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**TOWARDS AN ENTREPRENEURIAL UNIVERSITY – ENTREPRENEURSHIP
EDUCATION AND INNOVATION ACTIVITIES AT THE UNIVERSITY OF OULU**

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<p>Abstract</p> <p>Entrepreneurship and increasing entrepreneurial activity are topics of high interest for several groups in a society. Due to various benefits generated by entrepreneurship, governments and policy makers are interested in mechanisms and activities enhancing entrepreneurial activity. This has led to creation of a phenomenon called Entrepreneurial University, which emphasizes the role of universities in generating new innovations and future entrepreneurs and contributing to regional development.</p> <p>The purpose of this study is to examine the current state of entrepreneurship education and innovation activities at the University of Oulu. The study aims at identifying the primary activities and educational approaches of different organizations and activities contributing to entrepreneurship education at the University of Oulu and drawing a comprehensive understanding of the current state of the activities.</p> <p>This research is a qualitative study. Data is gathered by semi-structured theme interviews and altogether five interviews were conducted covering the operations of six organizations or activities. All the interviewees were either in the role of planning or implementing the activities and were experienced in their tasks after several years of working in their positions.</p> <p>The results reveal that entrepreneurship education and innovation activities at the University of Oulu are rich in nature and complementary to each other. All three areas forming the entrepreneurial university phenomenon were found, meaning entrepreneurship training, technology transfer and innovation support mechanisms. From the results it can be stated that after few years of iterative development, the case organizations and activities have found and adopted the best practices to their activities and formed a solid basis for operations. The study also reveals that the major challenges related to operations were shared by the organizations. The greatest challenges related to operations concern reaching and engaging Finnish students, which is caused by other smaller challenges such as lack of motivation, lack of credibility and language barriers. High levels of improvement of operations may be received by focusing on the issues revealed in this research and enhancing co-operation between the organizations.</p> <p>The results of this research provide the University of Oulu with valuable information about the current state of the entrepreneurial activities and reveal some development areas. This study contributes also to the growing body of research in the field of entrepreneurial university verifying some of the findings of previous research. The study serves also other higher education institutions and organizations planning of conducting similar activities and provides suggestions for further research.</p>			
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Additional information			

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1 INTRODUCTION

Entrepreneurship is a never ending topic of interest and discussion around the world. People dream about the freedom and independence that “working for yourself” could provide but are forced to weigh if the dream is worth abandoning employment with more certain rewards and less uncertainty (Long, 1983; Cramer et al., 2002). Politicians are interested in the jobs generated and taxes paid by the entrepreneurs and governments concern entrepreneurship as a source of competitive advantage becoming willing to conduct changes that contribute to creating a more favourable environment for entrepreneurship (Etzkowitz et al., 2000).

All these dreams and desires are based on the generally accepted assumption that entrepreneurship creates wealth and prosperity, which today is supported by a great amount of research. Majority of studies conducted about entrepreneurship and entrepreneurial activity are motivated by the economic benefits associated with the phenomenon, such as increased employment generation and from the macroeconomic perspective, creation of new innovations and increased competition (Praag & Versloot, 2007; O’Connor, 2013). It has been noted in numerous studies that entrepreneurship is a driving force of societies and the increased performance of companies has a positive effect on economic growth on national level (Carree & Thurik, 2003). Based on the good they create, entrepreneurs could be stated having also traditionally been people in high value. They are the risk takers and carriers that by running a business generate welfare to others. Besides job creation and taxes, research shows that entrepreneurs have also a strong impact in various other factors such as in early evolution and creation of new industries, carrying out innovations and increased productivity due to increased competition and enhanced rivalry on the market (Carree & Thurik, 2003; Stel, Carree & Thurik, 2005). Hence, the positive outcomes generated by entrepreneurial activity seem undeniable maintaining entrepreneurship a subject of high interest for multiple different groups, such as politicians and governments that are interested in entrepreneurship’s contribution to national competitiveness and welfare.

The importance of entrepreneurship has seen an increase during the last decades due to structural changes in global economy (Koellinger & Thurik, 2012). Evidence shows a pulse of economic activity transfer from larger to smaller firms already

around 1970s and 1980s, when the employment share of American companies on Fortune500 -list (a list of the 500 biggest firms in the United States) decreased by 11,5% from 1970 to 1996, illustrating the volume at which the restructuring of the market has occurred (Wennekers & Thurik, 1999.) Carlsson (1992) provides explanation for the major decrease by stating that the changes relate to intensification of global competition, increase in the degree of uncertainty in the global markets and the increase in market fragmentation. Thurik (2009) supports this by adding that technological change and development, globalization and deregulation among other things have reshaped industry structures and shifted them towards lesser concentration and greater decentralization resulting to an increased role of small businesses.

Even though entrepreneurship has been noted an important factor in economic development, the number of people willing to become entrepreneurs seems yet limited due to the risky nature of entrepreneurship. Despite the difficulty of giving a precise definition to entrepreneurship (Gartner, 1990) many academics agree that entrepreneurship is associated with risk bearing and that risk aversion discourages individuals from entrepreneurship (Cramer, Hartog, Jonker & Van Praak, 2002). As the economic and societal impacts of entrepreneurship are so evident, the question has arisen how entrepreneurial activity could be improved so that entrepreneurship would become a more desired career choice for people and more businesses would be established, especially ones aiming at high growth. Entrepreneurial education has been brought up as one tool in enhancing entrepreneurial activity and policy makers are noted to increasingly invest in universities in order to foster innovative start-up creation (Autio, Kenney, Mustar, Siegel & Wright, 2014).

