements and actions linked to academics, research and the university infrastructure and can in a way be identified as a small region itself. According to Fetters et. al (2010: 2) the definition of an university-based ecosystem, in short (U-BEE), is a "multidimensional enterprise that supports entrepreneurship development through a variety of initiatives related to teaching, research and outreach."

Fetters et. al (2010) in their works The Development of the University-Based Entrepreneurship Ecosystem studied the U-BEE's of six different universities across the world. From these findings they analyzed how these ecosystems provide a context supporting and initiating innovation and entrepreneurship. Their results identified seven success factors for the construction of an innovation and entrepreneurship ecosystem in a University environment. In addition to these, the importance of space was highly emphasized. The authors explain that for the startups themselves, as well as the E&I activities, 'On campuses, space symbolizes permanence, prestige and strategic importance, all of which increase campus mindshare and support ecosystem development.' (Fetters. et. al 2010: 29) This should be noted as an interesting point when analyzing the empirical data in detail. The following factors were identified as important when constructing a University-Based Entrepreneurial Ecosystem (U-BEE)

1. *Senior leadership and the university's vision and engagement in E&I activities*
2. *Strong leadership from the faculty side of the E&I activities*
3. *The commitment towards the E&I activities in a long term*
4. *Provision of the needed resources for the construction and maintenance of the ecosystem*
5. *Innovating over study programs, projects and courses*
6. *Provision of the appropriate infrastructure*
7. *Building the necessary extended network*

(Fetters et. al 2010)

Research conducted by Åsterbro et. al (2012: 675), demonstrates that universities have the possibility to influence the startup rates of students and recent graduates in different ways. The factors that had positive impact in the three universities studied: Chalmers, MIT and Halmstad, were the students themselves, entrepreneurial orientation of the faculty, and program design especially in innovation and entrepreneurial courses' industry orientation and entrepreneurial spirit. It was demonstrated that an intentional or formal innovation ecosystem had a positive impact on the formation startups, but was not necessary if there were other motivating factors in place. Åsterbro et al. (ibid) elaborate that the students themselves and their own entrepreneurial activities have a lot to do with the spirit of entrepreneurship.

In this study, the aim is not to construct a new model of Aalto University's E&I ecosystem, but use the existing information and research conducted by Graham (2014) as a basis of the ecosystem. Important ideas and points have taken into consideration from the studies of Isenberg (2010), Fetters et. al (2012) and Åsterbro (2012). The success factors of a university innovation and entrepreneurship agenda, leading to an innovation and entrepreneurship ecosystem, are shown in **Figure 5** (Graham 2014: 43). In the case of Aalto University, the experts responsible for the ecosystem architecture mention the following early success factors for the ecosystem: a dynamic student-led entrepreneurship movement as well as a university leadership supporting and enforcing the entrepreneurial ecosystem. (Graham 2014)

1. **University senior management:** Strong university leadership and governance, actively promoting a clear and prominent E&I agenda that is responsive to the regional and national entrepreneurial environment.
2. **University departments:** An academic culture that acknowledges, supports and rewards E&I enquiry within a cross-disciplinary context, helping to nurture influential disciplinary-based role models, curricular and co-curricular activities, and champions for institutional change.
3. **University-led E&I activity:** Distributed responsibility for E&I delivery across multiple university agencies, with a range of support services and participation routes for both students and staff throughout each stage of their personal entrepreneurial growth.
4. **Student-led E&I activity:** An empowered, cohesive, inventive, bold and well-connected student-led entrepreneurial community, benefitting from sustained low-level funding, seasoned entrepreneurial mentors and direct connections to university senior management.
5. **External E&I community:** Robust relationships built on trust and mutual benefit between the university and the regional/national E&I community, with a platform for these individuals to play a visible and influential role in university life.

Figure 5*: Distinguishing building blocks of university's E&I strength (Graham 2014)*

Graham has identified two ways in which a university ecosystem typically forms. The first is a *bottom-up* or *student-led* approach, in which the ecosystem springs from the grass root organizations students and the alumni. In this approach trust and strong partnerships create an active and inclusive ecosystem, but also little regulation and power of the university. (Graham 2014: 38) The other approach is called *top-down* or *university-led*. Here the driver of the ecosystem is the university with the aim to raise income through research innovation turned into business. According to Graham (2014: 38), this is a more formalized and organized way of building an ecosystem, which can result in more marginalized entrepreneurial activity. In the case of Aalto University, the formation of the E&I was built through a bottom-up approach, through an active student entrepreneurship movement, however quickly supported by the university's E&I activities.

The specific student-led activities of Aalto University E&I are: Aalto Entrepreneurship Society (Aalto ES), Start-Up Sauna, Start-Up Life, Summer of Start-Ups and SLUSH. The supporting functions from the University's side are: Design Factory, Aalto Center for Entrepreneurship (ACE), Aalto Ventures Program (AVP), Open Innovation House, Stanford Aalto Project, Aalto Start-Up Center and App Campus. These elements are specifically aiming to foster and provide instruments for innovation and entrepreneurship within Aalto University by: providing inspiration and introduction to entrepreneurship, building capabilities and skills of the entrepreneurs, holding immersive study and working periods, providing mentoring and physical working spaces around campus, as well as providing access and support for pitching and VC

investment. (Graham 2014: 57) Interestingly many of these components are not only available for Aalto University students, but are open for anyone to participate.

2.5 Theoretical framework

In the previous sections of the literature review, the concepts of entrepreneurial motivation, the opportunity development process as well as an innovation and entrepreneurship ecosystem have been discussed and key elements identified. The theoretical framework presented in **Figure 6** shows the relevant and key theories, which make the backbone for the empirical fieldwork. The framework is a guideline or a starting point, however changes can and will be made according to significant empirical data. This type of a method is known as a systematic combining and will be discussed further in section 3.1. This framework itself had been formed using theories and models from three research areas: university based entrepreneurial ecosystems, entrepreneurial motivation and, entrepreneurial and innovation opportunity development.

This study looks how the Aalto University's entrepreneurship and innovation (E&I) ecosystem affects the motivational factors and the opportunity development process of university-based startups. **Figure 6** identifies the elements of the E&I ecosystem, in which the startups have started from and developed in. These elements are based on models and theories presented by Graham, Isenberg and Åsterbro regarding innovation and entrepreneurship ecosystems generally and within Aalto University. (Graham 2014, Isenberg 2010, Åsterbro 2012) The five key domains of the ecosystem are the following: entrepreneurship and innovation across departments, university-led E&I activities, student-led E&I activities, external E&I community, and not E&I specific university activities. In the core of the E&I ecosystem are the university-based startups. The first three of the elements are intentional, meaning that they have been specifically designed and used to cater for the needs of innovation and entrepreneurship. Unintentional in turn, means that the elements exist in the university environment, with or without an E&I ecosystem, but can potentially contribute to the E&I ecosystem and its stakeholders

The opportunity development process used in this model is based on Ardichvili et. al's theory on opportunity development. (Ardichvili et. al 2003) The model has three important components with internal functions: influencing factors, entrepreneurial alertness and opportunity development. In this research the effect of the ecosystem and motivational factors over the opportunity development process has been examined. As this model hasn't been built specifically for student- and university-based startups, there might be important revelations and improvement suggestions from the empirical data.

As discussed in the previous section regarding motivational factors (section 2.2), the effect of motivation is continuous throughout the opportunity development process. In some case the motivation might be a strong influencing factor or there might be stronger motivation as the process develops further. Because of this, the motivational factors are shown to affect the whole process. In this model the motivational factors have been divided into push- and pull-factors, and are based on research of Karhunen et. al (2010), Dawson et. al (2012), Kirkwood (2009) and Amoros et. al (2013).

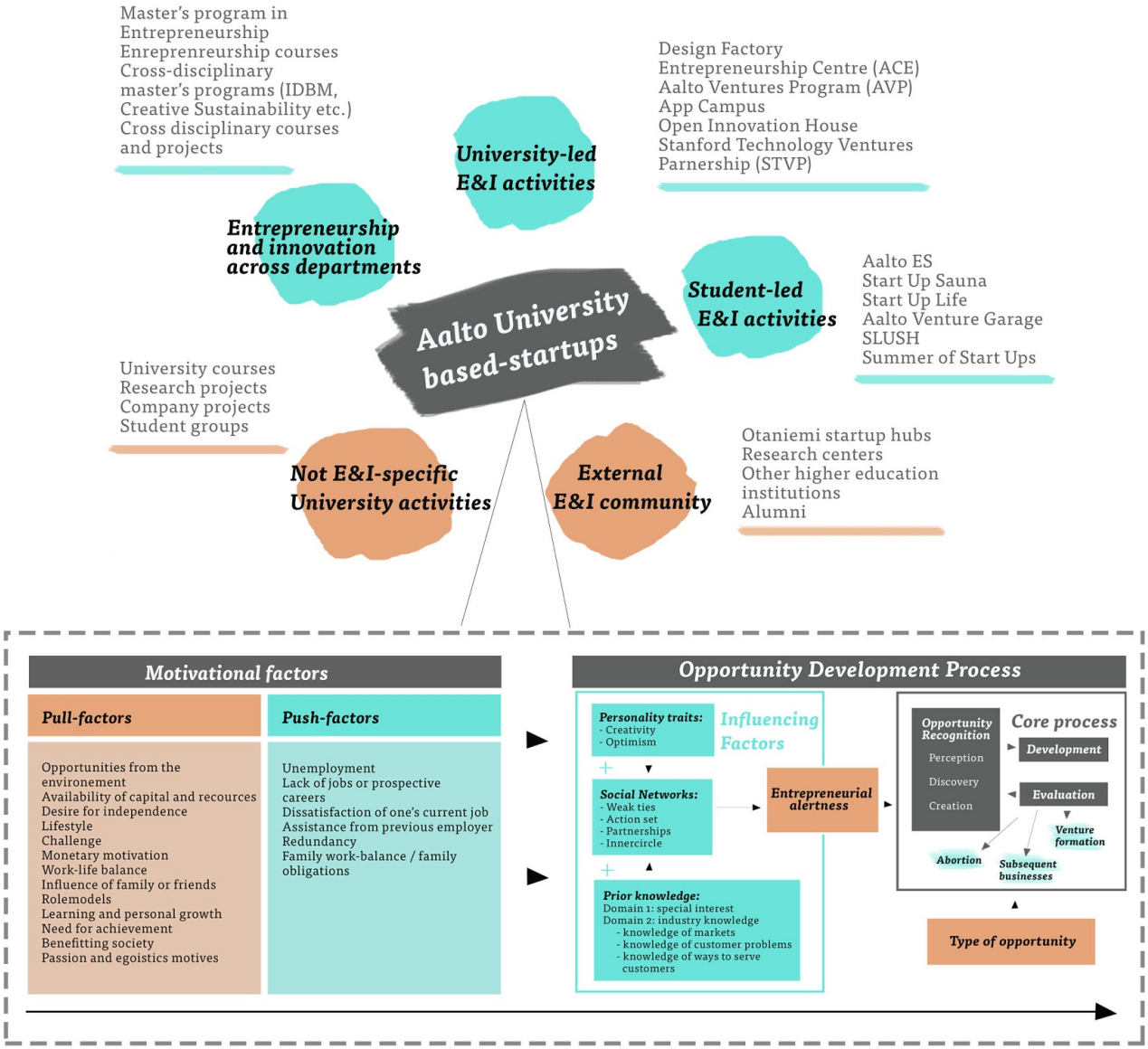

***Figure 6**: Theoretical framework of the study (adapted from: Graham 2014, Isenberg 2010, Åsterbro 2012, Dawson et. al 2012, Kirkwood 2009, Karhunen et. al 2011, Amoros et. al 2013, Ardichvili et. al 2003)*

3. METHODOLOGY

This section of the thesis explains the research process and the decisions made regarding the chosen research methods. The first section discussed the research process and the chosen research methods, followed by research design, and lastly the validity and reliability of the study.

3.1 Qualitative research process and methods

There are two parts of this thesis, the theoretical part and the empirical side. The theoretical framework provides a backbone to the empirical research, which then puts the research in a real life context. These two parts work together to form a comprehensive report of ongoing phenomena; in this case entrepreneurship within a university entrepreneurship and innovation ecosystem. The choice of conducting a qualitative research was obvious in this case as the aim is to describe and look at the subjective experiences of the chosen case-companies within a specific context; in this research, the Aalto University E&I ecosystem. Moreover, the aim is to study the linkages between these experiences and the environment under study. (Flick 2014; Barbour 2008) The qualitative research method allows us to identify links and important factors, without predefining them or identifying them prior to discussing with the case subjects; thus finding key embedded processes. (Barbour 2008: 13) Another reason for choosing a qualitative research method was the novel nature of entrepreneurial and innovation ecosystem in the Aalto University setting, which was officially founded only four years ago. This means that there are a limited amount of suitable case companies available, which have been formed within this time frame. Therefore, this factor makes the choice between conducting a qualitative research over quantitative research more reliable and realistic for this study.

Research paradigms are concerned about the way research is conducted and refers to the nature of knowledge and assumptions about the world. It is important to recognize the researcher's own paradigm as it shapes and determines the course of the research project. (Collins and Hussey 2003: 47) This thesis has adopted a *phenomenological* paradigm, in which the qualitative research method, discussed in the paragraph above, belongs to. As the researcher in this study is a case study itself and has immersed herself on the subject, this has contributed to one of the main characteristics of phenomenology paradigm: to reduce the gap between the researcher and what is being research.

(Ibid: 48, 53) Moreover, the nature of this study involves searching for patterns and drawing theories from these to increase understanding of the phenomena under study: in this case, an innovation and entrepreneurship ecosystem. Opposed to a *positivistic* paradigm, where large samples are used to create generalizations, this study has used a small sample size of five case-companies to obtain rich and thorough empirical data to look deeper into the theories built around opportunity development and motivations, in a compact setting. Where as the possibilities for generalizations and reliability is lower, the validity and possibility to apply the theories developed to similar environments exist. (Ibid: 55)

The thesis process began by drafting the initial research plan, objectives and early research questions. As the process developed further, this research plan with its components have had many iterations before getting their final shape. Along with the formation of the plan, current news, videos and magazine articles were read and watched to draw inspiration from and obtain ideas. The actual theoretical data formation started by reading and studying the relevant literature in the topics of entrepreneurship, innovation, opportunity development and ecosystems. This gave an overview of the underlying theories and built the knowledge of the researcher on the basic issues related to these topics. University specific perspective was added in the mix to learn about how these topics were in relation to students and the university environment. The combination of the basic theories, together with the university setting, was necessary in order to find the suitable models for studying the entrepreneurship and innovation ecosystem of Aalto University. These models were combined to form the theoretical framework presented in section 2.5.

For this research an appropriate method to work with the theoretical side and the empirical data was to use a process known as *systematic combining*. In this process there is continuous evolvement of the theoretical framework, empirical fieldwork and the cases themselves, as the research process moves forward. (Dubois and Gadde, 2002: 554) Dubois and Gadde (2002: 555), in their research, they found that often in a case study research researchers move constantly back to the theory to understand it better as information comes in from the empirical fieldwork. Moreover, the case study approach cannot be handled as a straightforward process, but consists of simultaneously ongoing and intertwined activities. Systematic combining is a way to take these activities into consideration in a systematic manner.

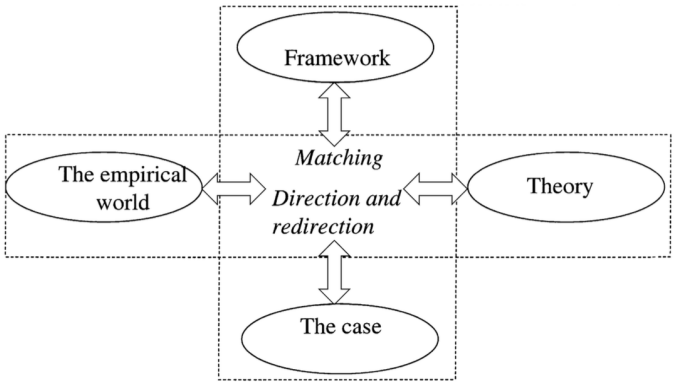

Fig. 1. Systematic combining.

***Figure 7**: Systematic combining (Dubois and Gadde 2002: 555)*

There are two processes involved in systematic combining, which are *matching theory with reality* and *redirection and direction*, as shown in **Figure 7** above. The four elements, which affect these two processes are: theory, theoretical framework, the empirical information and the cases themselves. *Matching* refers to the act of going back and forth between the initial framework, data analysis and the empirical findings. (Dubois and Gadde 2002: 665) In this study, as each of the cases were built there was a reflection to the initial framework and matching with the new empirical information. Dubois and Gadde (2002: 558-559) use a description 'tight and emerging framework', which means that the framework prior to collecting empirical data serves as a guideline and will be modified according to emerging empirical insights and theoretical revelations. (Dubois and Gadde 2014: 1279) During this research process, the theoretical framework (section 2.5) served as the initial general framework, which was allowed to evolve during the research process and empirical fieldwork. Therefore, the framework itself holds elements, which may change shape, get replaced or gain new elements. The modifications to the framework are discussed in the discussion and analysis section 5.

Case study approach was chosen as appropriate method for this thesis, as the aim is to reflect the theoretical framework in a real life context and phenomena. (Dubois and Gadde 2002: 554) According to Robert K. Yin (2014: 64), "The case study as a research strategy comprises an all-encompassing method – covering the logic of design, data collection techniques and specific approaches to data collection". More specifically, a multiple-case study approach was chosen over a single-case study to increase the possibility of replication in the empirical findings; thus making the research more valid.

Where as a single case study forms very complex models due to the richness of the data, with a multiple case study the researcher aims to find connections and links between the cases. This makes the results more simple and generalizable. (Eisenhardt and Graebner 2007: 30)

The building of the cases followed a multiple-case study procedure, developed by Yin. (2014: 60) This procedure follows a replication approach, which mean the cases are carefully selected under the same context and conditions. In this case the context is Aalto University E&I ecosystem and the criteria for the selecting the units of analysis have been presented in section 3.2.2. The case studies themselves were structured over three themes: the motivations of engaging in entrepreneurial activities, the opportunity development process and the relationship of the venture with the Aalto University E&I ecosystem. Moreover, the opportunity development process and the relationship with ecosystem were illustrated for each case to draw attention to important findings.

3.2 Research Design

3.2.1 Data collection

The empirical data collected was mainly obtained through personal interviews. Since the study focuses on the subjective views and experiences of the individual entrepreneurs, and their business opportunity development process, obtaining primary data through one-to-one personal interviews was the most appropriate data collection method. However, when building the case studies it was occasionally necessary to use secondary data, such as the companies' websites, to acquire additional information, but this was held to the minimum and accounts for an insignificant amount of the collected data.

For qualitative research methods, interviews are the most common way to collect data, especially when conducting a case study research. (Yin 2014: 110; Barbour 2008: 17) The interviews were semi-structured as they allow collection of information in a flexible manner, while keeping inline with the theory specific themes. The specific structure ensured that all the topics were covered and the results could be compared and contrasted between the different case companies.

Moreover, interviewing the individuals in this manner allowed them to elaborate on topics, which they found important and relevant to their case; thus perhaps finding embedded processes and unsought results. (Gillham 2005: 91; Barbour 2008: 13)

Practically, the interviews were conducted via Skype interviews, recorded and transcribed for further analysis. The reason for Skype interviews, compared with face-to-face was due to the distance between the interviewer and interviewees. For most of the case companies, the interviews were held in and transcribed in Finnish, except for one case company the interview was held in English. Having the interviews in the mother tongue of the founders was important to allow them to fully express themselves. Overall, ten people were interviewed for this research and the average length of an interview was approximately 45 minutes. For the case of TwentyKnots, as the writer is a case subject herself, the interview an answer was written down for each interview question.

3.2.2 Units of analysis

As a qualitative research trait, the units of analysis cannot be chosen randomly, but are selected to suit the research in question. (Hirsjärvi et. al 2007: 175) There were five case companies chosen as the units of analysis. From these, two founders were interviewed separately from each of the case companies. This makes altogether ten interviews, from which the primary empirical data for this thesis was collected. The aim of this section is to explain and give the selection criteria for the chosen case-companies. According to Yin (2003: 30), the selection of cases for a multiple-case study is initiated through a review of the research questions and objectives. As the overall focus is to look into the effect of the Aalto University Entrepreneurship and Innovation Ecosystem, over startups and entrepreneurs raised from this environment, the units of analysis will have common linkages to this environment. The following was used as a guideline when selecting the case companies:

1. The first requirement is that the founders of the case studies must have either studied full-time or taken part in the courses of Aalto University. The founders may have been involved with the different campuses or schools within the university, and can be in different stages in their studies or have already graduated. The opportunity development phase must have been done when the founders were studying in Aalto University.

2. As many of the E&I Ecosystem elements were put in place nearly at the same time or after official formation of Aalto University, the case-companies had to be officially formed after 2010.
3. The case companies had to be founded by at least two founders, with linkages to Aalto University. Two founders were interviewed to get different points of view to the phenomena.
4. For this study the interviewed founders were all first-time entrepreneurs.
5. The offerings of the case companies may have varied in their nature.

***Table 2**: The characteristics of the case companies selected as the units of analysis*

Name	**Founders interviewed**	**Year founded**	**Type of offering**	**# Of founders and employees ( )**
Booncon Oy and Booncon PIXELS Oy	Tobias Johannes Lukas Hafner	2012	Service	2 2 (6)
TwentyKnots Oy	Joel Mikkonen Maria Mikkonen	2012	Service	3 (4 full-time and 9 part-time)
Ambronite Oy	Simo Suoheimo Arno Paula	2013	Product	4 (2)
LeeLuu	Emmi Pouta Heini Salovuori	2014	Product & service	4
Smarp Oy	Mikael Lauharanta Roope Heinilä	2013	Product & service	3 (30)

3.2.3 Context of the study

Aalto University and its entrepreneurship and innovation ecosystem is the context of this study. Aalto University was officially formed in 2010 from the three schools: Helsinki School of Economics, University of Art and Design Helsinki, and Helsinki University of Technology. Currently there are four locations where the university operates in, which are also the previous locations of the three separate schools. These locations are the Otaniemi campus in Espoo, Töölö campus in Helsinki, the art and design facilities in Arabianranta Helsinki, as well as the international business unit in the Mikkeli campus.

The University currently has about 20 000 students, including 2,300 students from abroad and 3,500 postgraduate students. Staff-wise, from the 5000 faculty members, there are about 350 professors across the university. (Aalto University 2015)

Various entrepreneurship and innovation elements and facilities have been added to the Aalto University ecosystem. Some existed before the formation and but most were added after the official formation in 2010. These elements include student-led and university-led activities, courses and programs focusing on innovation and entrepreneurship, not E&I specific university courses and activities, as well as the surrounding environment.

3.2.4 Analysis and interpretation

The key issue with qualitative research is how to reduce and structure the empirical data into patterns and coherent information. One way is to informally quantify data to search for repetition and patterned behavior. (Collins and Hussey 2003: 254) Thomas Lindlof in his research handbook *Qualitative Communication Research Methods* (Ibid: 261-262) has identified four key elements to analyze qualitative data. This particular research has followed and adapted the following elements as part of the research process:

Process means that the material is analyzed throughout the study as information is obtained. During this study a research diary has been kept to keep track of notes and ideas that have risen at the different phases of the study. These notes are then compared and contrasted with new incoming data.

Reducing the data is concerned with the physical and conceptual sortment of the data. Physically during the research process, the empirical data was color coded according to the research questions and themes. In the findings and analysis sections, the data was further processed into visual presentations to increase understanding of the important issues found in the empirical data.

Explaining refers to conveying the meaning of the obtained results and information to the readers. In the findings section (4) the data has been presented case-wise, however the aim of the data discussion and analysis section (5) is to explain the linkages and patterns found between the five cases presented in this research.

Theory provides the context and serves as a guideline to this study. The theoretical framework (section 2.5) is based on prior research and composed of the relevant theories to this study. The framework is allowed to change and new elements can be added according to important incoming empirical data. This framework with modifications has been discussed and explained in the discussion and analysis section (5).

In addition to the general analysis procedure used, *cognitive mapping* and *data displays* have additionally been used as tools to analyze the data further, as well as provide clarity and transparency to the process. These two tools are especially helpful when looking for repetition and linkages between the context and the study units, through with new theory and implications will be drawn from.

3.3 Validity, reliability and limitations of the study

The validity of the study refers to the truthfulness and accurateness of the data and results obtained. (Bryman 2004: 28) According to Bryman (ibid), there are four types of validity associated with results generated from research. These types are: *measurement validity*, *internal validity*, *external validity* and *ecological validity*. For this study, especially from a qualitative side, Internal validity and Ecological validity, were the most relevant and can be used to demonstrate the validity in this research.

Internal validity is concerned about the match between the researcher's observations and the theories they develop. (Ibid 2004: 273) This research has focused on five in-depth case studies drawn from a similar context to text and develops the theoretical framework presented in the section (2.5). Therefore, becoming familiar with both the observations, as well as the concepts. Moreover, literature review, as well as through background research on the current phenomena had been conducted, in order to immerse the researcher into the topic both academically, as well as understand what it currently happening on the research area. *Ecological* validity in turn focuses on the transfer and understanding of the scientific data, to the everyday social setting of whom the results may concern. This research has two types of contributions, an academic side of building over existing models, as well as a practical side, which offers development suggestions to Aalto University, based on the results.

Therefore, the results can be applied to the everyday processes of the context, Aalto University Entrepreneurship and Innovation ecosystem; thus affecting the lives of current entrepreneurs, as well as entrepreneurs in the future.

Where as validity is concerned with the truthfulness, reliability is focused on the ability to replicate and generalize the results obtained from the study. There are different ways to increase reliability in qualitative research. With case study research, using a multiple-case study instead of single case study, reliability has been increased through replication. (Yin 2014: 64) Another way is if two researchers end up with similar results or if the interviewee has provided similar answers from two rounds of interviews. (Hirsjärvi 2007: 226) Because of time constraints and the nature of the master's thesis, there were no second rounds of interviews. However, for each case study, two founders were interviewed separately with the same interview questions.

3.3.1 Limitations of the study

This study focused on the opportunity development and motivational factors, of university-based startups, specifically within the Aalto University entrepreneurship and innovation ecosystem. Therefore, the results of this study may not be true for other entrepreneurship and innovation ecosystems, even within other university environments. In addition, while the sample of the cases were spread throughout the different schools, within Aalto University, it is difficult to draw conclusions, which would generalize the results and identify the needs of all startups born within the research context. The case studies in question were all composed of teams, which may affect the results compared to sole entrepreneurs.

The research method used in this study was a multiple case study and the empirical data was collected through semi-structured interviews. Therefore, there might be personal bias and untruthful data obtained, due to personal opinions and views. This applies both to the researcher's views, as well as the ones interviewed. Moreover, the researcher is a case study herself (TwentyKnots) and knows a lot about the topic due to personal experiences as an entrepreneur. This had been noted prior to commencing the research work and the writer aimed to collect empirical data and analyse it as objectively as possible. However, this could be also regarded as an asset and not only a disadvantage.

4. FINDINGS

4.1 Case 1: Booncon Oy and Booncon PIXELS Oy

Booncon Oy is a Helsinki-based business-consulting venture established in 2011 by three friends Tobias Johannes, Lukas Hafner and Sven Perkmann. A year later of the company's establishment, two of the founders, Tobias and Lukas, formed a daughter company Booncon PIXELS Oy. The mother company Booncon Oy offers general business consulting services and currently consists of the two founders Tobias and Lukas. Booncon PIXELS Oy is a graphic digital design-consulting agency, with focus on building and designing websites, branding and marketing work. The core business of the daughter company is to help companies move into the digital era with high technology and well-designed solutions. The current team of Booncon PIXELS is very international and highly multifunctional, making it very customer oriented and providing innovative solutions for their clients.

The two founders interviewed, Tobias Johannes and Lukas Hafner, both currently work at Booncon Oy and Lukas is the CEO of the Booncon PIXELS Oy. During the founding process there was a third founder Sven Perkmann, who is not part of the company anymore. Lukas and Tobias are both originally from the Northern part of Italy; however hold very different functional study and working backgrounds. While Tobias has studied business management in Innsbruck Austria, Lukas has a background composed of visual communications, product design and programming. In terms of the connection to Aalto University, Tobias held a yearlong exchange period in the Aalto University Mikkeli campus and Lukas has participated in the Product Design Project-course in the Design Factory as a project manager.

4.1.1 Motivational factors

When the two founders describe the reasons why they wanted to become entrepreneurs the desire for creative freedom comes up as the main motivator. In the previous working experiences, especially the requirement to use time cards, as well as strict working hours, had been very de-motivating. Lukas explains that as a creative individual it is just not possible to be creative within

the traditional working hours. Moreover, some days you were finished with your daily tasks early and other days you would have to work extra hours.
There was a contradiction between the working hours and the amount of work varying day by day. The flexibility and giving individuals responsibility and trust for suitable working hours were missing at their prior working places.

Tobias elaborates further his desires for entrepreneurship, as the possibility to rely on your own work and see concrete results from your own actions. He states, "The basic reason why we wanted to have our business was kind of a cry for freedom, where we didn't want anyone to tell us what to do." He explains further that the right kind of a working environment didn't exist at their current jobs. The solution was to create the kind of workplace with the right atmosphere. The founders explain that these are values that they have put forward in their current businesses.

4.1.2 Opportunity development process

The two main influencing factors for the venture creation have been a positive entrepreneurial experience at Aalto University Mikkeli Campus and the social network consisting of an action set of three friends with similar desires and motivational factors. Tobias, during his exchange period in Aalto University Campus, had an interesting course called 'Business Consulting in the Global Economy'. He explains that during this three-week course they conducted a consulting case project for a Finnish company expanding to the Russian market. This was a very motivating task done together with an international team. Tobias states, "The seed of entrepreneurship was really planted there. - If you have cool team and a project for which you get excited about, you can really achieve a lot and do work that you can be proud of."

After his exchange he returned back home to Italy, but found himself reflecting on this experience during his work back home. It bit later the three friends with similar experiences and life situations started talking about doing something of their own. Being from and having lived in different countries, the map was laid down and they pondered for a place to establish their business. Tobias had through his experiences in Finland and Aalto University gained connections, which lead their venture to Design Factory and settling in Otaniemi, Finland. The team acquired a working space within the Design Factory facility and community, and began to search for suitable business ideas.

With different functional backgrounds, the three friends figured they would do well with a business consulting firm specialized in programming business applications. Tobias had studied business management and gained business knowledge from his family's business in Italy, Sven had a strong programming background and Lukas, in addition to programming had been studying visual communication and product design. As a group of three, they worked and developed their business for a year in Design Factory. From this original idea they have since then founded another daughter company Booncon PIXELS Oy, with marketing and branding focus. In **Figure 8** below, the roadmap of the venture build up has been presented.

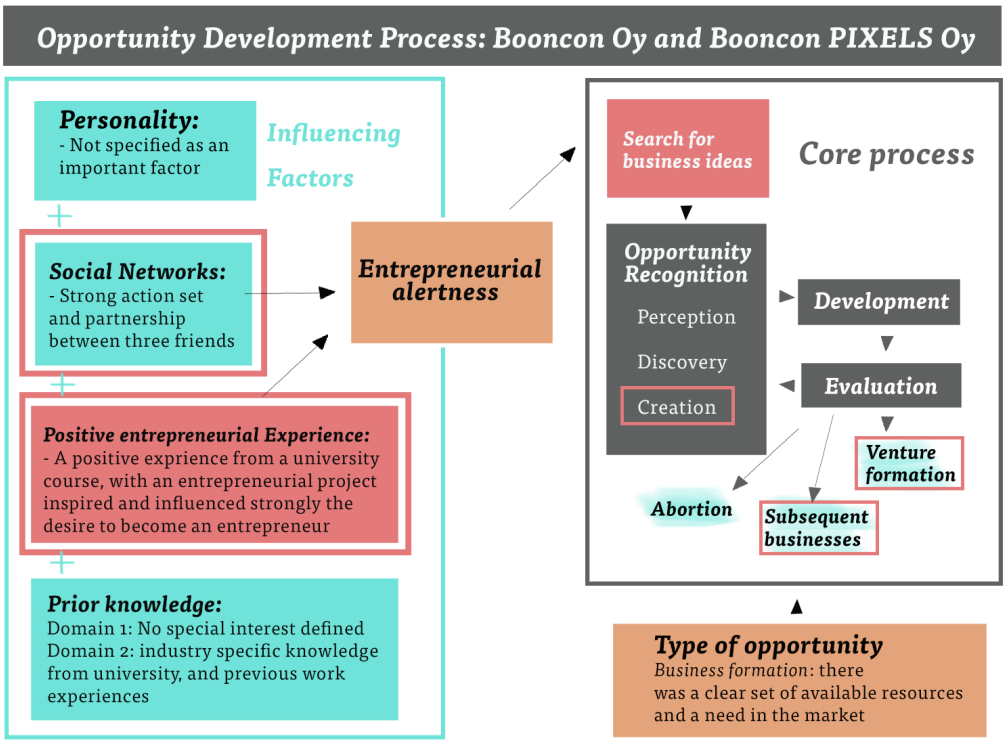

***Figure 8**: The opportunity development process of Booncon Oy and Booncon PIXELS Oy*

In the **Figure 8** above, the way Booncon Oy and its daughter company Booncon PIXELS Oy developed has been illustrated. What is important to note, is that their path differs from the theoretical model of Ardichvili et. al's proposed in the theoretical framework (section 2.5). Firstly, in this case there was an addition of a new type of an influencing factor. '*Positive entrepreneurial experience*' was identified as an important factor in influencing the founders' entrepreneurial alertness. Secondly, in regards to the opportunity development process, the founders at the time of settling in Design Factory didn't know what their offering would be.

The first step they took was to '*Search for business ideas,*' that would take into account their professional experiences and functional backgrounds. The founders didn't perceive a need or discover a fit between a customer need and the available resources, but looked for a need that they could fulfill with their skills and capabilities.

4.1.3 Aalto University E&I ecosystem

Both of the founders describe their experiences within the Aalto E&I ecosystem with mixed feelings. On one hand they explain that there were many concrete examples how the ecosystem has been beneficial, but on the other hand there are many things that could be improved to make the system more helpful and effective. **Figure 9** illustrates the effect of the ecosystem on the entrepreneurs and venture formation.