1.1 Background and the purpose of the study

Entrepreneurship is a never-ending source of discussion also in Finland. According to Statistics Finland, there were around 350 000 companies in Finland in 2016. Altogether these companies employ more than 1,4 million people and have a significant contribution towards the society also in the form of taxes paid. What is still noteworthy is that the majority of Finnish companies is formed by either micro-enterprises or self-employed people. Almost 95% of all the companies employ less than ten people and 89,2% employ the maximum of four people. Medium size

companies (50-249 people employed) and large companies (more than 250 people employed) form only 1,2% of Finnish companies. (Tilastokeskus, 2018.)

The employment rate of Finland being 72,1% in December 2018, the debate over how to increase entrepreneurial activity, lower the barriers for new venture creation and increase the attractiveness of Finland for foreign investors remains on the discussion table for a reason, as all these issues could have a positive contribution to the employment rates, too.

While looking for solutions on how to increase entrepreneurial activity, universities have started taking a stronger societal role in recent years (Tuunainen & Knuuttila, 2009) contributing more to regional development as the focus of research universities has been previously more on a national state level (Etzkowitz, 2017). One form in which this new role has been adopted is by contributing to generation of future entrepreneurs. This is conducted by providing entrepreneurship education to university students, which has seen an increase in many countries (Matlay, 2008). Entrepreneurial education and more precisely entrepreneurial university are relatively new concepts gaining continuous interest both from academics and the governments. The field has gained great interest from researchers, but the studies are still rather scattered.

Integrating entrepreneurship studies to different study programs is part of the strategy for years 2016-2020 also at the University of Oulu, the case university of this study. The university has around 16 000 students and it provides education in eight faculties. Conducting a comprehensive study about the current state of entrepreneurship education provides the university with first-hand information and comprehensive understanding how the current state of entrepreneurship education reflects and complies with the recent research about the topic. Few studies about the topic have been conducted also in Finland, but the focus of these studies has been on the attitudes and perceptions of the students about entrepreneurship education and the studies have been narrower. Lack of a comprehensive case study focusing on how entrepreneurial education is provided and conducted and how it currently reflects with the research is yet missing, giving justification for conducting this study.

Personal interest and motivation for conducting the study stems from an increased awareness and understanding about the economic impacts of entrepreneurship and especially the contributions of high growth ventures.

1.2 Research questions

The purpose of this study is to examine the development and current state of entrepreneurship education and innovation activities at the University of Oulu. The aim is also to find out how the conducted practices and current state of the activities reflect with literature concerning entrepreneurial education. Hence, the main research question of this study is the following:

What is the current state of entrepreneurship education and innovation activities at the University of Oulu?

In order to provide a comprehensive understanding about the current state of entrepreneurship education and how it is implemented at the University of Oulu and to answer the main research question, the following sub-questions are used:

How are entrepreneurship education and innovation activities implemented at the University of Oulu?

What challenges can be observed in the operations of these activities at the University of Oulu?

This study is conducted by using qualitative data collection and analysing method. The collection of the empirical data is done by conducting semi-structured interviews. Interviewees of the study were chosen from the personnel of the case organizations and programs that are participating in the entrepreneurship education and innovation activities either in the role of a planner or an implementor. Methodology of this research is described in more detail in chapter four.

1.3 Structure of the study

This research starts with an introduction that provides an overview on the examined topic. Background on entrepreneurship, its impact on economic development and the reasons for an increased interest towards entrepreneurship education are discussed in this section. The chapter presents also the background of this study and the research gap giving justification for conducting the study.

The second chapter starts the literature review and forms the scientific base for the study. It starts by examining entrepreneurship as a phenomenon and the definitions given to it. The chapter continues by explaining the social and economic impacts of entrepreneurship through various studies conducted about the topic. The literature review continues in the third chapter with the examination of entrepreneurial university, the triggering factors behind the establishment of the phenomenon and the motives and impact of the changing roles of universities. Closer look at the different approaches concerning entrepreneurship education will be also taken in this chapter and the theoretical framework of the study is provided at the end of this chapter.

In the fourth chapter the methodology of this study is presented. The chapter provides justification for the decisions concerning the selection of research method and the selection of data collection and analysing methods. The empirical analysis is presented in the fifth chapter providing also the main findings of the study and drawing up an understanding of the current state of entrepreneurial education at the University of Oulu. Finally, the sixth chapter provides the conclusion and evaluation of the study. It provides also recommendations for future studies that may be conducted as a continuum of this study.

2 ENTREPRENEURSHIP AND THE ECONOMY

Entrepreneurship has gained a great interest from academics already for several decades and over time classification of entrepreneurship research to three main categories has been developed, which are *how entrepreneurs act*, *what happens when entrepreneurs act* and *why people choose to act as entrepreneurs* (Douglas & Shepherd, 1999). This categorization reveals that entrepreneurship is not just a concern of business management, but it is also in the interest of researchers in psychology, social sciences, economics and political sciences, and that entrepreneurship can be studied on multiple different levels from individuals to whole societies.

When it comes to defining entrepreneurship, a variety of definitions has been proposed in the literature. Despite the vast amount of literature and publications, complexity concerning the meaning of entrepreneurship is evident as academia still today argues about the definition and no clear consensus can be found in the field (Cunningham & Lischeron, 1991; Verheul, Wennekers, Audretsch & Thurik, 2001; O'Connor, 2013). Finding an exact and comprehensive definition for entrepreneurship from the literature is a challenging yet significant task and giving a precise definition to the phenomenon remains a difficulty still to this day (Hebert & Link, 1989; Gartner, 1990; Cunningham & Lischeron, 1991; Martin & Osberg, 2007). Still, the use of the term has gained more popularity in recent years and new terminology, such as social entrepreneurship and intrapreneurship, has been derived from the original, even though confusion and uncertainty are simultaneously associated with the original phenomenon (Johnson, 2001; Martin & Osberg, 2007; Abu-Saifan, 2012). This development has triggered in the past the question whether entrepreneurship has become a label of convenience with only a little inherent meaning (Gartner, 1990), but as these new phenomena emerge, the usage of the term has become more flexible (Light, 2006).