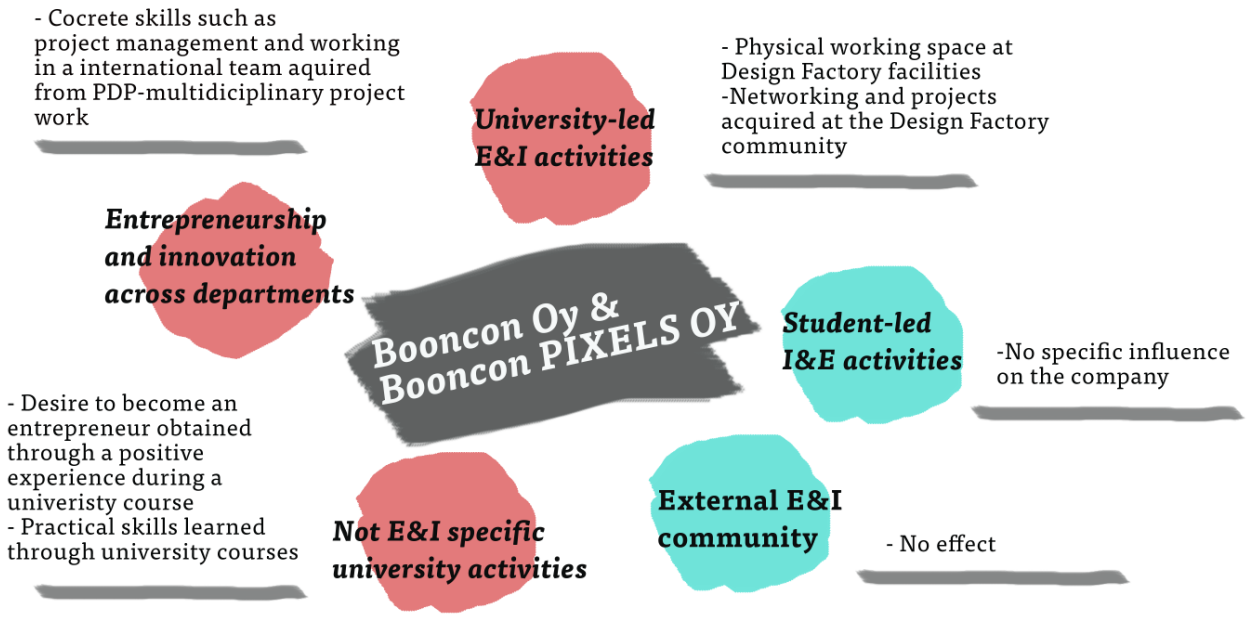

Figure 9*: The linkages of the Aalto University E&I ecosystem with Booncon Oy and Booncon PIXELS Oy*

One of the most important factors regarding this venture is the inspiration and experience obtained from a university course, in the Aalto University School of Economics, Mikkeli Campus. The project nature combined with a well working international team left a mark on one of the founders. This led to the idea of starting something of their own.

Tobias says that without the experience in Mikkeli, there wouldn't be the whole venture. The other founder, Lukas has also found the experiences of interdisciplinary project work in Aalto University useful for their business. His role as the project manager of a PDP-project taught him project management skills, as well as improved the ability to manage and work with an international team. Generally, Aalto University ecosystem has aided this company with a physical working space in Design Factory in the beginning of their journey. During this time spent in the Design Factory community, they were able to network with students, staff and other entrepreneurs, as well as obtain clients and business projects.

Even if there were concrete benefits of residing in the Design Factory community, the founders explain that the role of the companies within the community was a bit unclear and what potentially could have been very collaborative was a bit cold and superficial. Moreover, they elaborate that perhaps the reason was lack of communication within the local ecosystem. In terms of their opportunity development process, it was difficult to get help from the Aalto E&I ecosystem due to the uncertain nature and lack of a concrete business idea in the beginning. Apparently many of the student-led and university-led functions of the ecosystem weren't able to provide assistance or know how to help them. However by observing the ecosystem from an outsider perspective, Tobias notes that for students with a clear business idea the ecosystem could work very well.

There are few things that could be improved in the current E&I ecosystem. Tobias mentions that it would be beneficial if the companies would play a bigger role in the everyday activities of Design Factory. These activities could be for example teaching some of the courses in Design Factory. He continues to explain that perhaps young entrepreneurs could connect better with students than executives from larger companies and investors. Another suggestion would be to use the Design Factory's international network to help startups expand abroad. Since there are already physical locations in different continents, there could be physical spaces for startups to establish business in these countries. Lastly, the founders would have wished for more practical assistance from the ecosystem with the Finnish bureaucracy of starting a business.

4.2 Case 2: TwentyKnots Oy

TwentyKnots Oy was established in the spring of 2012 by three siblings Joel Mikkonen, Maria Mikkonen and Paul Mikkonen. TwentyKnots Oy offers experiences in windsurfing and stand up paddling (SUP), as well as combinations of these with various other sports and outdoor activities. The core business consists of renting windsurf and SUP boards, weekly courses for these activities, paddling adventures, as well as company team days and other private groups. Along with the traditional versions of SUP, TwentyKnots has held classes of body weight training, yoga, pilates and meditation on the stand up paddle boards as well. The company has three physical locations in Munkkiniemi Helsinki, Långvik Kirkkonummi and Naantali, as well organizes events in other coastal locations, with a movable set of paddling and windsurf boards. The company has currently five full time employees and seven part time instructors. The main season in Finland lasts from June to August, but with proper wetsuit equipment, it can be extended to last from the beginning of May until the end of September.

Two of the founders of TwentyKnots Oy are currently studying in Aalto University and were interviewed for this thesis. The third founder Paul Mikkonen started his studies in packaging design in the Lahti University of Applied Sciences. Joel Mikkonen studies in the program of Information Networks in the Aalto University School of Technology and is in his third year of studies. Maria Mikkonen (the author of this thesis) has studied International Business for her bachelor's studies in the Aalto University School of Economics Mikkeli Campus and is currently finishing her master's degree in International Design Business Management.

4.2.1 Motivational factors

All of the three siblings were working as windsurfing instructors and the local windsurf club prior to founding TwentyKnots Oy. As the club was a non-profit organization, it was run collectively and wasn't very professionally organized. Moreover, the aim was not to make a profit in the first place, but to cater for the ones interested in starting windsurfing and storing their equipment. While there was a desire to continue teaching, the setting was not very optimal, especially for developing it further business wise. Joel explains that there wasn't a specific desire to become an entrepreneur, but all of it happened more or less as an accident.

Specific motivational factors after venture formation, for him have been the possibility to learn wide range of skills from marketing to accounting and sales, which you wouldn't learn if being employed by someone else. Also, along side with studies and hobbies the ability to set your own schedules and the amount of work to do has been an attractive side of entrepreneurship.

There are similarities between the motivational factors of the two founders. Maria also agrees that the main benefits of being an entrepreneur are the freedom to do various tasks within the startup, as well as choosing your own schedules. She explains that in her previous job as a sales coordinator at Rovio Entertainment, it was very motivating at the beginning to be able to work across the company in various tasks and projects. As the company grew, the tasks became more focused and simplified. As intrinsic rewards of the job were reduced, it gave her the push towards pursuing an opportunity and becoming an entrepreneur. Moreover, she states, 'In addition to interesting tasks, for us outdoor-enthusiasts, working outside and with our favorite water activities in the summer is something all of us love to do.'

4.2.2 Opportunity development process

As explained in the previous section, the founders of TwentyKnots had been working as windsurf instructors at a local non-profit windsurf club. There was a rising interest towards windsurfing in the Helsinki capital region, but it was hard and de-motivating to develop the current windsurf club due to its organization and non-profit nature. The founders had gained a lot of industry specific knowledge and experience from instruction work, as well as had the personal abilities and required resources in place during the initial ideation. Therefore, the actual opportunity development process got initiated very fast. **Figure 10** shows the key elements of the opportunity development process of TwentyKnots Oy.

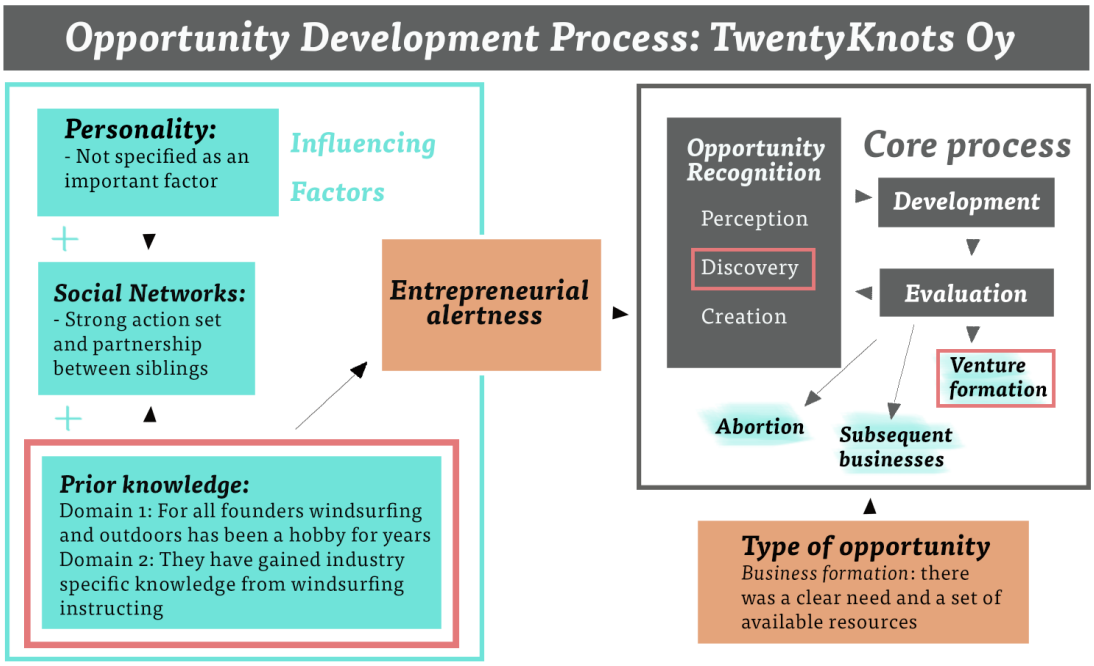

***Figure 10**: The Opportunity Development Process of TwentyKnots Oy*

In this case the opportunity was 'discovered' and there was a clear fit to a need, as there was a lack of working windsurfing facilities and instructing organizations, and the availability of the human resources on hand. The founders had been gaining industry specific knowledge through their experiences as instructors and practicing windsurfing as a hobby for many years, and through this they knew that there was a need for this type of a service. According to Joel and Maria, the development and evaluation phases of the opportunity development happened very fast and there was almost instantly an initial decision to form a venture. In addition, the initial idea did not change during the opportunity development process and still is part of the core offerings.

The first action steps after the decision to establish a venture were very concrete. The three siblings purchased a few windsurfing boards, a van, set up a website which was the first marketing channel, as well as worked on the bureaucratic requirements of founding this type of a service company. Joel described the process as starting small and adding building blocks on the way. Within the founders there was a mix of skills and capabilities to do all of the tasks amongst themselves. All of the founders were able to deliver the service of instructing, but there was also capabilities to code their website, photographing and graphic design, as well as copywriting and knowledge about social media and marketing.

Both of the founders' parents were also entrepreneurs or working in a startup, and were able to help with bureaucratic activities. This reduced costs, risks and saved time in the beginning.

4.2.3 Aalto University E&I ecosystem

Both of the founders state that Aalto University hasn't had a direct impact on the opportunity development process itself, but has had indirect influence on the motivation and influencing factors of the process. As can be seen in the **Figure 11** below, the two elements that have influenced the venture formation have been *Entrepreneurship and innovation across departments* and the *Not E&I specific university activities*, whereas the other three components have not played a major part.

Figure 11: *The linkages of the Aalto University E&I ecosystem with TwentyKnots Oy*

The founders explain that they have gained specific skills from the university courses and programs that have been useful working as entrepreneurs. For example, Maria explains that both her Bachelor's program in International Business, as well as master's in International Design Business Management have been very project intensive, as well as focused on team working skills in an international and multidisciplinary environment.

This has helped to plan and execute their business plans and schedules, recognize different skills and capabilities of the team members, as well as look for innovative ways to work with a traditional product and service. Joel in the other hand, by studying in the Information Networks program, has gained very concrete skills such as coding and accounting, which he has been able to use since the very first days of the venture creation process.

The offerings of TwentyKnots Oy are very concrete and possess characteristics of a small business opposed to the nature of a fast growing startup. The founders explain that many of the services offered at Aalto University ecosystem (University-led and Student-led E&I activities) seemed to be aimed at and be more useful for technology companies or startups looking for investors, internationalization, networking or IT knowledge. This is why they haven't actively taken part with their company in the university-led or student-led IE-ecosystem specific functions. Even though the founders state that it may not be the role of the university to provide services such as accounting assistance or legal aid, this would have been something they would have needed in the beginning and took a significant amount of time.

4.3 Case 3: Ambronite Oy

Five enthusiastic Aalto University based founders founded Ambronite Oy in 2013: Simo Suoheimo, Arno Paula, Tapio Melgin, Miika Perä and Mikko Ikola. Ambronite is the world's first functional and drinkable meal, which aims to cater for both physical and mental wellbeing. The meal is optimized to hold the different nutrients required by the official nutritional guidelines and is made with various plant-based ingredients such as nuts, berries, oats and herbs. Since the establishment of the company less than two years ago, the meal is currently being sold to over 40 countries across the world. The team working with the product currently has two new full-time employees in addition to the three working founders (two of the founders are silent partners at the moment).

Two of the five Aalto University based-founders interviewed, Simo and Arno, both started their studies in Aalto University School of Economics in the year 2007. Arno studied corporate finance and Simo has studied information and service economy, as well as has taken part in other multidisciplinary courses and projects. Simo is currently finishing his master's studies and Arno graduated in 2013.

4.3.1 Motivational factors

For Simo, his risk-averse and positive personality has been a big player in entering entrepreneurship. He explains, "When the risk of not doing something entrepreneurial is bigger, than the risks associated with entrepreneurship, it was natural to engage in this type of activity." After graduating from Aalto University, Arno had started working in corporate financing and soon after had to decide whether continue or start working full-time with Ambronite. Like Simo, he wanted to do something different and adventurous. He chose the more exciting path of becoming a full-time entrepreneur.

Both founders put a lot of weight on working with something interesting and meaningful. If you don't do it now, no one will either. Simo explains that, "For me a great internal motivator is the ability to do something you believe in, you are good at and do it together with a team you can learn from." There is also a different speed of doing things as a small team, you can learn new things everyday, you are able to shape the working days and meet interesting people on the way.

These founders explain that while the opportunity cost of becoming an entrepreneur is high compared to the job opportunities for recent graduates, money is a bad motivator and the intrinsic benefits weigh more in this kind of work.

4.3.2 Opportunity development process

In this case the personal interest and industry specific knowledge was a key influencing factor for the venture formation and opportunity development process, as is seen in **Figure 12**. Each of the founders had been trying to solve the problem of a quick meal composed of healthy ingredients and proper nutritional values. Own hobbies such as outdoor activities, experiences in the Finnish army and quick workplace lunches, had contributed to the need and built up the problem in their hands. The team had also realized that there wasn't a product like this available on the market and there was the desire to do something entrepreneurial had been on the minds of the founders. Simo stated that, "We are on that stage of life where this kind of experimentation possible, to also see what we want to do when we grow up!"

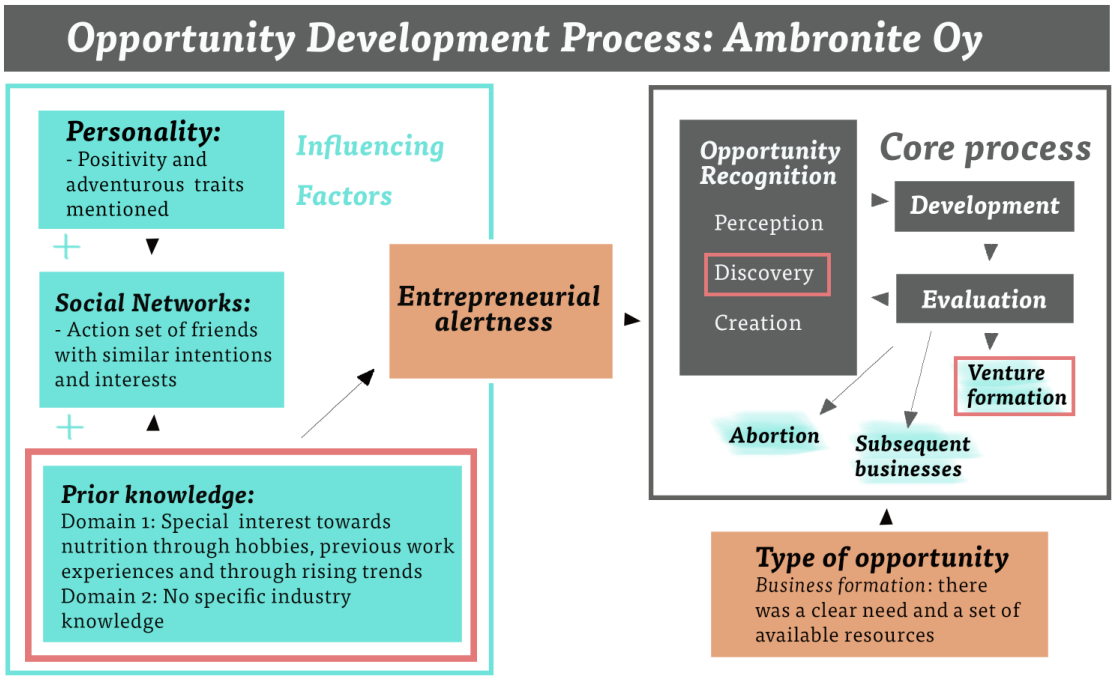

***Figure 12**: The opportunity development process of Ambronite Oy*

In addition to their personal experiences, the founders had noticed and paid attention for rising food trends in the world. Simo explains that he had started to follow the rising food trends rising from United States and noted the idea of quantified self as interesting phenomena. He also had seen how many of the trends take years to come by the Nordics and the Finnish market. Even though there were many trends related to nutrition and drinkable products, a full nutritionally rich drinkable meal didn't exist.

The actual sharing of ideas and talks about entrepreneurship happened when all of the founders sat down together one summer day and started talking about their experiences and ideas. Even though they had all known each other, they had talked about this previously in two separate groups. They realized this and decided to solve the problem together as a bigger group. This opportunity development stage included experimenting and building the product together with a nutritional professional as a doctor, introducing and getting feedback from customers during a Restaurant Day in Helsinki[3], as well as taking their product to the Kickstarter crowd funding platform. In the fall of 2013, they officially founded the company and at the same fall participated in the Startup Sauna accelerator.

4.3.3 Aalto University E&I ecosystem

In this case Aalto University E&I ecosystem has had a major impact, especially from the *student-led entrepreneurial activity* point of view. They explain that they have had many touch points to the ecosystem through the student-led activities, and one thing had often left to something else. First of all the team members had met during activities organized by Aalto ES and had became good friends. Simo says that he and Miika met on a trip to Siberia, which was organized by Mikko Ikola. They ended up working on events and different projects later on. In 2013, Ambronite was accepted into Startup Sauna and from there ended up on the stage of the SLUSH conference. Winning at SLUSH[4] the team got the opportunity to spend time in Silicon Valley, network and meet potential investors. Since the venture formation, they have also been having their office and storage in the Sauna facilities, in Otaniemi.

[3] Restaurant Day is originally a Helsinki-based food carnival created by thousands of people organizing and visiting one-day restaurants worldwide. (http://www.restaurantday.org/en/)

[4] Slush is a non-profit startup conference held every autumn in Helsinki organized by a community of entrepreneurs, students, investors and music festival organizers. Slush brings together startups, investors, tech talent, business executives and media. In the year 2014, 14 000 people, 750 investors and 3500 companies attended the event. (http://www.slush.org)

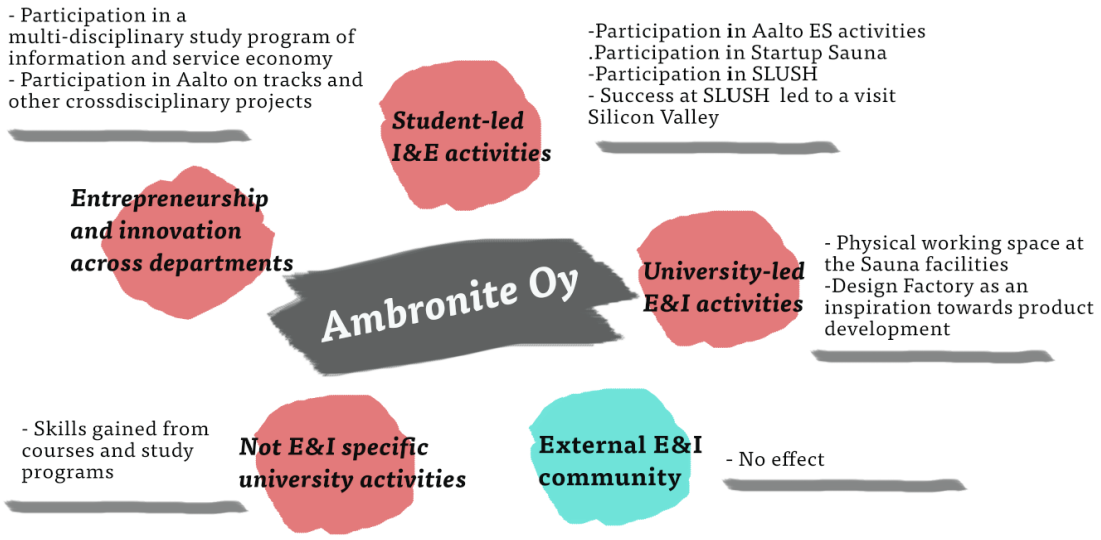

***Figure 13**: The linkages of the Aalto E&I ecosystem with Ambronite Oy*

On a personal level the founders have worked on their capabilities and gained skills, which have been useful in their venture creation. For example, because of Design Factory and its personnel, Simo has been able to learn about and work on product development. Arno in turn has been able to apply his excel-working skills from finance studies, on day-to-day basis for various tasks. However, the freedom to choose courses that you would find interesting or useful has been missing in Aalto University, explains Simo. Courses such as coding, or product and service design would have been important for own interest, as well as profession wise. Moreover, "If courses that have been found useful and successful in one department, why couldn't they be made available for other students as well?" he questions.

The overall mentality of entrepreneurship in Aalto University has changed and can be felt. Simo says that there has been a shift especially in the School of Economics from corporate financing and management consulting, towards startups and entrepreneurship. This has been the result of a strong grassroots movement and volunteer-based student community around entrepreneurship, to which Aalto University has given support, by providing the grounds and premises to work within. Raimo Lovio had observed a good example of this shift in attitudes throughout the years, as the professor of organizations and management. In the beginning of each management course he had asked how many of the students would consider becoming an entrepreneur. Roughly in ten years the percentage of interested students had risen from less than 10% to over 80%.

4.4 Case 4: LeeLuu Oy

LeeLuu Oy is an innovative Aalto ARTS based company established in 2014. Their products are interactive nightlights, which help children sleep better on their own and fight the fear of dark. The stuffed animals are made with interactive textiles and sensors, and can be turned on and off by squeezing, dimming by stroking and one of them can be used to control other LeeLuu nightlights in the room. Currently the team is works on their prototypes in the user environment and their patent applications regarding touch sensors in their products. The team is growing and recently a technical expert has joined in their team.

From LeeLuu, two founders Emmi and Heini were interviewed. Heini Salovuori studied marketing as a major in the Aalto School of Economics and has done various cross-disciplinary courses and projects such as International Design Business Management (IDBM) and a Stanford collaboration project ME310. Emmi Pouta in turn has a strong design background from the Aalto ARTS side. She has studied textile design through her Bachelor studies and specialized in interactive textiles in her Master's studies. The two other founders Lisa Gerkens originally from Germany and Hanna Markgren from Sweden, have a background in industrial design. During the beginning there also was fifth person Sanghyun Ryu involved, who was from South Korea. It can be concluded that this team is very international and designer-based.

4.4.1 Motivational factors

In this case it wasn't clear for the founders before the opportunity with LeeLuu, that they would become entrepreneurs; especially startup founders. Emmi explains that entrepreneurship and being a freelancer is the common way to work today if you are a designer. Other kind of working opportunities are not very great at the moment. "If someone had told me that in one year I would be a startup founder, I would have laughed. You see me doing a finance plan?" says Emmi about her thoughts about becoming a startup founder. Heini having her study background in business didn't think about entrepreneurship or working for a startup too much as a career for the future either.
She explains that she thought that she would end up working for a larger company, but when she met the team and worked with them during Summer of Startups, she gave entrepreneurship a second thought.

Even if there weren't clear motivational factors prior to the venture formation and opportunity development, both founders identify several factors that they have found very motivating since the establishment. The key factors were learning things everyday. Especially from a designer point of view, seeing the commercial side of things had been very interesting and new to Emmi. Both founders enjoy seeing the results of their work and the fact that the direction and goals of the company can be changed quite fast, making the work very flexible.

4.4.2 Opportunity development process

In this case an entrepreneurial experience from an university course played a big part in the venture formation in general and the opportunity development process. The four original founders took part in an interactive prototyping course in the Aalto ARTS industrial design faculty. The theme of the course was interactive textiles, and more specifically, finding an application to solve problems in the key turning points of our lifetime. The team thought about various events from their childhood and chose the phase when small children learn to sleep in their own rooms. For this phase, after ideation, they chose to work on a soft nightlight concept.

During that course the team built their first prototypes and got to test it for 120 kids. Their project was a success and they figured that in one way another they would continue with it in the future. A key player was the team that formed during the course. Emmi explains that somehow there was a great combination of the team members, the idea and the end result; "something just clicked," she says. The teams kept in touch and were encouraged to take the idea further by their course professor Jussi Mikkonen, who is their company's advisor at the moment. . In the summer of 2014 the team applied to Summer of Startups and the following fall in Startup Sauna. During this time they officially formed the company and Heini Salovuori became a founder in LeeLuu. The opportunity development process for LeeLuu has been illustrated in **Figure 14**.

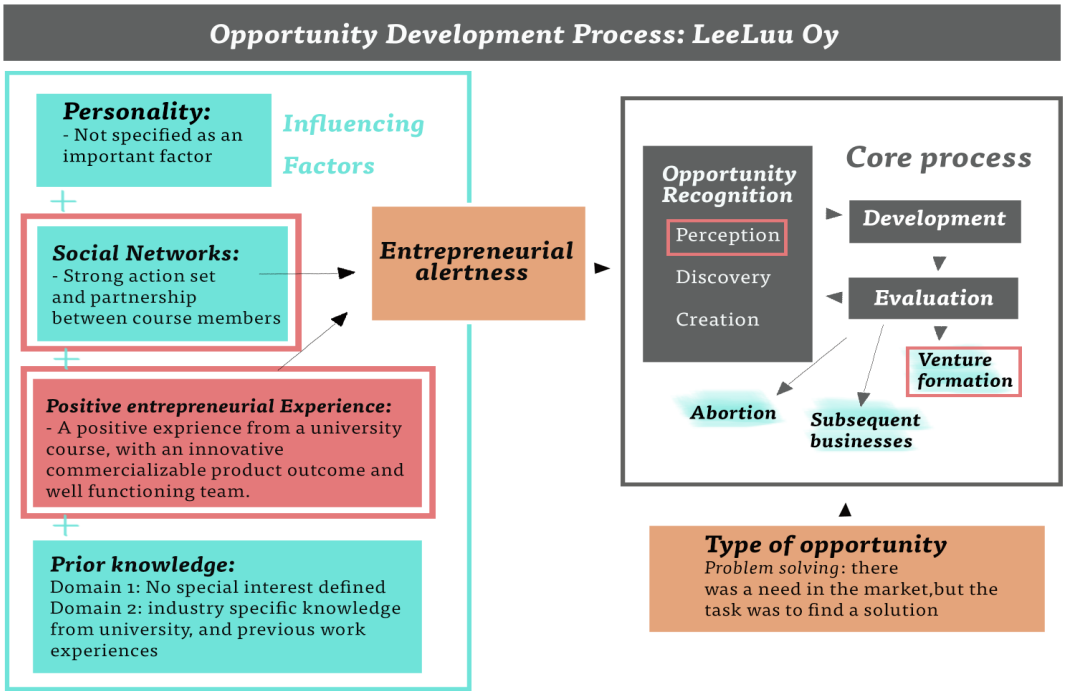

***Figure 14**: The opportunity development process of LeeLuu Oy*

Regarding the **Figure 14** above, the two major influencing factors have been the combination of a positive entrepreneurial course project and the team that was formed during that assignment. The team 'clicked' and produced a product that had commercializable value and a possible need in the market. During the course there was a given problem and the task was to create a solution with interactive textiles. Therefore, the opportunity was *perceived*, to as a solution to the problem of how ease the phase of children moving into their own room. The challenge here was to create a product to meet the needs of this problem. The company was established in early 2014 and currently the products are being developed further.

4.4.3 Aalto University E&I ecosystem

The major link between the ecosystem and their opportunity development process has been the interactive prototyping course at Aalto ARTS and support from their course professor Jussi Mikkonen. According to Emmi, he was the one that had very strong belief in the team's product and urged them to go forward and commercialize their course project. During this 'cross-facilities' (a mixture of different ARTS students) course, the team also met most of the team members and were able to prototype their first versions with 120 children.

Emmi explains that even in a small 'interdisciplinary' scale, a mixture of designers with different study backgrounds, great ideas are more likely to form. She elaborates on this stating that often when two designers from the same background work together it becomes more of a question about style than solving the proposed problem. In **Figure 15** below, the linkages of LeeLuu to the Aalto University E&I ecosystem have been illustrated.

***Figure 15**: The linkages of the Aalto E&I ecosystem with LeeLuu Oy*

The team has also been involved with the E&I activities in the Otaniemi campus. After processing the idea after the course, they decided to apply for the Summer of Startups, as well as the Startup Sauna. They made it to both programs and gained valuable knowledge from various experts, met up with their fourth founder Heini, as well networked with other entrepreneurs. After these two accelerators they were able to utilize the working facilities and electro shop at Design Factory. According to Heini, without this help and support from Aalto University, they wouldn't have had the resources to go through with building the venture. The team has been able to get ideas from an Aalto Venture's Programs (AVP) course, where LeeLuu nightlights were a case-company for the students to work on.

There are also many different skills and capabilities the founders have built during their studies and used during the building of their venture. For Heini, especially interdisciplinary has thought a lot of skills that she has been able to utilize, for example taking into account different perspectives of designers, engineers and business. Emmi also has noted this and states, “It’s very clear that Heini has worked a lot with designers and there is no problems with communication.” In addition to communication skills, in this case the designer-founders have gained a lot expertise from industrial design and textile design. Emmi with her major in interactive textiles has obtained a lot of useful industry specific knowledge from her studies, which can be applied directly their product development.

There are some things that could be done better with the Aalto E&I ecosystem. From the Aalto ARTS, there aren’t many startups that have been established by a group of designers. After thinking about it for a moment, Emmi cannot come up with any other ones. However, she explains that many of the students are very entrepreneurially oriented, because of the employment situation for designers at the moment. Becoming a freelancer or establishing a designer collective is the common way to go. Based on this, there could be more initiatives to increase the motivation and communication about start up entrepreneurship at Aalto ARTS. Another point that Heini notes is the need for a very practical entrepreneurship course. During their venture creation process they would have wished for help in the bureaucracies with registering and doing business in Finland. However, she also states that maybe it is not the role of the universities.

4.5 Case 5: Smarp Oy

Smarp Oy founded in 2011, offers an employee advocacy software, which encourages employees to take part in the company's communication in different social media outlets. Smarp Oy provides a platform called Smarpshare in which a company can share articles and links to its employees, which then can pass them on to their own networks and earn points by doing this. These points can be used for example towards employee's choice of charity. In addition, the employees can also suggest articles, pictures or videos, which would be useful to share. The company has had major growth in the past two years and has opened offices in Sweden, UK, Norway and the Netherlands. Currently the company has 20 employees and the team is constantly growing.

Three friends Tommi Huovinen, Roope Heinilä and Mikael Lauharanta who were all studying in the International Business program at the Aalto University School of Economics, Mikkeli Campus, founded the venture. The two founders Roope Heinilä and Mikael Lauharanta currently both work full-time, and haven't yet started their Master's studies in marketing and entrepreneurship. Mikael Lauharanta is the Chief Operating Officer of Smarp Oy and is also responsible for the company's UK operations. Roope Heinilä in turn resides in Helsinki and is the Chief Executive Officer.

4.5.1 Motivational factors

The founders had thought about entrepreneurship and had the desire to do something of their own before an actual idea what they would do. Roope explains that the best motivational factor in the beginning was the opportunity to create something new without boundaries or 'without a glass ceiling.' When the three founders started talking about entrepreneurship ship they were in a life situation where there was nothing really holding them in one place. Mikael states that "There was a spark to do something important, but I didn't know whether it would have been done in an own business or working for someone else." There was a great desire to do something meaningful and getting to challenging work tasks. At the moment the best thing about entrepreneurship is the ability to learn new things everyday, even if you don't know something you just go and learn about it, explains Mikael.

4.5.2 Opportunity development process

During their studies Roope Heinilä, Tommi Huovinen and Mikael Lauharanta had started talking about entrepreneurship. They had a team and they started throwing ideas of what kind of venture they could set up. During a career fair they talked with a consulting company about social media and figured based on that conversation, that they actually possessed a lot of knowledge about how social media works. Since social media had been around all of their lives and as active users, they noticed that there would be a niche in the social media consulting market. Both Roope and Mikael were at the school's student board, when an opportunity arose to help a local business with their social media campaign for opening new restaurants in the city. They established a company, did the agreements and took the job. That was the first concrete step in becoming entrepreneurs in the field of Social Media.

For this restaurant case, they did various social media campaigns, as well as launches in Facebook and Twitter. However, what really draw their attention was Linkedin and its potential as a tool for both the employer and the employees. It was a win-win situation as there was a possibility for the individual employees to build their own employee brand and at the same time promote the company they were working for. This was the basis for the ideation for a suitable product or service. The opportunity development process for Smarp Oy has been illustrated below in the **Figure 16**.

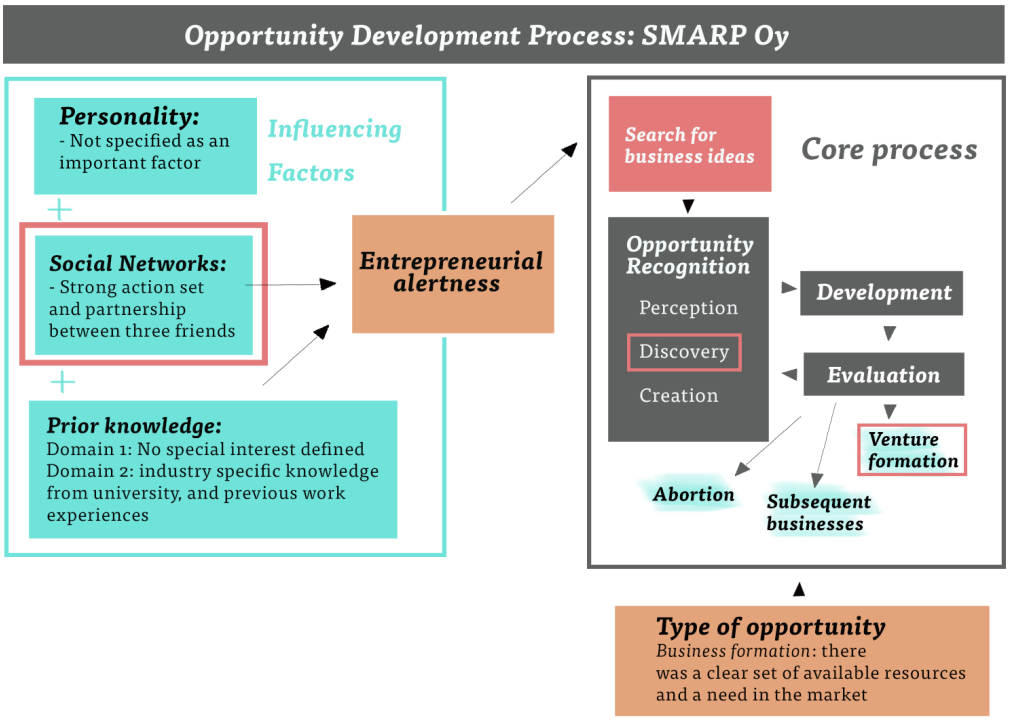

***Figure 16**: The opportunity development process of Smarp Oy*

The main influencing factor for Smarp Oy has been the team they formed during their studies in the Mikkeli Campus. With an entrepreneurially minded team, they started talking about possible business opportunities and ideas. Through risen opportunities in the field of social media, they started focusing their thoughts towards that area. They discovered a niche within the social media outlet Linkedin and started developing their products and services to meet these opportunities. The company has had three major pivots where they have evaluated their offerings and then made adjustments. Their journey had gone from social media consulting, to social media training and currently their offer an employee advocacy software.