To get an overview about the different definitions and approaches given to entrepreneurship and entrepreneurs, table one summarizes some of the most significant and prominent definitions given to these terms. It also highlights the complexity of definitions and approaches and how different streams of research emphasize different things when forming the definitions.

Table 1. Definitions of entrepreneurship and entrepreneur modified from Abu-Shaifan (2012).

Schumpeter (1934)	Entrepreneur is an innovator, who implements change through entrepreneurial activity among the market. The process of creative destruction creates dynamism on the market and eventually leads to economic growth.
McClelland (1961)	Entrepreneur is an individual with a need for achievement, which is reflected in the process of entrepreneurship. Achievement behaviour should lead to successful entrepreneurship.
Kirzner (1978)	Entrepreneur reacts and acts to those market opportunities that are recognized.
Shapero (1975)	Entrepreneurs take initiative, organize some social and economic mechanisms and accept that there is also a risk of failure related.
Carland et al. (1984)	An entrepreneur is a person that establishes and manages a business and aims at gaining profit and growth. Entrepreneur is characterized by innovative behaviour and implementing strategic management practises in running the business.
Shane & Venkataraman (2000)	Entrepreneurship is a scholarly examination of how, by whom and with what effects opportunities to create future goods and services are discovered, evaluated and exploited. Field involves study of sources, processes and individuals.
Timmons and Spinelli (2008)	Entrepreneurship is a way of thinking and acting that emphasizes opportunity and has a holistic approach to the phenomenon.

The scope and variety of definitions given to entrepreneurship is wide and as the most recent definitions adopt a holistic approach, the complexity of the phenomenon remains high. Some of the definitions have also faced criticism and for example Cunningham and Licheron (1991) state that if emphasizing creative activity as a defining factor of entrepreneurship as Schumpeter does, majority of individuals engaging with entrepreneurial activities would be excluded from being defined as entrepreneurs. Carland et al. (1984) continue by criticizing the usage of the term

“entrepreneur” and want to distinguish entrepreneurial firms from small business owners, as not all new ventures are entrepreneurial in nature. In Schumpeterian approach, a business is any organization that is responsible for economic growth and efficient production of goods and services, whereas enterprise refers to an organization that participates in innovation and creation of new markets and dynamics. (O’Connor, 2013.) Carland et al. (1984) continue that entrepreneurial firms may begin at any size level, but they are still characterized by growth, as the others remaining with less growth over their organizational lifetime should be referred as small businesses. Van Praag and Versloot (2007) present an opposite and more accepting opinion as they define entrepreneurs or entrepreneurial firms either as small firms, young firms, entrants or self-employed and their counterparts being bigger and older incumbent firms.

This polyphonic and vivid discussion emphasizing the complexity of the phenomenon has also impacted the research about the topic making it rich in viewpoints. Gartner (1990) emphasizes consideration of individual beliefs concerning entrepreneurship, as these beliefs influence the questions asked and may further complicate conducting research about the topic not advancing the emergence of a precise definition for entrepreneurship. Due to the various definitions given to the phenomenon, conducting comparable research could be stated to remain challenging as defining the right control groups is difficult. More generally, entrepreneurship fails to be a properly documented factor in empirical literature concerning growth, due to problems in defining and hence, measuring entrepreneurship (Stel et al., 2005).

Despite the confusion concerning the comprehensive and precise meaning, some level of agreement has been still achieved and a general definition to entrepreneurship can be derived from business management literature, in which entrepreneurship is referred as a set of previously non-existing activities and a profit making undertaking, carried by individuals that aim at maximizing those profits (Carland, Hoy, Boulton & Carland. 1984; Gartner, 1990; Abu-Saifan, 2012). Additionally, entrepreneurs are defined as individuals that take agency and initiative, have the ability to see and seize opportunities and start a business based on them, and organize and coordinate economic resources (Hébert & Link, 1989; Douglas & Shepherd, 1999; Johnson, 2001; Martin & Osberg, 2007; O’Connor, 2013). Other

characteristics related to definition of an entrepreneurial venture include things such as introduction of new goods, new methods of production and opening of new markets, many of which being opportunities arising from technical progress (Carland et al., 1984; Douglas & Shepherd, 1999). As it can be noted from the above discussed, the number of characteristics associated with both of the terms form a rich pool of attributes.

Among the above-mentioned characteristics, common agreement seems to also concern the notion that entrepreneurship is associated with risk and risk bearing, as rewards of entrepreneurship are less certain compared to employment (Cramer et al., 2002) and self-employment is characterised by additional uncertainty opposed to being employed (Long, 1983). Derived from this, research has also revealed that risk aversion is a remarkable impediment in entrepreneurial endeavours and the individual level of risk aversion may discourage entrepreneurship (Van Praag & Cramer, 1999; Cramer et al., 2002). Based on these findings, entrepreneurs are consequently noted to be more risk prone individuals with willingness to bear and ability to manage the inherent risks associated with entrepreneurship (Johnson, 2001; Martin & Osberg, 2007).

This personality approach to entrepreneurship has also faced criticism as entrepreneurship is stated to require such a great variety of behaviours that relating it to specific personality trait is impossible (Rauch & Frese, 2000). In general, the discussion about entrepreneurial ability, personal characteristic and attitudes is lively and different arguments are presented whether entrepreneurial ability and entrepreneurial orientation is an inborn feature or something that can be increased through education. Entrepreneurial abilities and entrepreneurial education are discussed in more detail in the third chapter.

2.1 Entrepreneurship, innovation and economic development

A famous economist, Michael Porter, has once stated that entrepreneurship is “at the heart of national advantage”. As brought up in the beginning, entrepreneurship is a strong force driving societies and the good performing companies have a positive effect on economic growth on national level. (Carree & Thurik, 2003.) Research has already given evidence that differences in national growth rates are in many cases

attributed to the speed with which countries engage in entrepreneurial activity, which has placed entrepreneurial activity also in the interest of policy makers (Thurik, 2009). Adopting the best practises and a more “entrepreneurial mindset” for producing more entrepreneurs and enabling more firms to grow has been also written down in the policy approach of the European Union and is supported by the European Commission (Thurik, 2009; Nabi, 2013).

Entrepreneurship has been studied widely for decades and one of the early pioneers of entrepreneurship research was Joseph Schumpeter, who emphasized in his book *The Theory of Economic Development* (1934) the role of entrepreneurs as the primary reason for economic development. Schumpeter explains, based on his definition about entrepreneurship, how innovative entrepreneurs challenge the incumbent firms already existing in the market by introducing new inventions, such as new products, services, processes and materials that make the existing products and technologies obsolete. The new entrepreneurial combinations destroy the existing equilibrium and create a new one, which is a process that is referred in literature as *creative destruction*. As these new technologies and innovations are recognized and utilized and new ventures are established, the competition in the markets increases and tightens and forces the incumbents to reshape their operations to maintain in the competition. The increased competition further enhances productivity and new innovations may eventually lead to establishment of entirely new industries (Stel, Carree & Thurik, 2005). Koellinger and Thurik (2012) take the notion further when referring to Baumol (2002) who states that entrepreneurs serving as agents of change and economic development may even anticipate in triggering economic booms. It seems that innovative entrepreneurs have a significant role in triggering a recursive cycle that maintains the markets dynamic and renewable.

As entrepreneurs have been noted to have a major contribution to innovation, one could make a fast assumption that this is due to bigger research and development expenditures compared to counterparts. Van Praag and Versloot (2008) however disprove this assumption by stating that entrepreneurs actually produce fewer patents and technologies and the percentage of radical innovations is lower among entrepreneurial firms. Still, the efficiency of how innovations are produced is higher, which may enhance the process of creative destruction and hence, contribute to increased competitive situation on the market.

Even though research continuously reports the positive impact of entrepreneurship on economic development, some contradictory results have been also received. Stel et al. (2005) reported a negative impact of entrepreneurship on GDP growth in developing countries. Despite the results, the research does not discourage entrepreneurial activity in these poorer countries, but it emphasizes the role of large firms in the transformation process of developing countries becoming developed countries. Another possible reason, more noteworthy to this study, is the notion of lower human capital levels in the poorer countries compared to entrepreneurs in developed countries. The relationship between general and entrepreneurial education and their impact to entrepreneurial activity and performance will be discussed in more detail in the third chapter.

2.2 Entrepreneurship and new job creation

Among other things, entrepreneurs have noted to have a remarkable contribution to job creation, and research clearly shows that entrepreneurs create more employment than their counterparts, relative to their size (Van Praag & Versloot, 2007), which is why the topic is in the interest of many policy makers. Many countries offer enhancing “entrepreneurial culture” a panacea for increasing levels of productivity and answering to the increasing levels of youth and adult unemployment (Matlay, 2008). Research has long claimed that especially small and young firms, also referred as Mice, account for disproportionately large share of employment growth (Henrekson & Johansson, 2009) and that small and new firms on average grow larger than large and established incumbents (Carree & Thurik, 2003). Studies also show that organic growth generates employment growth to larger extent than acquired growth, which is an important notion when considering that it is the small and young firms that have higher levels of organic growth compared to large and old firms (Henrekson & Johansson, 2009). Hence, small and young firms are required to boost employment creation (Van Praag & Versloot, 2008).

The above statements still hold truth today, but recent studies have shown that rapidly growing companies, also known and referred as Gazelles and not necessarily small and young, are outstanding job creators contributing to job creation and revenue generation even in larger proportions than small firms (Henrekson & Johansson, 2009; Acs, Parsons & Tracy, 2008). Due to this, new venture creation and

especially high growth venture creation is in the interest of policy makers and more attention has been raised to examine what is the recipe to creation of Gazelles. What emphasizes the importance of Gazelles according to earlier research is that the employment generation of Gazelles has been noticed to grow also during an economic recession (Henrekson & Johansson, 2009). As brought up in the beginning of this paper, majority of Finnish companies is formed by micro-enterprises or self-employed people, which is why the question of Gazelle-creation is understandably relevant and interesting also in the Finnish context.

The contribution of entrepreneurship to job generation could be still criticized considering that the establishment of new ventures may also destroy some of the existing incumbents eliminating also certain amount of jobs. As noted, the process of creative destruction reshapes the markets and it could be argued whether the process eventually has a positive or negative effect considering net job creation. Van Praak and Versloot (2007) provide insight to this question by stating that entrepreneurial firms create important spill-overs, which have a significant impact on regional employment growth rates of all companies in the region in the long run. Even though young and small firms contribute to portion of job destruction among incumbents and hence, result to a more volatile process of job creation, the evidence suggests that there is a positive long term effect of more entrepreneurial activity on labour demand, also by non-entrepreneurial firms. In other words, the job creation of new ventures restructures the market in such way that enhances also the job creation of incumbents. (Van Praak & Versloot, 2008.) This summarizes why entrepreneurship is such a remarkable and important factor of economies: numerous studies report that in addition to direct contributions that entrepreneurship has, the indirect effects are also remarkable.