4.5.3 Aalto University E&I ecosystem

According to the founders, the Aalto University E&I ecosystem has influenced their venture formation in few different ways. In the first place the study environment of the Mikkeli Campus has brought them together as a team, as well as provided the founders with many useful skills and capabilities. The International Business program in the Mikkeli Campus emphasizes presentation and team working skills throughout the courses.

Moreover, with a high proportion of international students, learning about different cultures and working in English has become natural during the two years. This internationality is reflected in the team composition of SMARP today. In their team they have members from China, Russia, Vietnam and Germany, just to name a few. Overall in terms of skills learned from school, Mikael explains that "Today, its more important to know where to obtain information, than to have it in your head. Things do not have to be ready when you start something, you can always work on them on the way."

After finishing their Bachelor's Degrees the founders moved back into the capital area. They participated in the different Aalto ES events, recruitment events and also co-created a an event called Startup Speed Dating. From these events, they were able to network with other entrepreneurs, pitch their story, find employees and talk with investors. In the Otaniemi area they haven't been physically present, but they have had an office space in the Aalto Startup Center, in Salmisaari. The Aalto Start-Up Center is a business accelerator, providing support for growth in the fields of business, technology and art. This experience has been very useful in terms of obtaining a physical working space, talking and discussing with industry experts and startup coaches, as well as getting help with external funding and everyday bureaucracies. They also found their first own in-house coders from this environment. The linkages of the Aalto University E&I Ecosystem have been illustrated in the **Figure 17** below.

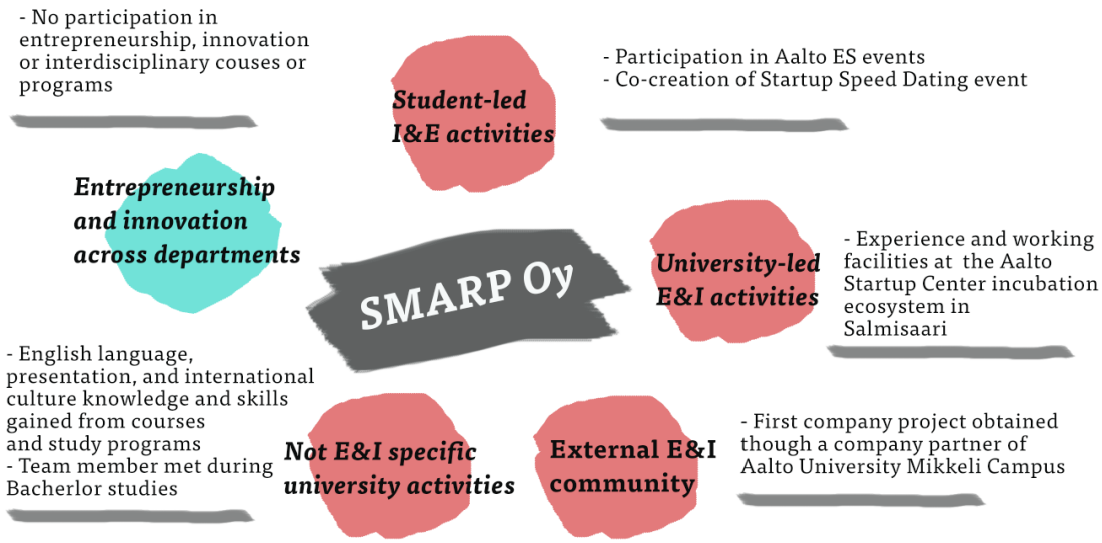

***Figure 17**: The linkages of the Aalto University E&I ecosystem with SMARP Oy*

Overall, both Roope and Mikael describe the Aalto E&I useful for startup and students thinking about entrepreneurship as a career choice. Roope explains, “The environment is useful if you know how to use it.” There are various pieces of the ecosystem and at times it can be a bit confusing of which parts would be useful, and at what time of the business development. Personally Mikael would have wished for opportunities to learn concrete skills, such as coding and Photoshop during his studies, and thinks it would be useful to provide these kinds of courses for everyone. “If I would continue my studies, especially during an entrepreneurial career, I hope they would support each other as well as possible,” Mikael explains. The future of Aalto University E&I looks bright as the entrepreneurial vibe is spread throughout the campuses via success entrepreneurial stories. As the momentum grows, hopefully the school will develop their courses and different elements of the ecosystem to support this movement.

5. DISCUSSION AND ANALYSIS

5.1 Motivation on becoming an entrepreneur

Most of the motivational factors for these case entrepreneurs were regarded as pull-factors. More specifically, *improvement-driven* factors, as the studies over motivational factors in the innovation-driven economies have shown. (Amoros et. al: 32) Improvement-driven entrepreneurial motivational factors refer to improving your life through monetary motivations and independence, opposed to earning a steady income. (Ibid) Only in two case-companies the motivation was based on push-factors. Most of the factors had been identified in previous studies, however three new factors were added. These factors were: *seeing concrete results of your work, interesting tasks and the team*. In the cognitive map below (**Figure 18**), the case-companies and their motivational factors have been illustrated and the most important highlighted. In addition to the push- (red) and pull-factors (green), new factors have been marked in black.

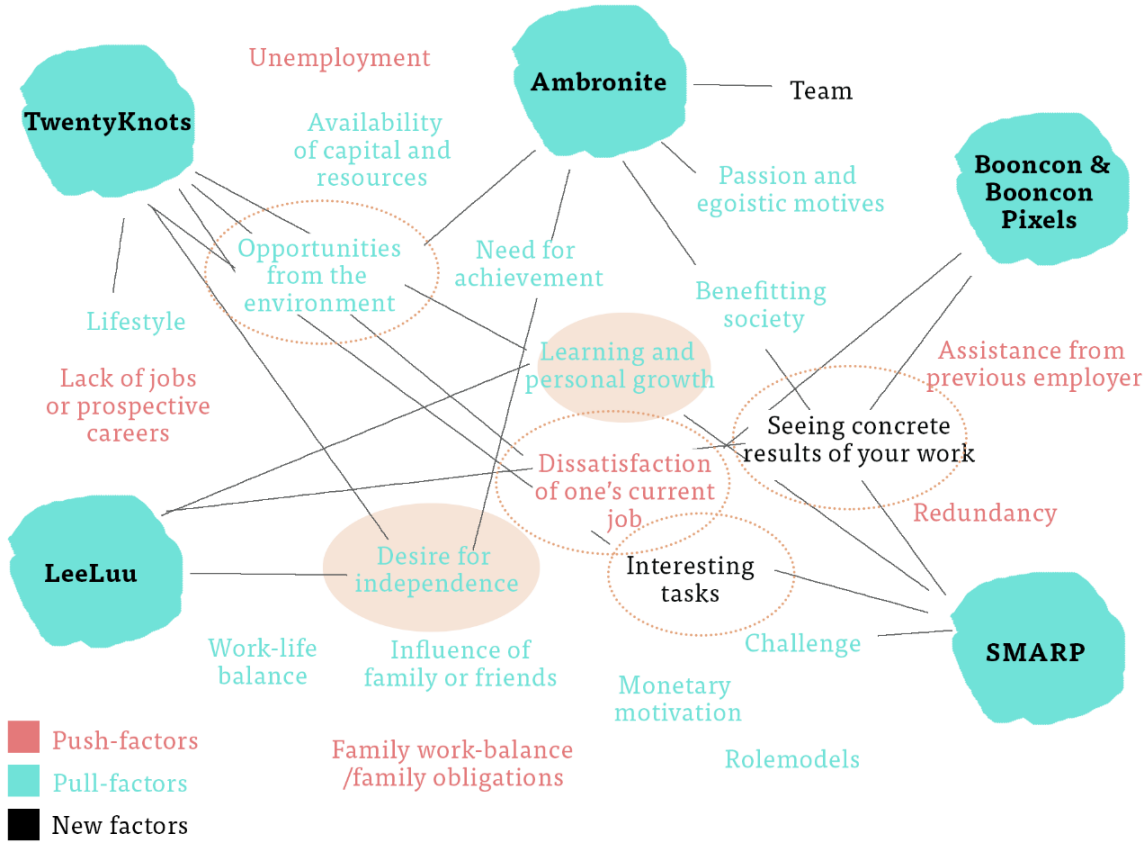

***Figure 18**: Cognitive chart of the motivational factors in relation to the case-study companies*

Like previous studies demonstrate (Amoros et. al: 32), the motivational factors of the case-entrepreneurs in this study were also dominated by pull- and improvement-driven factors. Illustrated in **Figure 18**, there are some factors that haven't been viewed as important, few that have only been identified by one case-company, and some key factors that two or more companies have been affected by. The most important motivation factors in this study were: *desire for independence* and *learning and personal growth.* Other important pull-factors in this study had been: *benefitting society*, *interesting tasks*, *seeing concrete results of your work* and *opportunities from the environment*. The rest were either identified by one case company or hadn't had effect on any of the case-companies.

5.1.1 Pull- and improvement-driven motivational factors

Desire for independence in these case companies was seen as the need to choose one's own schedules, set the amount of work, as well as the ability to work in a suitable environment. As students, there also was the need to do something challenging and to have interesting work tasks. In a typical career path within a larger company, it is normal to work slowly up to the tasks that would be the most interesting and where the concrete results of your work are seen. This was especially the case with Smarp Oy. Roope Heinilä explains that their motivation for starting a company was to do something without a 'glass ceiling' and getting right into the meaningful tasks. In the creative side, working in an inspiring environment, and during the times when you are at the most creative state, were regarded important by Tobias Johannes from Booncon Oy.

Learning and personal growth was brought up as an important factor especially from a student point of view. As an entrepreneur you are able to use acquired knowledge from studies and apply it to a real life context. About half of the entrepreneurs had the desire to become entrepreneurs before an actual business idea or a team, whereas the other half had faced the choice of becoming entrepreneurs when the opportunity for entrepreneurship rose. While the starting points were different, similar motivational factors and revelations about the perks of entrepreneurship had risen after forming the ventures. All of the case entrepreneurs explained that the most motivating factor about entrepreneurship had been the ability to learn new things everyday, especially from a student and a first-time entrepreneur point of view. There are many new things that come up, which need to be solved and worked on.

Emmi Pouta from LeeLuu Oy says that especially with a designer background, learning about the business side has been very useful and interesting on the way.

Both Ambronite and TwentyKnots had been highly affected by the *environment and opportunities*. In the case of Ambronite, each of the team members had been faced with similar problems regarding nutrition and functional food trends before coming together as a team. This built-up of information and opportunity maturation had also increased and formed the motivation to become an entrepreneur one day. Less visible but in a similar way, the opportunity of TwentyKnots offering had affected the motivation of the entrepreneurs. As the founders had acquired knowledge during prior work as windsurf instructors, they had also been exposed to potential opportunities in the field. Together with the right timing, prior knowledge and resources, the motivation of becoming an entrepreneur had been built up.

Doing something *important*, *interesting* and *seeing the results of one's work* were regarded as motivating when looking at specifically the entrepreneurial tasks and the type of business. The entrepreneurs explained that it's not just about making money or doing any work, but there has to be something special about the way the work is done, the offering or doing something that benefits society. As an entrepreneur, all the results are dependent mostly on your own input and decisions. Emmi Pouta from LeeLuu explains that as your own boss, you are able to change direction and plans in a fast pace, which makes the work very flexible. "There is a different speed of doing things with a small team, opposed to working in a larger company", explains Simo Suoheimo from Ambronite. Working in a larger company the results of your work or your team's work might take a while to show or might not even show at all. Seeing your own importance and touch on the offering, are good motivators.

In regards to doing something important and interesting, the case-entrepreneurs explain that especially as young students it is hard to get meaningful jobs and tasks early in a career. By doing something on your own, you are able do tasks and take responsibility over things that would have normally taken a long time in a larger company to get to. Joel Mikkonen from TwentyKnots mentions that his tasks might vary from coding websites to accounting and marketing. This keeps the work interesting and intrinsically rewarding on daily basis. The entrepreneurs also said that doing something they can stand behind for and believe in makes the offering important personally.

In the case of Ambronite, the founders wanted to do something socially important. Simo Suoheimo says, “If we wouldn’t do it, no one else would do it either.” Interestingly, empirical findings from this study indicate that monetary motivations were not significant. This goes against previous studies, which explain that alongside desire for independence, monetary motivation was an important improvement-driven factor. (Amoros et. al: 32) Simo Suoheimo from Ambronite explains that money is actually a bad motivator compared to the intrinsic factors of doing something important and what you believe in; even if there is a high opportunity cost for a business student to engage in entrepreneurial activities opposed to the jobs offered to recent graduates and students.

Alongside monetary motivations, there were few other pull-factors that did not get mentioned as being influential. Interestingly, *influence of family* and friends and *role models* did not directly influence the case-companies, even if there had been a rising hype of startups and entrepreneurship in Aalto University (Graham 2014: 26) Perhaps the findings could be different if this study would have been conducted a few years later, as these startups are the ‘role models’ and have developed alongside other influential startups from Aalto. The motivation and support in these cases has been more parallel with other startups, opposed to initially looking up for role models.

5.1.2 Push- motivational factors

In terms of push-factors, *dissatisfaction of one’s current job* had been a major factor for two of the case-companies Booncon and Booncon PIXELS, as well as TwentyKnots. Dissatisfaction of one’s current job for the two case-companies means being unsatisfied by the way the company had been organized, how the offering been brought to the customers, as well as the working environment itself. In the case of TwentyKnots, the founders noticed a more efficient and professional way to provide the same service as the non-profit organization they worked for, was offering. Because of the non-profit nature of the organization, it wasn’t possible to improve and develop the product further, without investing time and money on voluntary basis. For Booncon and Booncon PIXELS, the issue was mostly about the working environment and working hours. As creative individuals, working within very traditional working hours, wasn’t motivating and productive. They decided that by working on their own, they could create and working environment that would allow them to get inspired and work most efficiently.

None of the entrepreneurs described the current unemployment situation, the lack of prospective careers, redundancy or family obligations as a push-factors towards entrepreneurship. The main reason possibly lies in the backgrounds and working experiences of the students and graduates. The results would possibly be a bit different if these entrepreneurs had families or longer working careers behind them. In terms of other career options, these entrepreneurs weren't too worried about not getting employed, as was reflected in the improvement-driven nature of the motivational factors. Simo Suoheimo from Ambronite says that the working opportunities for recent graduates from the Aalto School of Economics are good and well paid. There is rather an opportunity cost of ignoring those opportunities in order to pursue entrepreneurial opportunities.

5.1.3 Summary of the entrepreneurial motivational factors

Overall, these empirical findings show that improvement-driven motivational factors such as *desire for independence* and *learning and personal growth* were regarded as most important by the case-entrepreneurs. **Figure 19** summarizes and categorizes the factors according to their importance to this study's case companies and their founders. As can be seen push-factors had almost no effect, whereas pull-factors had been distributed quite evenly on the levels of importance.

	Pull-factors	***Push-factors***
Very important	Learning and personal growth Desire for independence	
Important	Opportunities from the environement Interesting tasks * Seeing concrete results of your work* Benefitting society	Dissatisfaction of one's current job
No so important	Team* Lifestyle Passion and egoistics motives Challenge	
No effect	Availability of capital and recources Monetary motivation Work-life balance Influence of family or friends Rolemodels Need for achievement	Unemployment Lack of jobs or prospective careers Assistance from previous employer Redundancy Family work-balance / family obligations

* New motivational factor

***Figure 19**: Summary of the motivational factors categorized in order of their importance*

5.2 Opportunity development process within an entrepreneurship and innovation ecosystem

There are many commonalities in how opportunities have developed in the E&I ecosystem, however all of the case-companies have a unique process and story how they have been formed. The opportunity development process according to Ardichvili et. al's model (Ardichvili et. al 2003: 118) has been composed of three areas: influencing factors, entrepreneurial alertness and the core process. This served as the guideline for investigating the case-study companies' opportunity development processes. During the interviews and gathering the findings, two new elements of the model were discovered, which were: a *positive initial entrepreneurial experience* as part of the influencing factors, and *active search for business opportunities* as a type of entrepreneurial alertness. The following figure (**Figure 20**) illustrates and compares the different opportunity development paths of the case-study companies. In this figure, the motivational factors have also been included from the previous section as part of the process.

***Figure 20**: Opportunity development processes of the case-study companies*

5.2.1 Influencing factors

For the case companies, *prior knowledge* and a *positive entrepreneurial experience* were regarded most influential in terms of gaining entrepreneurial motivation. As a second factor, four out of five ventures described how social network, especially in the form of an *action set* had played part in the opportunity development process. In the case of SMARP, the action set itself was

the primary influencer. Interestingly, none of the entrepreneurs mentioned personality as a specific factor. The reason might lie in the fact that all of the case-companies had been established by teams from the beginning and it might be hard to realize that personality has had a large role in the formation.