Both Mice and Gazelles have noted to contribute to job creation, but which one is then better, entry of many small new firms or rapid growth of fewer ventures? According to Henrekson & Johansson (2009) the two views are complementary. The positive employment effect of new ventures seems to decline after a certain period of time, which is why the continuous generation of new ventures is essential to achieve positive net job creation. Parker, Storey and van Witteloostuijn (2010) point out in their paper that only small number of gazelles are successful in maintaining a sustained growth, while a number of gazelles are drawn back to more subtle growth

rates. Based on this finding it could be suggested that a continuous flow of small and young firms would also increase the likelihood of generation of new Gazelles.

Despite the number of jobs created by entrepreneurs, some earlier studies claim that the quality of jobs created by entrepreneurs is lower than the ones of the counterparts (Van Praag & Versloot, 2007; Litwin & Phan, 2013). It must be still noted that these studies have defined and measured employment quality only with factors such as remuneration and health and retirement benefits and entrepreneurs are defined as young start-ups with fewer resources, which is why the statement of employment quality should not be generalized to entrepreneurs in general. Still, despite the lower wages and fewer benefits provided by entrepreneurs, other intangible benefits seem to exist as the job satisfaction among employees of entrepreneurs has been noted to be better than among their counterparts (Van Praag & Versloot, 2007). Motivations for attempting entrepreneurship as a career choice are discussed in the following chapter.

2.3 Entrepreneurship as a career choice

When looking at the motives for individuals to pursue entrepreneurship as a career choice, research shows that entrepreneurship may be seen as a utility-maximizing career choice, meaning that people choose to become entrepreneurs based on the total utility that they expect to derive from becoming entrepreneurs. The utility maximization consists of both income and working conditions such as decision-making control and work effort. (Douglas & Shepherd, 1999.)

Research on the motivations of attempting entrepreneurship are rather consistent, yet the order of most determinant motivations has some variation. Dawson and Henley (2012) studied the motivation to become an entrepreneur in United Kingdom and the most popular reason given among both genders was independence, which accounted for around one third of the responses, followed by nature of the occupation and money-related factors. This finding is supported by Douglas and Shepherd (2002) who examined that income is not the most significant determinant in entrepreneurial intention: people seem not to start their own business to get richer or actually to get any wealthier than they expect if they were employees. It seems that the

attractiveness of entrepreneurship is much more related to intangible factors such as independence and self-control than money and wealth.

Despite the internal and intangible factors being more dominant when considering entrepreneurship as a career choice, income-related factors still have a role. The economic state and general state of employment has been noted to have an impact on the desirability of entrepreneurship as a career choice. Two streams of approaches exist to the relationship between entrepreneurship and unemployment. The first approach assumes that the decision to become an entrepreneur is a response to being or becoming unemployed or having poor perceptions about future employment prospects, also referred to as the “refugee” effect. (Thurik, Carree, Stel & Audretsch, 2008.) This is supported by Koellinger and Thurik (2012) who observed that an upswing in the entrepreneurship cycle was attributed to one among unemployment cycle, so becoming an entrepreneur serves as a response to poor economic state and employment. The other view on the other hand does not comply with this viewpoint and it suggests that entrepreneurship in the form of new venture creation contributes to decreasing the unemployment, even though this does not necessarily mean that it stimulates economic growth (Thurik et al., 2008).

As noted earlier, entrepreneurship is associated with risk and risk-bearing, resulting to a decrease in the number of individuals willing to pursue entrepreneurship as a career choice. Research shows that entrepreneurship is discouraged by the individual degree of risk aversion (Cramer et al., 2002) and that the intention to become an entrepreneur is higher among those individuals who express more positive attitudes to risk and independence, meaning that higher tolerance of risk is positively associated with higher intention of becoming an entrepreneur (Douglas & Shepherd, 2002). As the economic benefits of entrepreneurship have been shown positive in a number of studies, the question of the role of entrepreneurial education on the propensity of increasing entrepreneurial activity has gained more interest. The following chapter discusses the phenomenon of entrepreneurial university and entrepreneurial education in more detail.

3 ENTREPRENEURIAL UNIVERSITY

Academic institutions are traditionally known as individual knowledge producers that operate in isolation and tight communities and pride and protect the work around science from an ivory tower. In history, universities have adopted a subsidiary role in institutional relationships while either economy or polity had a predominating role (Etskowitz, Webster, Gebhardt & Terra, 2000). This composition has faced a reform over the past decades. The Triple Helix-model, theorized in 1990s, describes the more balanced university-industry-government relations and states that universities may act in an enhanced role especially in innovation in today's knowledge-intensive societies, which was previously dominated by the industry (Etskowitz & Leydesdorff, 2000). This re-arrangement has remained continuous to this day as societies have started to evolve increasingly to knowledge-oriented direction reforming also the role of universities that are transforming from ivory towers to engines of economic growth (D'Este & Perkmann, 2011). As a result, the triple-helix model has been developed further and research has proposed an advanced quadruple-helix-model that adds civil society and other societal based innovation users as the fourth helix (Miller, McAdam & McAdam, 2018; Centobelli, Cercione, Esposito & Shashi, 2019).

The changing role of universities is not limited to only changes in power-relations concerning innovation, but a more extensive phenomenon has emerged. The following sub-chapters will examine the evolving role of universities, what external and internal issues have triggered the change and what kind of impact the changes have established both for universities and the external society around them. The second sub-chapter focuses on describing the topic of entrepreneurial university and entrepreneurial education based on existing literature.

3.1 Changing role of universities

The preliminary role of science universities has a long history executing purely the task of research and teaching (Etskowitz & Leydesdorff, 2000) and the external focus of universities has been on national state level (Etskowitz, 2017). During the past few decades the role of universities has yet become more complex and universities have become more entrepreneurial in nature due to the external pressure

(Guerrero & Urbano, 2012) becoming something we refer today as *entrepreneurial universities*. According to Soetanto & van Geenhuizen (2019) entrepreneurial university is a concept that ensures knowledge generated among universities contributing simultaneously to regional development. This definition reveals the changing external focus of universities, which is supported by Etzkowitz (2017) who states the external focus of research universities being in a national state level, but entrepreneurial universities being first and foremost regional actors with a regional focus.

Globalization and major leaps in technological development have made it possible to transform information with almost no costs and decreased the relative prices of obtaining information and knowledge. This has led the global economy to change to direction where knowledge has become the main source of competitive advantage replacing physical capital as the dominant driving factor. (Audretsch & Thurik, 2001; Hytti & O’Gorman, 2004; Audretsch, 2014.) Due to the knowledge-orientation of today’s societies, the ability of both companies and individuals to engage in innovative activity and new economic activity has become increasingly important placing universities with increased pressure (Hytti & O’Gorman, 2004). As knowledge producing and disseminating institutions, universities are playing a central role in industrial innovation (Etzkowitz et al., 2000), which has resulted universities to adopt a new set of societal service functions and having a more central role in fostering societal development and national economic prosperity. (Tuunainen & Knuuttila, 2009.)

Some authors say that academic institutions are going through this transformation in response to growth of an “entrepreneurial academic paradigm” that emphasizes knowledge capitalization (Lam, 2010). The commercialization of research, technology transfer and cultivating growth in economies is also referred as the “third mission” that universities have adopted besides research and teaching (Brown, 2016; Soetanto & van Geenhuizen, 2019; Centobelli et al., 2019). Giving a precise definition to this third mission is still hard as the form it takes differs depending on the context and environment. The previously utilized arms-length principle among university-industry-government relationships has diminished as the relationships have become increasingly interwoven establishing several new linkages. (Etzkowitz et al., 2000.) The growth and variety of collaboration between university and

industry has reached higher levels blurring the traditional boundaries between these institutions (Lam, 2010; D'Este & Perkmann, 2011). According to Etzkowitz et al. (2000) the entrepreneurial university that reshapes the triple helix-model faces certain developmental mechanisms and new structures, which can be summarized as four processes:

- 1) *Internal transformation* of helices, such as assumption of economic development mission of universities
- 2) *Influence of one institutional sphere to another* for example in the form of governments revising rules of intellectual property ownership to transfer rights from individuals to universities
- 3) *Creation of new trilateral linkages* to stimulate organizational creativity and regional cohesiveness
- 4) *Recursive effect* of these networks representing academia, industry and government both in their original spheres and largely in society

Etzkowitz et al. (2000) argue that the shift in roles is affected by and arises from both internal development of the university as well as external influences. The statement gains support from Tuunainen and Knuutila (2009) who state that academics have become increasingly affected by profit motive and market-like behaviour as they are pursuing to secure external grants at times of stagnant or declining budgets. Besides the financial aspect triggering the closer connections, industry engagement has been noted to generate other considerable benefits for academic research, such as promotion of new ideas and research questions for universities. (D'Este & Perkmann, 2011.) Hence, universities have become willing actors of the exploitation of research results to boost their income and response to more competitive environment around them (Lam, 2010).

After acknowledging the relationship between entrepreneurial activity and economic development, governments have started to both pressure and support entrepreneurial activity as they benefit from this development in various forms. It has become a key assumption on top of which most of innovation policies are based that universities are crucial entrepreneurial actors (Brown, 2016) and that they are simultaneously “good for business” and “good at creating business” (Collini, 2012), which is why they are increasingly being called to contribute to economic development and

competitiveness (D'Este & Perkmann, 2011). Due to these demands and developments, universities are becoming key elements of innovation systems both as providers of human capital and as a seed-bed of new ventures (Etzkowitz et al., 2000) and policymakers are increasingly investing in universities to foster innovative start-up creation (Autio et al., 2014). In general, governments have increased actions that improve the business climate by for example lowering taxes to boost entrepreneurial activity in their region (Etzkowitz et al., 2000). The process of commercializing research has led to establishment of a phenomenon referred as "academic capitalism" that has transformed the role of academic institutions to become entrepreneurial universities (Brown, 2016).

3.2 Entrepreneurial university and technology transfer mechanisms

In their role conducting the third mission and becoming entrepreneurial universities, universities are awaited to produce certain benefits to regions. As shown in table 2, universities can conduct the third mission and extension of research by developing entrepreneurial training, conducting technology transfer activities or by conducting innovation support mechanisms that facilitate firm formation and growth, either focusing on one of these or developing all three aspects simultaneously (Etzkowitz, Germain-Alamartine, Keel, Kumar, Smith & Albats, 2019).

Table 2. Approaches to conducting the "third mission" (Etzkowitz et al. 2019).

Approaches to conducting the third mission and extension of research
Conducting entrepreneurial training
Conducting technology transfer activities
Conducting innovation support mechanisms facilitating firm formation and growth

Audretsch (2014) has illustrated (see figure 1) the structure of the entrepreneurial university to consist of three different layers: the core of the entrepreneurial university is in the basic research, which is surrounded by applied research that has a focus on meeting particular and specified needs. Audretsch continues by stating that having just the applied research surrounding the core has not been proved to generate

sufficient spillovers from the universities to external market, which is why the third ring of spillover mechanisms was noted to be required in order to successfully bring the applied research outside the university.