Two of the case companies, Booncon and Booncon PIXELS, as well as LeeLuu, explained that their companies wouldn't probably exist at the moment without a *positive entrepreneurial experience* that shaped their view, built confidence and developed their skills as an entrepreneur. For both of these companies there was the positive initial experience that had raised the level of entrepreneurial motivation. In the case of Booncon, it was the push-motivational factors that gave the momentum of the founders to start seeking for potential business opportunities. In the case of LeeLuu, social network and the influence of a member of the inner circle was needed to give the boost and confidence to start developing their opportunity further.

In the case of Booncon, a project-based international university course, done in a real life context was a trigger in thinking about entrepreneurship. Tobias Johannes explains, "The seed of entrepreneurship was really planted there. - If you have a cool team and a project for which you get excited about, you can really achieve a lot and do work that you can be proud of." Here the benefits have been the ability to test project management skills with a concrete idea, see the results of your own work, as well as get excited about your own idea being brought to life. For LeeLuu, in addition to the opportunity and problem obtained from a multidisciplinary course, the main gain was to meet and work with potential co-founders. In a university setting, there is huge potential in finding and testing team members without the monetary and legal risks associated with a proper business formation. Moreover, often these potential team members are met in projects and courses, which could lead to innovation and business opportunities.

Prior knowledge in the opportunity development model has been divided into two domains: special interest (domain 1) and knowledge of the industry (domain 2). Two of the case companies TwentyKnots and Ambronite, had both identified prior knowledge as the primary influencing factor, moreover, they had stated that both of the two domains were significant. The founders of TwentyKnots had been very involved with the watersports industry, especially windsurfing for many years before their work as windsurf instructors. From their job as instructors they were able to learn specific knowledge about customers and the actual offering that they would later provide in their company.

In addition, through working at the windsurf association they learned about the sport of stand-up paddling, which has become very popular in the recent years all over the world. Ambronite has a similar time span, in regards to obtaining prior knowledge. According to the interviewed founders, functional foods and their use had been of interest for years. Simo Suoheimo explains that through scout activities and the army, where quick energy was needed, however topped with the negative effects of serving unhealthy foods, proposed an interesting problem to the founders. This led them to search and find out more about the functional food industry and new trends that were entering the market. Interestingly, for both companies there was a gain of data and information about these areas, but the founders did not actively search for niches and business opportunities. Instead, they were alert for new information and with the right timing and discovery of an opportunity they decided to start developing their ideas further.

Social network, especially a strong action set is visible in all of the case-study companies. All but one of the case companies had identified an action set as the secondary influencer. The founders of Smarp explain that the founding team was the most influencing factor in engaging in entrepreneurial activities. Three of the founders had met during their studies in the Mikkeli Campus, and had worked on various projects, as well as been roommates together. During this time they had learned about each other's skill sets and seen whether they would work well together. With the founding team they talked about entrepreneurship, built their motivation and started to actively search for potential business opportunities. Within these case companies there are different types of teams that have been established. Smarp, LeeLuu and Ambronite have all been formed through the university setting, while Booncon is made up of friends and TwentyKnots is composed of three siblings.

5.2.2 Motivation and alertness

For all of these case companies there has been a primary influencing factor, which combined with the secondary motivational factor has given the founders momentum and raised their entrepreneurial motivation. This motivation in turn has either turned into passive entrepreneurial alertness or active search for business opportunities. The opportunity development model, proposed by Ardichvili (Ardichvili et. al 2003: 118) worked well as a guideline when applied to the E&I ecosystem of Aalto University.

This model was a good choice as it assumes that entrepreneurs today don't have the time to wait for opportunities to rise, but can be created by imaginative and creative entrepreneurs. Especially in a university setting, when time is limited, activeness of potential entrepreneurs is important.

Between the entrepreneurial alertness and an active search there might be a switch to either move from a passive stage into an active one, or shift from an active phase to a more passive one. Even if only two of the case companies, Smarp and Booncon clearly explain that their opportunity development process included 'search elements', this doesn't mean that the other three companies were completely passive after gaining entrepreneurial motivation. For example, after the interactive textiles course and the successful project, the founders of LeeLuu did not completely forget about the opportunity found through the project. For a year, they kept in contact with the team members, exchanged ideas and benchmarked similar concepts. They were in an alert stage, but continuously learning more about the industry and the markets. Similarly, the founders of Ambronite constantly kept talking and thinking about functional foods and the potential of the functional foods market, while doing other jobs and studies; thus scanning the field for opportunities. When the potential business opportunity came up, they concentrated their time and energy on its execution. For TwentyKnots, the discovery of the opportunity was a result of a more unconscious state of alertness. In this case the founders hadn't thought about entrepreneurship or gained knowledge with the goal of doing something of their own in the end. The discovery was more or less sudden and accidental.

The level of motivation seems to affect the type of alertness in the case subjects. In Aalto University, by working on the influencing factors of the students and affecting their entrepreneurial motivation, it could be possible to have them floating at least on a 'passive entrepreneurial alertness level'. When and if opportunities were to rise, there would be potential founders to engage and develop the opportunities further. Ideally, these students could then be able to utilize the social capital, knowledge and support structures early on while present at the university. During projects and courses, it could be possible to raise the level of the alertness more towards an active search. Overall, it would be important to learn about the influencing factors and how they build the motivation of the students that haven't yet engaged in entrepreneurial activities.

5.2.3 Core process

In terms of the core processes of the case-companies, the opportunity recognition stages, as well as the time spent on different stages varied, while the process in general was quite straightforward. Three of the case-opportunities were discovered, one perceived and one created. Interestingly, these factors relate to the level of motivation and time constraints that the entrepreneurs had had. In the cases where the opportunities were discovered, there wasn't a very specific time when the founders wanted to establish a venture and the process was very organic.

In two of the cases where a time constraint was present, either through strong push-motivation or through a proposed problem, perception and creation were the modes of opportunity recognition. The founders of Booncon explain that the environment of their previous work place wasn't motivating and they were quite unhappy with the situation. They gathered the team and looked for a place to establish a company, even before having an idea what they would do. They created the opportunity based on their backgrounds and differing skillsets. LeeLuu's opportunity in turn was found as a solution to a problem, proposed in an Aalto ARTS course in Interactive Textiles. In this case the time constraint was the extent of the course, where they worked with the solution, all the way to a prototype. For these two companies, the time after creation and perception was spent on learning about the industry and gaining knowledge. From Aalto side, LeeLuu obtained support through Summer of Startups and Startup Sauna, which accelerated the process.

The three other companies did not have a specific hurry or time constraint prior discovering their opportunities. Even if SMARP was actively searching for opportunities, they were occupied with their studies and other work at the same time. However, when the opportunity was discovered, all of the companies worked fast through development and evaluation to the venture formation. In the case of Smarp, a proper venture was needed to take a job offered to them regarding a social media campaign. This pushed the founders to take action. For TwentyKnots, the amount of prior knowledge gained allowed them to move straight into building the venture when the idea was born, instead of developing and evaluating the idea. Ambronite's case was a bit different, since their team is composed of two groups who had on their own thought about solutions to the same problem regarding functional foods and the nature of the product itself. It took a bit of time getting the whole crew on the same page, as well as testing and developing their offering.

Interesting about these cases is the time allocated before and after the opportunity recognition phase. As seen from these cases, the more motivation and drive you have towards entrepreneurship or you have a specific time constraint, the faster the opportunity is discovered, perceived or even created. This works well with the opportunity 'creation' theory as it assumes that entrepreneurs do not have to wait for opportunities to rise, but they can be created or actively searched as well. In turn, the development, evaluation and venture formation stages in these cases were affected by the amount of prior knowledge, either through personal interest, industry knowledge or both. Overall, the process was quite straightforward for all of the case companies.

5.2.4 Revised opportunity development process model

The opportunity model proposed by Ardichvili et. al (2003: 118) was combined with entrepreneurial motivational factors, to serve as a guideline when studying startup companies formed within an I&E ecosystem. As a guideline, the model worked great, but few iterations and changes had to be made during the research process. The original model did not include entrepreneurial motivation as a separate factor, as it was assumed that it were the influencing factors that affected entrepreneurial motivation. In the revised model proposed by this research (**Figure 21**), it is argued that the influencing factors themselves do not necessarily initiate an alertness state or an active search for business opportunities. In this model, the influencing factors affect the entrepreneurial motivation, which in turn initiates an active search for business opportunities or keeps the potential entrepreneurs in a passive alert state, until an opportunity is recognized. Entrepreneurial motivation continues throughout the different states of the opportunity development process, as well as through latter stages of the venture's lifetime.

Another key change was the division of the alertness into two levels of alertness. The empirical findings show that there were different levels of alertness present in the founding teams. These levels changed between a very active search state, to a more passive state where the potential entrepreneurs had other things to do, but kept scanning and their eyes open for opportunities and knowledge. An interesting continuation of this study would be to look at the different levels and changes of alertness from the first sparks of entrepreneurial motivation, to the actual opportunity recognition.

A third change was the addition of *initial positive entrepreneurial experience* as one of the influencing factors. This means that the entrepreneur has gained ideas what entrepreneurship is like, skills and confidence to engage in entrepreneurial activities, without the risks associated. In a university setting this type of an experience can be simulated in workshops, courses or programs. Both case companies, had participated in a project-based course where the aim was to take learned knowledge from the academic side and apply it to a real world case.

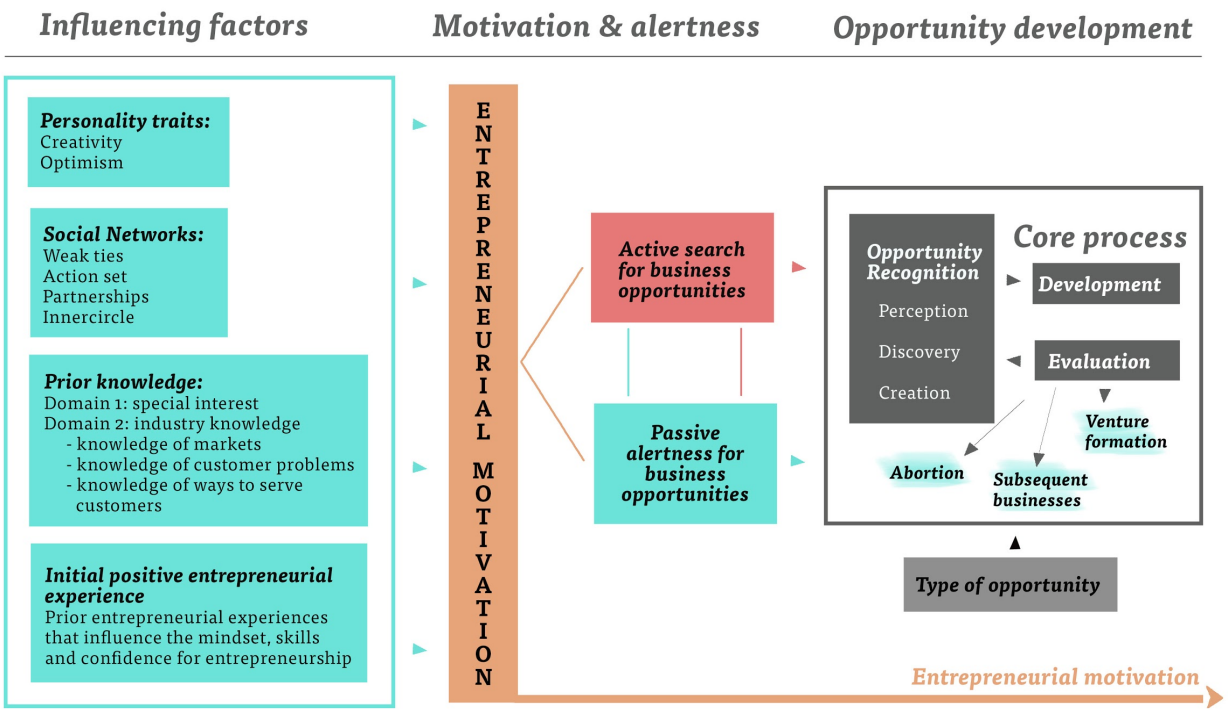

***Figure 21**: Revised opportunity development model for university based startups*

5.3 How can the E&I ecosystem be developed to meet the needs of university-based startups?

In the third research question the development of the current E&I ecosystem has been critically examined and concrete steps for improvement identified. It is important when addressing this research question to look at the results obtained in the previous sections regarding entrepreneurial motivation and the opportunity development processes, as well as takes into account improvement suggestions directly from the case-entrepreneurs. In the first section the aim is to look at the overall utilization of the ecosystem and the links between the motivation and opportunity development.

From these, key roles have been established for each section of the ecosystem, of which can be emphasized in the future. This chapter is built around the third research question, which to recap is the following:

What measures should be taken to develop the current Aalto University E&I ecosystem to evoke and support innovative business ideas?

In this study, Aalto University E&I ecosystem has been looked at from a point of view of five different ecosystem elements, which have been identified either as intentional or unintentional. Intentional in this case means that the university has actively pushed forward entrepreneurship and innovation activities through different functions and facilities. The intentional ecosystem elements are: *E&I across university departments*, *student-led E&I activities* and *university-led E&I activities*. In turn, the two unintentional elements are: *external E&I community* and *not E&I specific university activities*. From these, the case-entrepreneurs have utilized various parts, which have affected different stages of the opportunity development process or entrepreneurial motivation. **Figure 22** below recaps what functions and stakeholders each ecosystem element is made of, as well as explains how the different parts of the ecosystem has been utilized by the case companies.

E&I across departments	*Master's program on entrepreneurship* *Entrepreneurship courses* *Cross-disciplinary study programs ex. IDBM, Creative Sustainability* *Cross-disciplinary coures and projects*

Concrete skills learned through participation in cross-disciplinary programs, courses and projects
* Project management
* International and cross-disciplinary team work
* Creative thinking

Networking
* Finding team members
* Sharing ideas

Obtaining business ideas and finding opportunities

University-led I&E activities	*Design Factory, Aalto Centre of Entrepreneurship (ACE), Aalto Venture's Program (AVP), Open Innovation House, App Campus, Stanford Technology Venture's Partnership (STVP), Aalto Entrepreneurship Center*

Design Factory
* Physical working spaces
* Networking
* Customers obtained through DF company network
* Inspiration and assistance from DF staff for product development
* Ability to use special working spaces such as electroshop

Aalto Start-Up Center
* Coaching and practical assistance
* Working spaces
* Networking

Overall the university's positive take on entrepreneurship impacts the students opinions

Student-led I&E activities	*Aalto Entrepreneurship Society (Aalto ES), Start-Up Sauna, Summer of Startups, Start Up Life, SLUSH*

Start Up Sauna and Summer of Start Ups
* Acceleration of the venture creation
* Coaching and mentoring
* Meeting potential investors
* Networking
* New team members found

Aalto ES events
* Networking
* Inspiration from other start-ups and guest speakers
* Positive message sent about entrepreneurship as a career choice

SLUSH
* Inspiration from other start-ups and guest speakers
* Positive message sent about entreprneurship as a career choice
* Meeting investors and gaining access to develop the venture further in Silicon Valley

***Figure 22**: Utilization of the different E&I ecosystem elements*

In the **Figure 22** above, the various benefits and activities used by the case-study companies have been collected and identified under each of the ecosystem elements. It can be concluded that all of the elements have had a role in the opportunity development and formation of the case ventures, although some having more weight than the others. Moreover, for each of the elements there are activities that could define the role and the function of that specific ecosystem area. One of the key feedbacks from the case-entrepreneurs was that at the moment the current Aalto University's E&I is too complicated and complex to use. In addition, it not very clear what roles the different facilities have when it comes to entrepreneurship. The following sections examine the current roles of the ecosystem elements, from the point of view of the empirical findings.

5.3.1 Entrepreneurship and innovation across departments

E&I across departments consist of entrepreneurship or cross-disciplinary courses, projects and programs, intentionally established by the university, which can be part of the students' study structures. In this study, the case-entrepreneurs had taken part in cross-disciplinary master's programs, projects, but hadn't taken part in entrepreneurship courses or programs.

Along with similar comments from other founders interviewed, Simo Suoheimo explains that if you want to become an entrepreneur, you just have to get your hands dirty, experiment and learn skills that you might need along the way. In other words, these are skills that one will not learn from an entrepreneurship course, but from experiences, trials and errors. Cross-disciplinarity however, was seen as very useful by all of the founders that had been in contact with these types of courses and activities.

The key benefits for entrepreneurship and innovation activities spread across various departments, were: project management skills, working with different kinds of people from various backgrounds, thinking creatively and sharing ideas. Moreover, after these experiences the students had been able to utilize and recognize different potentials, when working with different types of people. In the case of LeeLuu, Booncon and TwentyKnots, *Technology, Design and Business* are clearly visible in the structure of the teams. In the case of LeeLuu for instance, throughout her studies Heini Salovuori, with her background in business, had gained experience working with designers in various cross-disciplinary courses. Her working methods and communication skills had been very useful in a designer heavy team.

Another benefit had been the project-based nature of these courses. Especially in the IDBM, ME310 and PDP projects, the projects last for a school year and are done to a third party sponsor. Working with an external client, with a real life case and a cross-disciplinary team, taught the founders a lot about project management and communication. Maria Mikkonen from TwentyKnots, explains that the tight and intensive nature of the IDBM-program has been useful in the business world, especially when managing a team and working with tight schedules. Even if the students wouldn't engage in entrepreneurial activities, problem solving, cross-disciplinary teamwork and project management are important skills for any type of work and working environment. Currently, these courses have been made optional students, but these could be promoted more and cross-disciplinarity included in the students' required courses.