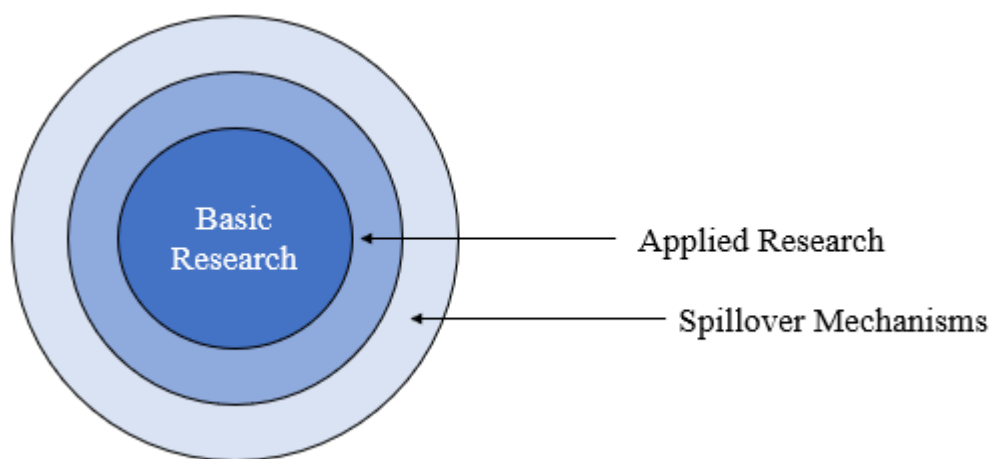


Figure 1. Structure of the entrepreneurial university by Audretsch (2014).

There are various forms of spillover mechanisms meaning the diverse ways how technology transfer may be conducted from university to industry. Table 3 presents the main types of transfer conducted by universities:

Table 3. Mechanisms of technology transfer from universities (Brown, 2016).

Mechanism	Definition
Sponsored research	An agreement based on which university receives funding either from government or industry for conducting a certain research.
Licences	Giving further a legal right to use a specific piece of intellectual property (IP) of the university.
Spin-off firms	A new venture that is created around a certain faculty or a university licence.
Student start-ups	New venture creation by student alumni that is not based on the intellectual property of the university.
Human capital	Recruitment of students from the university, specially ones working among sponsored projects.

The above provided table reveals that providing human capital has been part of universities technology transfer already in the past. Still, as the importance of entrepreneurial activity has seen an increase, so has the demand for individuals that become entrepreneurs, reforming the role of universities as providers of human capital. As noted in the previous chapter, the risky nature of entrepreneurship cuts down the number of people willing to pursue entrepreneurship as a career choice creating scarcity. This has triggered policy makers to demand for more actions to enhance the propensity of more people considering entrepreneurship as a desirable career prospect, which is seen in an increase of establishment of entrepreneurial education programs (see for example Matlay, 2008 and O'Connor, 2013). The following sub-chapter will examine more closely the concept of entrepreneurial education.

3.3 Increasing entrepreneurial activity through education

As a response to fulfilling the third mission assigned to academic institutions, universities have started establishing and heavily investing in entrepreneurship education programmes and remarkable expansion has been seen in the number of entrepreneurship programs established globally (Katz, 2003; Matlay, 2008; O'Connor, 2013). The expectation among policy makers advancing and supporting this development of extension is that entrepreneurship education is a mechanism that by more and better utilization would eventually lead to an increase in both quantity and quality of entrepreneurs entering to the market (Matlay, 2008; O'Connor, 2013).

Establishing entrepreneurship education programs holds a key assumption that entrepreneurship can be taught, and one can learn skills and capabilities enabling to become an entrepreneur instead of entrepreneurial abilities and characteristics being inborn features that cannot be adopted through education (Oosterbeek, van Praag & Ijsselstein, 2010). This assumption is supported by research, which reveals that entrepreneurial knowledge and skills can be taught and developed when an appropriate environment exists (Packham, Jones, Miller, Pickernell & Thomas, 2010). Hannon (2006) continues by stating that education plays an important role in the process of building entrepreneurial capability. Research also shows that attitudes are better predictor of entrepreneurial propensity than personal characteristics (Douglas & Shepherd, 1999), which is an encouraging notion as it has been noted

that education and training may influence the behaviour and attitude of students (Fayolle, Gailly & Lassas-Clerc, 2006).

Concerning the actual meaning, entrepreneurship education may be defined as the promotion of entrepreneurship and stimulating entrepreneurial skills and knowledge (Verheul et al., 2001). From a more simplistic viewpoint, entrepreneurship education has been categorized into three different categories, which are education “for”, “through” and “about” enterprise (O’Connor, 2013) depending on what is the target group and the goal for the program. Despite this division of entrepreneurial education to categories, researchers still debate about the features that are essential in forming effective entrepreneurship education programmes. Hytti and O’Gorman (2004) discuss about enterprise education, which could be stated close to a synonym for entrepreneurship education and state that confusion concerning what enterprise education programmes should constitute of is partially caused by the fact that the set of objectives placed under the “enterprise education” heading is wide. Further conceptual and theoretical development is noted to be needed also concerning the concept of entrepreneurial education in order to establish purposeful programs (O’Connor, 2013).

According to Andersson and Jack (2008) entrepreneurship education is a challenging topic to lecture due to its high levels of complexity, variability and contingency. Katz (2003) adds to this by stating that entrepreneurial education still reflects high levels of homogeneity in terms of teaching pedagogy, which can be found contradictory concerning the different streams of entrepreneurial education, but yet emphasizing the difficultness that relies in planning entrepreneurial education programmes. Despite the difficulties, research still points out that there are three main objectives, which are essential for successful entrepreneurship education; developing a wide understanding about entrepreneurship, acquiring an entrepreneurial mindset and gaining knowledge on how to start and run a business effectively (Packham et al., 2006).

Entrepreneurship curricula may consist of large variety of activities including simulation of practice, providing academic courses, conducting business plan competitions, mentoring or organizing entrepreneurial training aiming at venture establishment (Etzkowitz et al., 2019). Neck and Greene (2011) have identified and

examined four different streams of entrepreneurship education revealing the difference of focus in different approaches.

The Entrepreneur stream of education treats entrepreneurs as certain types of hero figures, due to which the education from this perspective contrasts the student with different ideal types of entrepreneurs and aims at students reflecting themselves with these models. This stream of education utilizes self-assessments and is characterized by descriptive narratives about entrepreneurs.