- ***Evaluate the content of the current entrepreneurship courses and programs***
- ***Encourage students to take part in cross-disciplinary projects, courses and programs, or include cross-disciplinary elements into students' study programs***

5.3.2 University-led entrepreneurship and innovation activities

University-led E&I activities differ from the previous element, by being activities and facilities organized by the university, which are not specifically part of courses and study programs. The function of these activities is to foster innovation, entrepreneurship and commercialization of ideas born within the university. Both staff and students can utilize these facilities and activities. In this research, the case companies had used the facilities of Design Factory and the Aalto Start-Up center. Indirectly, using the Sauna facilities, the teams have also used resources provided by Aalto University to be used by Aalto Entrepreneurship Society (Aalto ES). The rest of the facilities provided by university, hadn't been used by the case-entrepreneurs. As a note, Tobias from Booncon explains that many of the activities and facilities provided by the University are way too complexly organized and it is unclear what they actually do. For example, most of the founders did not know what was the function of Aalto Center of Entrepreneurship (ACE) and whether it could be useful for their business formation.

The empirical findings show that the main benefits provided by Design Factory (DF) and Aalto Start Up Center have been the physical and social spaces, as well as the expertise of the staff. Interestingly, there weren't any specific virtual spaces mentioned by the entrepreneurs. Physical working spaces were regarded as one of the first things to have when setting up venture with a team as a place where to meet and work outside your home. Booncon and LeeLuu had used the actual DF-workspaces, Ambronite had been working in the neighboring Sauna facilities and SMARP had resided in the Aalto Start Up Center. In addition to having place to work, other typical office spaces had been also provided by these facilities. The founders mentioned spaces used for Skype meetings, ideation and even storage to have been useful during the venture creation process. In addition to a physical working space provided by the Aalto Start Up Center, the founders of SMARP obtained their own startup 'counselor', which they were able to consult when they had a problem or needed some assistance.

Other types of spaces that the case-entrepreneurs mentioned were places for social encounters and networking, as well as spaces where the facility staff was able to assist with various problems and challenges. Networking and sharing ideas with others was seen as one important activity when developing your own business ideas further. In the spaces used by the case-entrepreneurs, networking had been built into the spaces' ecosystem processes. For example, Design Factory encourages people to openly discuss and share their ideas with each other.

Both LeeLuu and Ambronite state that they have had valuable assistance and support from the Design Factory staff regarding their product development. Heini Salovuori from LeeLuu says that without the facilities and knowledge provided by the university, their starting costs for the venture would have been too high for even considering building a venture. For Ambronite, the effect of the Design Factory has been more inspirational, than concrete. Through Design Factory courses and staff, they have gotten interested in product development.

Mostly the interviewed founders were very satisfied and grateful for all the assistance and support they have received from these facilities. As almost all of these case-entrepreneurs state, it's not obvious or given that the university would provide these types of spaces and support, as they provide at the moment. However, if they would give direct feedback regarding these spaces, two things came up. Firstly, as there are many stakeholders from students, to researchers, companies and startup teams using the spaces, it would be beneficial to define the roles of each stakeholder in the community. Especially when the spaces are aimed at open innovation, co-creation and networking, it would be important that everyone would commit to doing their part. Another comment was regarding the facilities and everyone's responsibility to take care of these provided facilities. As one of the case-companies had noticed, while all the spaces are free to use, it is not certain that everyone keeps them tidy, clean and uses the materials provided in a mindful manner. Therefore, as a requirement for the usage of these spaces, the participants would have to take better care of the resources provided.

- ***Define the roles of each facility and explain the roles each stakeholder has in the ecosystem, in order to make the spaces co-creative, open and function in an intended manner***
- ***Clearly state the rules when using the resources provided***

5.3.3 Student-led E&I activities

In the case of the Aalto University's entrepreneurship and innovation ecosystem, it was the student-led movement that was the main force behind the formation. (Graham 2013) Aalto Entrepreneurship society known as Aalto ES has since their first event in 2008, formed other programs such as Start Up Sauna, Summer of Startups and Start Up Life, which are growing and

very active today. The case-entrepreneurs had participated in the Start Up Sauna, Summer of Startups, as well as other events the Aalto ES crew has organized. The interviewees explained that in addition to the interesting and useful Aalto ES events and programs, they have been responsible for inspiring, encouraging and showing students what entrepreneurship is at best. Amoros et. al (2013) have identified one of the important roles of the educational institutions to convey the message of entrepreneurship as an viable career option for students. If not directly the Aalto University itself at first, but this message has been spread through the events and media channels of Aalto ES.

In the case of these interviewed entrepreneurs, it seems to be that there have been two main influences of the student-led activities. One has been a concrete startup program, such as Startup Sauna, and the other has been the message conveyed about entrepreneurship through different medias and events. In terms of the programs, both Ambronite and LeeLuu have participated in the Startup Sauna accelerator, and LeeLuu also in the stage zero level program of Summer of Startups. These programs have provided coaching and mentoring from industry specific experts and startup gurus, introduced the startups to potential investors and provided networking possibilities. For example, Heini Salovuori met the LeeLuu team through the Summer of Startup program and co-founded the venture later on with the original team. Ambronite in turn, did not make the Summer of Startups program, but participated in Start Up Sauna the following fall. Simo Suoheimo explains that during the Start Up Sauna program, they were able to develop their venture the most. The best yield had been networking with investors and possible partners during the process, as well as participating in the SLUSH startup conference.

Not all of the interviewed companies had participated in the Aalto ES organized accelerator programs, but all of the founders had been to different Aalto ES events. The events have been mostly about bringing different experts or companies to share their stories, and networking with like-minded people. Joel Mikkonen from TwentyKnots explains that it has been very motivating to hear different stories about how others have started their companies and what types of roads they have travelled on the way. Graham (2013) explains that one of the problems regarding entrepreneurship in Aalto University has been the history of focusing students' careers towards working in larger companies. By showing successful role models that have risen from the Aalto student communities, Aalto ES has managed to affect students' aspirations towards entrepreneurship already during their time spent in the university. Not all startups succeed nor grow into large global businesses; therefore it would be important that the messages sent through these

events would recognize that also smaller companies are as important as high growing startups. For example in the case of TwentyKnots, which is a seasonal company, not aiming for high international growth and with a very physical service, the current programs offered by Aalto ES wouldn't be very suitable.

- ***Continue conveying the message about success stories and role models, also keeping in mind smaller businesses***

5.3.4 Not E&I specific university activities

The unintended activities provided by the university's organization or students have been called the *Not E&I specific university activities* in this study. These activities consist of university courses, research projects, company projects and student activities, which do not have specific entrepreneurship or innovation specific functions. However, despite the unintended nature, they have had a significant role in the formation of these case companies. The main gain from these activities have been different types of skills and knowledge acquired, as well as meeting lots of new people and networking through projects and courses. All of the founders explain that different courses and projects throughout their studies have provided them with four types of skills or knowledge that they have been able to use during their venture formation process. The types of skills have been: *industry specific knowledge*, *basic business skills*, *specialist skills* and *communication skills*.

Industry specific knowledge obtained from university has been especially useful for LeeLuu in the form of interactive textiles, electronics and textile design. For Booncon and SMARP, the team members have used the skills obtained for business consulting and design work. Ambronite and TwentyKnots in turn have drawn their industry specific knowledge through the founders' personal interest towards their offerings. *Basic business skills* have been very useful for all of the case-companies. For example in the case of Ambronite, the courses from the Aalto School of Economics have been put to everyday use. Arno Paula explains that he uses his marketing and Excel-working skills in the Ambronite's daily operations. *Specialist skills* in this case, are skills that provide something extra to the startup's operations. For example coding the company's own website, photography, graphic design or legal knowledge.

By having this type of knowledge and skills from the company's side, opposed to buying it from outside, can save a lot of money and time. Joel Mikkonen from TwentyKnots, has for example been able to code their website, which is a necessity for every company nowadays. *Communication skills* are vital when communicating about your venture, selling your offering and working with a team. During university courses and projects, these skills are developed through various presentations, teamwork and projects. The founders of Smarp explain that the practice from project work, especially in international teams have been crucial, has been crucial when establishing an international startup. In the Mikkeli Campus, the courses are held in three-week modules, held in English and every course includes one or more group projects and presentations.

For the startup founders, the amount of time is usually very low especially in the beginning of the venture building. Therefore, trying to maximize the effectiveness of the studies, while learning useful things seemed to be an issue with many of the interviewed founders. The case-entrepreneurs explained that often there were skills or knowledge that they would have needed, but they were lacking the time or the ability to enter the courses had been restricted to certain study programs only. These skills were not so much about the communication skills or industry specific knowledge, but basic business or specialist skills. The founders explained that even if they weren't able to completely do something on their own, for example graphic design, it would have been important to understand how certain design programs worked. There were three areas of basic business bureaucracies and legalities, graphic design and photography, as well as coding, which the interviewed founders wished they had been able to learn more about during their university studies. These weren't either offered at that time or there were constraints about who is able to attend. From the Aalto ARTS side, it would be important to introduce more basic business courses to the students. Emmi Pouta from LeeLuu explains that she has been lucky to learn so much about business through the startup experience, but wished that there had been more business courses available in the Aalto ARTS side.

- ***Distinguish the most important skills needed for student entrepreneurs***
- ***Collect series of courses or other activities which cater to the skills needed***
- ***If there is an issue with accessibility and affordability, these course could be for example offered through virtual channels***
- ***Allow more movement between study programs and Aalto courses***

5.3.5 External E&I community

The external E&I community in this case included Otaniemi startup hubs, research centers, other higher institutions, the university alumni and university's partner companies. The external community hasn't been created intentionally, but has co-existed with the university and parts of it have been spread within the same region. Interestingly these case companies didn't have almost any touch points with the external E&I community. Only in the cases of SMARP and Booncon, they had been involved with a university partner company. SMARP obtained their first customer via Aalto University School of Economics, Mikkeli campus' student board, in which two of the founders belonged to at the time. The company offered a project to a group of students or a company established by students, which the founders then took. In the case of Booncon, one of the founders had been involved with a company during a Product Development Project (PDP), which then continued working with Booncon on another project.

In this case, the reason for the startups not identifying the external E&I community as an influencer could be that these have been integrated into the student-led and university-led activities. As the companies, mentors and alumni are more present in those facilities, events and channels, and thus there is no need to contact alumni or companies directly. However, as the cases of SMARP and Booncon show, companies can obtain useful services or products from Aalto found startups and in turn the startups gain experience and customers. Perhaps the research centers and other higher institutions within the proximity of Otaniemi, haven't been open and communicated about collaboration, or haven't had specific knowledge or resources to offer for the startup companies. This is an interesting observation as it goes against the findings from Graham's (2014: 55) report. In this report the development of Aalto University has been described as been built around the university rather than inside.

- ***Involve partner companies and alumni in the university-led and student-led activities***
- ***Connect the offerings of the startups with the needs of the partner companies***

5.3.6 Recommendations for development of the Aalto University E&I ecosystem

In the previous sections the different roles and development ideas for each ecosystem element have been identified and discussed. Some of the elements have had more weight than the others, but all had some touch points with the case-entrepreneurs. In the **Figure 23** below, the development ideas from the previous sections have been illustrated and summarized. These development points have been collected on the basis of the empirical findings from this particular research. In addition, based on the discussion the elements have been given a certain role according to the way they are seen and utilized at the moment.

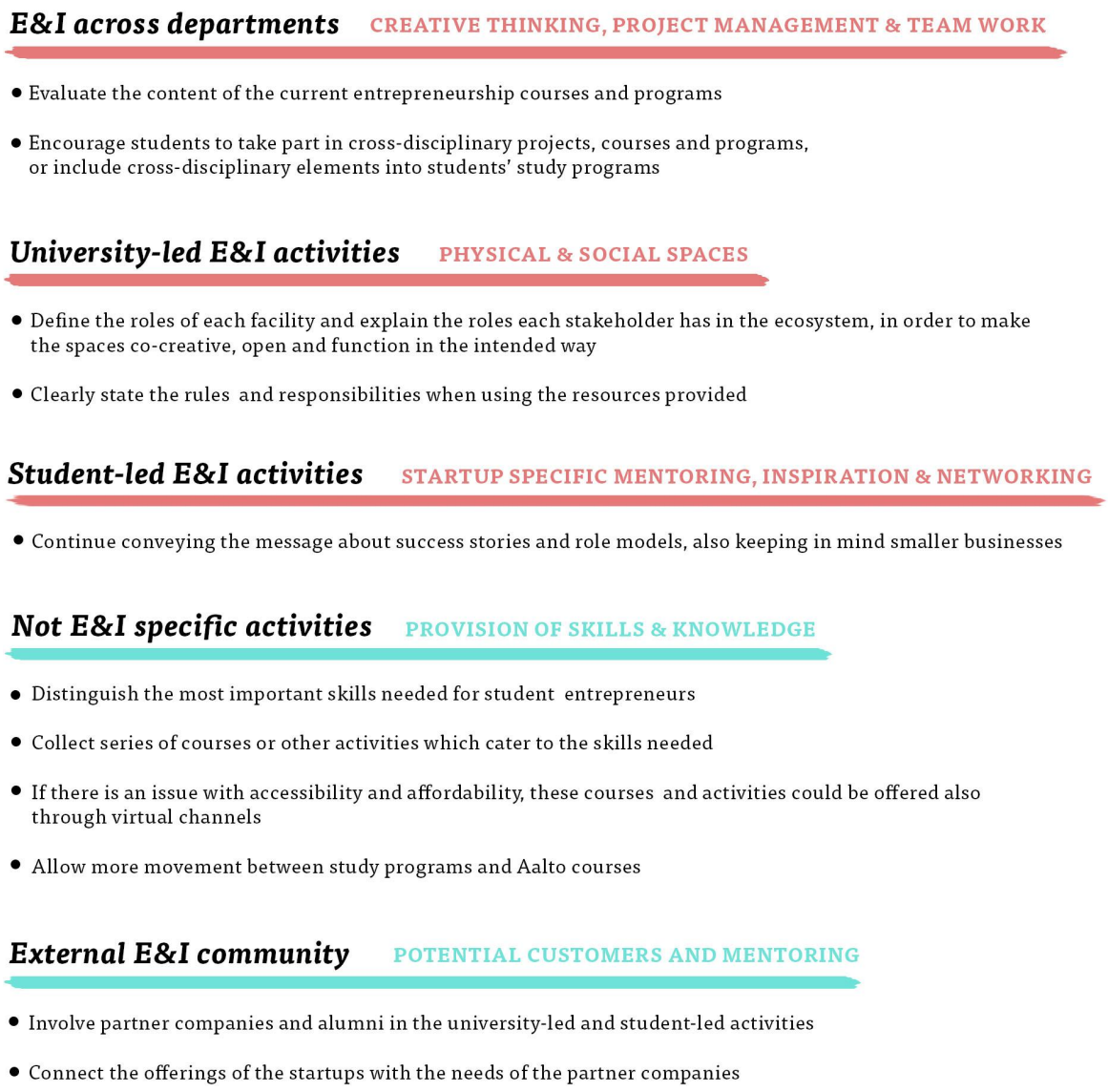

***Figure 23**: Recommendations for the development of the Aalto University E&I ecosystem*

6. CONCLUSIONS AND FUTURE RESEARCH POSSIBILITIES

6.1 Conclusions

The purpose of this research was to look at the phenomena of entrepreneurship within a university environment, specifically within the Aalto University entrepreneurship and innovation ecosystem. While academic spin-offs have been under study for a while, the ventures established by students have been undermined and little is known about how these ventures form. (Hsu et. al 2007: 769; Åsterbro et. al 2012) This study focuses on the motivation factors and the opportunity development, as well as introduces specific steps how to improve the current ecosystem. Therefore, the aim is to contribute academically in terms of knowledge about opportunity development and motivational factors, as well as provide practical implications for Aalto University in the form of concrete development suggestions. The specific research questions were the following:

- *What have been the students' main motivational factors of engaging in entrepreneurial activities?*
- *How do opportunities develop within an entrepreneurship and innovation ecosystem?*
- *What measures should be taken to develop the current Aalto University E&I ecosystem to evoke and support innovative business ideas?*

6.1.1 Main motivational factors of engaging in entrepreneurial activities

It is important to look into the motivational factors of the enterprising individuals, when studying the development of opportunities in a specific environment. As Shane et. al (2003: 258) point out that various steps in the opportunity development require motivation and decision-making of the willingness to engage in entrepreneurial activities. Venesaar et. al (2014) looked at the entrepreneurial motivations and attitudes of university students across Europe, including Finland as its own focus group. The findings showed that the Finnish and CEE (Hungary, Estonia and Romania) university student founders were motivated by the realization of one's own dreams, achievement, earning a higher income and challenge. This study served as a good starting point, but wasn't specific in terms of the sample of founders interviewed, as well as did not suit the context of studying the entrepreneurial and innovation ecosystem.

Therefore, studying the motivational factors of the active student founders within an entrepreneurial and innovation ecosystem point of view and within a Finnish specific context is a contribution to this research area.

As the data collection method was a semi-structured interview, the interviewees were let to elaborate freely on their motivation to become entrepreneurs. These answers were then reflected against the theoretical framework (2.5) and arranged according to their importance. The number of case-entrepreneurs, who had specified the motivational factor in question, determined the level of importance; *most important* means that the factor had been identified by almost all of the entrepreneurs, whereas *no effect* means that none of the case-entrepreneurs regarded the factor affecting their motivation.

These results showed that in accordance to previous research conducted about entrepreneurial motivational factors overall (Kirkwood 2009: 346; Dawson 2010: 699), most of the factors identified by the Aalto University case-entrepreneurs were considered pull-factors and specifically improvement-driven. The most important motivational pull-factors were: *learning and personal growth,* and *desire for independence*. These share similarities with Venesaar et. al's (2014) conclusions (discussed above), as well as Pölkki's (2015) article in *Helsingin Sanomat*, where they explained that nowadays university students are looking for meaning and inspiration in their work, opposed to getting a steady income. Adding on to previous research conducted over the motivational factors, three new entrepreneurial motivation factors were identified. These factors were: *interesting tasks* (important), *seeing concrete results from your work* (important) and the *team* (not very important). This shows again that instead of looking for higher income, motivational factors built inside the everyday tasks are seen as important.

In terms of push-factors, two of the case-companies explained that push-factors, specifically *dissatisfaction of one's current job* (important), had had a role in their motivation towards entrepreneurship. Interestingly, none of the case-entrepreneurs were pushed into entrepreneurship due to the current economic slowdown and rising unemployment numbers. (Statistics Finland 2015) The dissatisfaction in these cases had been due to the working culture, as well as how the organization was offering their services. All of these case-entrepreneurs were quite optimistic about working possibilities outside their venture.

6.1.2 Opportunity development within an entrepreneurship and innovation ecosystem

The success of the venture is often dependent on the capability of the entrepreneur to conduct a successful opportunity development process. (Stevenson et. al 1985 qtd. in Ardichvili et. al 2003: 106-107). Therefore, it was interesting to look into the opportunity development processes of the university-based startups, and whether there were unique factors to businesses formed within an entrepreneurship and innovation ecosystem.

The opportunity development model used as theoretical backbone for the empirical data, has been a model developed by Ardichvili et. al (2003). This model assumes that active entrepreneurs, opposed to waiting for them to rise, may also create opportunities. Moreover, the original model is constructed of three parts: the influencing factors, entrepreneurial alertness and the core process, which lead to venture formation, subsequent businesses or abortion of the idea. The aim of the second research question was to find out how university-based startups have developed their opportunities based on this model, does this model work for this type of study and what changes need to be made when taken to this type of a context. Below (**Figure 24**) the original model by Ardichvili et. al (2013), as well as the revised version have been presented.

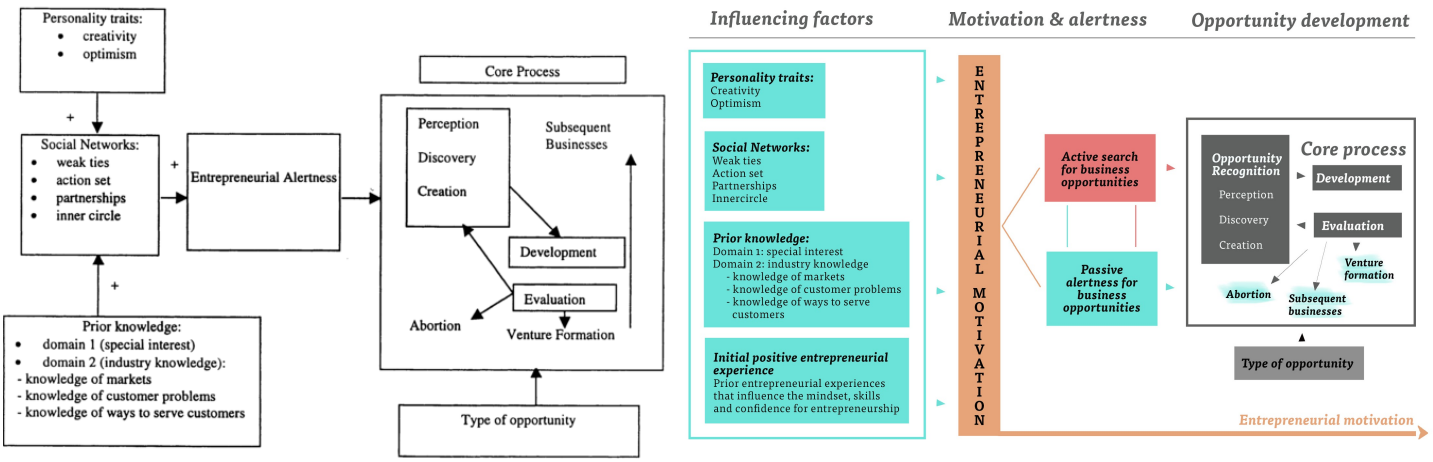

***Figure 24**: Archichvili's model of opportunity development (2013) and revised opportunity model*

Overall the original model worked well in terms of observing the process, for studying university-based startups within an innovation and entrepreneurship ecosystem. However, few changes and additions to the model were made based on the empirical data from the case-entrepreneurs. The biggest change was the addition of the *entrepreneurial motivation* as part of the model, as well as breaking *entrepreneurial alertness* into two different levels of activeness. Based on the results, it was interesting to see that the influencing factors themselves did not necessarily act as motivators. Instead they were prerequisites that raised the entrepreneurial motivation. This in turn either led the students towards a *passive alertness* or an *active search* for business opportunities. It is interesting that the passive alertness relates to the discovery and realist theories for opportunity development, whereas the active search with these case companies meant in addition to a search, creating and constructing new business opportunities. In terms of the case-companies, about half had a very active state of alertness and the other half was more passively scanning for opportunities.

In terms of the influencing factors, *prior knowledge,* and a new influencing factor: *initial positive entrepreneurial experience*, were regarded most important by the case-entrepreneurs. *Prior knowledge* had been gained through previous work experiences, as well as through the founders' own interests and hobbies. *Initial positive entrepreneurial experience* refers to an experience where the founder(s) had been able 'try' entrepreneurship or similar, and through the experience gain entrepreneurial skills, attitudes and confidence, without the typical risks associated with entrepreneurship. *Social network*, in the form of a strong *action set*, had been the second most important factor for all of the case companies, and one had identified it as the most important. This might be an obvious result, as all of the case-companies have been established with a team, however the action set represents an important factor in the whole opportunity development process. These teams had been constructed of friends, school acquaintances and of siblings. Therefore, no conclusions about the types of teams formed within the E&I ecosystem can be drawn from this study.

6.1.3 Implications for developing the entrepreneurial and innovation (E&I) ecosystem

Nowadays, Universities have started to raise their heads about creating environments, which potentially can yield innovation and foster entrepreneurial activities. (Clarysse and Moray 2004: 58; Graham 2014) In Aalto University, both the students and the university have taken action to build an innovation and entrepreneurship ecosystem, which through environment consisting of human, social, intellectual and financial capital, would bring prosperity within the ecosystem, as well as to its surroundings. (Pulkkinen 2014: 8) The ecosystem structure and formation has been already analyzed, and the key actors identified in a recent study by MIT (2013). The focus of the study (ibid), was to learn from successful university E&I ecosystems, formed in challenging environments. Aalto University, as a case study, had been chosen as one of the four rising stars, with its E&I ecosystem.

The third research question focuses on the usage of the E&I ecosystem elements and the way this ecosystem could be improved to evoke and support innovative business ideas. As stated above, the ecosystem structure and formation has been previously analyzed, and the key actors identified by Graham (2014) in her extensive case study. As this provides the basic backbone of the ecosystem elements and structure, it was interesting to look at the influences and actual links with startups formed in this environment. Where as research about university ecosystems and their success factors and formation have been conducted (Fetters et. al 2010; Graham 2014), studies haven't been previously done from an entrepreneur point of view, on the way the ecosystems work and what the business formation experiences have been in these types of environments.

The Aalto University E&I ecosystem consists of five different elements, which are: *E&I across departments*, *university-led activities*, *student-led activities*, *not E&I specific activities*, as well as *external E&I community*. The first three of the elements are intentional, meaning that they have been specifically designed and used to cater for the needs of innovation and entrepreneurship. Unintentional in turn, means that the elements exist in the university environment, with or without an E&I ecosystem, but can potentially contribute to the E&I ecosystem and its stakeholders. In terms of the usage of the ecosystem by the case-entrepreneurs, all of the elements had been in use during their business formation, however some of the elements used more than the others. The results indicate that the *External E&I community* had been used significantly less than the other parts of the ecosystem, which had had quite even distribution of usage. **Figure 25** presents the elements of the Aalto University E&I ecosystem.

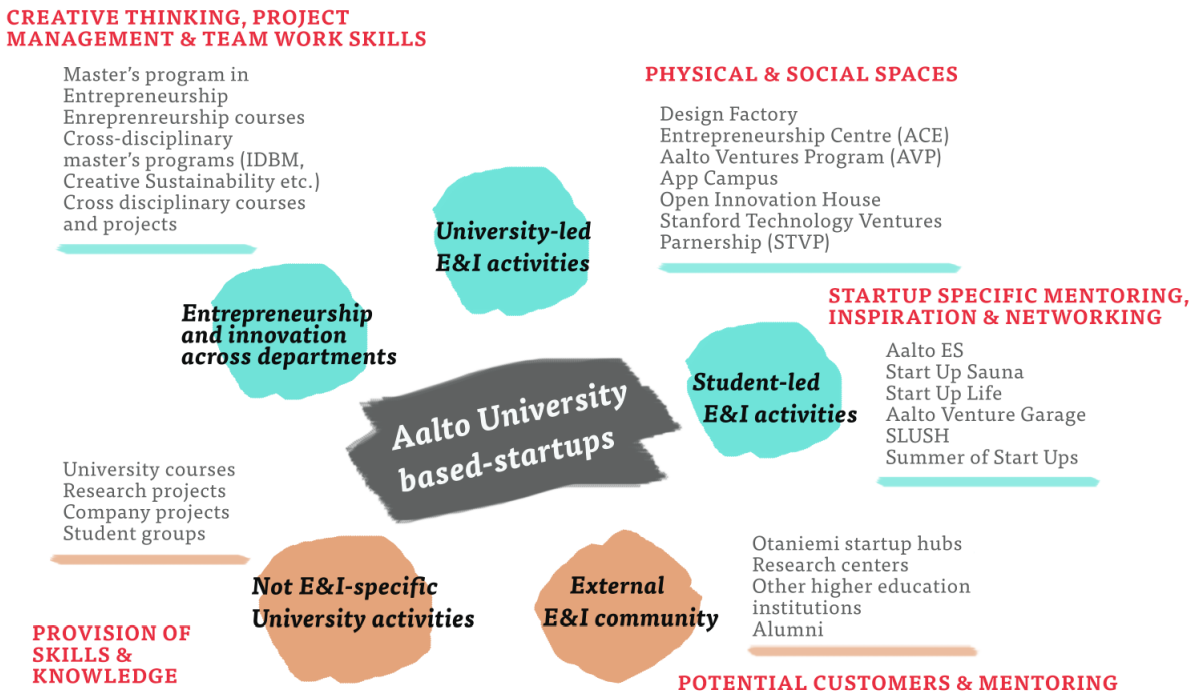

***Figure 25**: The Aalto University E&I ecosystem*

Through the analysis of the empirical data and the results, it became evident that the elements were used by the entrepreneurs for specific needs and through this, formed a specific perceived 'role' in the ecosystem. These roles have been embedded in **Figure 25** above. The types of roles of the ecosystem elements reflect the needs of the ecosystem entrepreneurs, referring to various skills and knowledge, spaces, networking and mentoring. These were all regarded important during the opportunity and venture creation process. The following steps, also illustrated in **Figure 23**, in section 5.3.6, are suggestions how to develop the Aalto University E&I further.

E&I across departments 'Creative thinking, project management & Teamwork
- Evaluate the content of the current entrepreneurship courses and programs
-Encourage students to take part in cross-disciplinary projects, courses and programs, or include cross-disciplinary elements into students' study programs

University-led E&I activities 'Physical and social spaces'
- Define the roles of each facility and explain the role each stakeholder has in the ecosystem, in order to make the spaces co-creative, open and function in the intended way
- Clearly state the rules and responsibilities when using the resources provided

Student-led E&I activities 'Startup specific mentoring, inspiration and networking'
- Continue conveying the message about success stories and role models, also keeping in mind smaller businesses

Not E&I specific activities 'Provision of skills and knowledge'
- Distinguish the most important skills needed for student entrepreneurs
- Collect series of courses or other activities, which cater to the skills needed
- If there is an issue with accessibility and affordability, these courses and activities could be offered also through virtual channels
- Allow more movement between study programs and Aalto courses

External E&I community 'Potential customers and mentoring'
- Involve partner companies and alumni in the university-led and student-led activities
- Connect the offerings of the startups with the needs of the partner companies

6.2 Future research possibilities

Entrepreneurial and innovation ecosystems, especially within a university environment present a lot of possibilities for future research. In general, this study focused on one specific university environment of Aalto University. There would be potential to compare the startups formed within other universities and/or in other higher institutions in Finland, as well as take a similar study within a more international setting. The user-perspective of looking at the entrepreneurship and innovation ecosystem, opposed to the general construction and success factors, is very interesting.

Looking at the different areas of the study (motivational factors, opportunity development process and the E&I ecosystem), one can find very specific opportunities for further research possibilities. Change in the levels of motivation and the specific motivational factors through the opportunity development process, could be looked into. In addition, it would be interesting compare the prior motivation of the students engaging in entrepreneurial activities, and the actual reflections after starting entrepreneurship activities. Entrepreneurial motivation in general is very interesting study subject, especially now when there is a specific agenda in the Aalto University to boost their E&I activities. In terms of the opportunity process, entrepreneurial alertness and the different levels of activity would be interesting to study further. Not only the different levels and their characteristics, but what trigger points cause the potential entrepreneurs to move from the entrepreneurial motivation to either an active search or a passive state, and can this change prior to opportunity recognition.

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8. APPENDICES

Interview questions

1. Tell a bit about yourself / yourselves
2. Tell about your business what do you do?

Motivation about being an entrepreneur

4. Why did you decide you wanted to be an entrepreneur?
5. Do you see benefits of being an entrepreneur opposed to working for someone else?
6. What type of an entrepreneur are you and what types of personality traits do you think are important?
7. What type of skills have you found useful while building the startup and is there something you would still like to possess?

Core process

8. Lets go back in the beginning of your journey, how did the business get started?
9. Where did you get your idea?
(Special interest, hobby, knowledge, previous work, skills & capabilities)
10. Was this current business idea the 'original idea' or has there been a transformation and change in the idea on the way?

Aalto University E&I ecosystem

11. In your opinion, has Aalto University had any influence on the business formation?
12. Have you been able to build your skills and capabilities as an entrepreneur in Aalto? For example, having interdisciplinary courses, courses directly linked with your business or entrepreneurship specific courses/programs?
13. Have you gained any resources (partnerships, team members, information, knowledge..)?
14. Have you participated in Aalto ES organized activities or used resources provided by them? (Startup Sauna, SLUSH, Venture Garage..) If yes, what have you gained - if no, why haven't participated?
15. Have you participated in Aalto University organized activities or used resources provided? (ACE, Design Factory, AppCampus,..)
16. Is there something in terms of resources, support etc. that you would have needed or wanted from the school during the venture creation process?
17. Do you think Aalto University is a fruitful environment for startup formation? Are there suggestions how to the ecosystem work better for student entrepreneurs?

Smarp Oy

Smarp Oy founded in 2011, offers an employee advocacy software, which encourages employees to take part in the company's communication in different social media outlets. Smarp Oy provides a platform called Smarpshare in which a company can share articles and links to its employees, which then can pass them on to their own networks and earn points by doing this. These points can be used for example towards employee's choice of charity. In addition, the employees can also suggest articles, pictures or videos, which would be useful to share. The company has had major growth in the past two years and has opened offices in Sweden, UK, Norway and the Netherlands. Currently the company has 20 employees and the team is constantly growing.

LeeLuu Oy

LeeLuu Oy is an innovative Aalto ARTS based company established in 2014. Their products are interactive nightlights, which help children sleep better on their own and fight the fear of dark. The stuffed animals are made with interactive textiles and sensors, and can be turned on and off by squeezing, dimming by stroking and one of them can be used to control other LeeLuu nightlights in the room. Currently the team is works on their prototypes in the user environment and their patent applications regarding touch sensors in their products. The team is growing and recently a technical expert has joined in their team.

Ambronite

Five enthusiastic Aalto University based founders founded Ambronite Oy in 2013: Simo Suoheimo, Arno Paula, Tapio Melgin, Miika Perä and Mikko Ikola. Ambronite is the world's first functional and drinkable meal, which aims to cater for both physical and mental wellbeing. The meal is optimized to hold the different nutrients required by the official nutritional guidelines and is made with various plant-based ingredients such as nuts, berries, oats and herbs. Since the establishment of the company less than two years ago, the meal is currently being sold to over 40 countries across the world. The team working with the product currently has two new full-time employees in addition to the three working founders (two of the founders are silent partners at the moment).

Booncon Oy and Booncon PIXELS Oy

Booncon Oy is a Helsinki-based business-consulting venture established in 2011 by three friends Tobias Johannes, Lukas Hafner and Sven Perkmann. A year later of the company's establishment, two of the founders, Tobias and Lukas, formed a daughter company Booncon PIXELS Oy. The mother company Booncon Oy offers general business consulting services and currently consists of the two founders Tobias and Lukas. Booncon PIXELS Oy is a graphic digital design-consulting agency, with focus on building and designing websites, branding and marketing work. The core business of the daughter company is to help companies move into the digital era with high technology and well-designed solutions. The current team of Booncon PIXELS is very international and highly multifunctional, making it very customer oriented and providing innovative solutions for their clients.

TwentyKnots

TwentyKnots Oy is a company established in the spring of 2012 by three siblings Joel Mikkonen, Maria Mikkonen and Paul Mikkonen. TwentyKnots Oy offers experiences in windsurfing and stand up paddling (SUP), as well as combinations of these with various other sports and outdoor activities. The core business consists of renting windsurf and SUP boards, weekly courses for these activities, paddling adventures, as well as company team days and other private groups. Along with the traditional versions of SUP, TwentyKnots has held classes of body weight training, yoga, pilates and meditation on the stand up paddle boards as well. The company has three physical locations in Munkkiniemi Helsinki, Långvik Kirkkonummi and Naantali, as well organizes events in other coastal locations, with a movable set of paddling and windsurf boards. The company has currently five full time employees and seven part time instructors. The main season in Finland lasts from June to August, but with proper wetsuit equipment, it can be extended to last from the beginning of May until the end of September.