The process stream of entrepreneurship education has a more analytical approach and it abandons the aim to embed certain entrepreneurial traits to individuals. The process approach has a focus on the firm instead of the individual and topics such as opportunity recognition and evaluation, new venture creation and business planning are central to this approach. Concerning the pedagogical side, the students are made to undertake process tasks that are believed to prepare them to entrepreneurship as they learn the processes they should replicate in the future.

The cognition stream to entrepreneurship education has again focus on the entrepreneur, the individual, and the way of thinking and decision making that underpins successful entrepreneurship. In this approach, the usage of case studies and simulations is common to allow and trigger the students to delve into the “entrepreneurial mindset” and discover the entrepreneurial mental models that are the base of decisions leading an individual to become an entrepreneur. This approach emphasizes students learning to become entrepreneurial decision makers.

The method stream of education has a more inclusive approach to entrepreneur, the team and the firm and it places the student into the role of being an actual entrepreneur and to learn through the actual experience of being entrepreneurial. In this approach the practical implementation of education may be done by actually starting a small business or engaging with simulations that encourage reflective behaviour. The method stream has a portfolio approach to learning meaning that various methods are used, and it emphasizes students taking actions and, hence adopting entrepreneurial behaviours.

Table 4 summarizes the different streams and illustrates a comparison between the core characteristics of each of the streams:

Table 4. Streams of entrepreneurship education. Modified from Neck and Greene (2011).

Stream of education	Entrepreneur	Process	Cognition	Method
World of...	Heroes and personality profiling	Planning and prediction	Thinking and doing	Value creation
Level of analysis	Entrepreneur	Firm	Entrepreneur and team	Entrepreneur, team and firm
Focus	Traits	New venture creation	Decision making to engage in entrepreneurial activity	Different techniques to practise entrepreneurship
Pedagogical implications	Description	Prediction	Decision	Action

As it was brought up previously, entrepreneurship is possible to be taught among an appropriate environment and entrepreneurship education and training may influence the behaviour and attitude of students (Fayolle, Gailly & Lassas-Clerc, 2006) emphasizing and justifying the role of universities as change agents (Klofsten, Fayolle, Guerrero, Mian, Urbano & Wright, 2019). It must be still noted that there are different propensities among different students to actually act towards becoming an entrepreneur. In a study conducted by Packham et al. (2010) researchers found that in a comparison between German, French and Polish students, completion of an entrepreneurship course decreased the results of German males while resulting to positive increase in results among French and Polish students. The study also provided evidence to previous studies revealing that German students entering higher education are less likely to pursue entrepreneurship as a career and that general attitude towards entrepreneurship is gradually changing in France.

These varying results and findings between different countries illustrate a fact that may be more important than the actual results, which is the realization of the difficultness of measuring success of entrepreneurship education between countries and even between regions: cultural context, macroeconomic circumstances, educational policies and number of other things have major impact on the outcome, which has been noted for example by O'Connor (2013).

What must be also noted is that the positive impact of entrepreneurship education on students may not necessarily increase the propensity of these students becoming entrepreneurs if there still exist other factors such as lack of opportunities or unfavourable entrepreneurship environment, which form barriers to entrepreneurship (Packham et al., 2010). Hytti and O'Gorman continue by stating (2004) that many enterprise education programmes automatically assume that the teaching input provided to an individual would be associated with the output of increased entrepreneurial motivation, ability and understanding, which would then lead to an increased propensity to establish a new venture.

Even though education may increase the propensity of an individual to establish a business, one could also argue that the increased knowledge about entrepreneurship and its demands could also have a negative impact on the propensity of becoming an entrepreneur as the students become more aware of the risks and challenges associated with being an entrepreneur. This assumption is supported by Oosterbeek et al. (2010) who reported negative effects on entrepreneurial intentions after group of Dutch students had participated in a specific study program aiming at increasing entrepreneurial propensity and intension. The study revealed the students having lost their (over-)optimism, which lowered their interest towards entrepreneurship and becoming an entrepreneur.

Another noteworthy issue, in case of an increased intention, is that the increased propensity of becoming an entrepreneur does not as such give any information about the nature of the venture and entrepreneurship the students consider, meaning that information whether the students aim at self-employment or starting a future high growth venture remains unclear. Matlay (2008) found in his study that majority of 64 respondents of the study were either sole traders or owners of micro business (employing less than 10 people) after one year of graduation and none was working

as an employee in small or large organization. Ten years after the graduation most of the sole traders had grown to owners of micro- or small businesses, but the amount of people partnering in new or existing enterprises had not increased remarkably. As it has been noted in the previous chapter, different types of ventures have a varying impact for example on the net job creation in a society, which is why it could be assumed that the nature of the established firm would receive more interest in the future.

3.4 Criticism of entrepreneurship education

As universities are cost-effective and creative inventors and transfer agents of both knowledge and technology (Etzkowitz et al., 2000) the entrepreneurship education programmes run by higher education institutions are considered the most effective way to contribute in enhancing entrepreneurial activity. Despite this, there are still critics that claim the impact of entrepreneurial education being unclear (Pittaway & Cope, 2007) and that the entrepreneurial programs have high chances of not meeting the intended effects (Oosterbeek et al., 2010).

In addition to this, general education attainment has been noted to be higher among entrepreneurs and success rates of entrepreneurs and start-up attainment are noted to be higher when entrepreneurs they have higher levels of general education (O'Connor, 2013). Higher education levels have been also proven to diminish the capital constrains when establishing a new venture, which in later stages has been noted to positively affect the performance of the venture (Parker & van Praag, 2006).

Considering these statements, it seems that distinguishing between general and entrepreneurial education is difficult remaining the measurement of effects a challenge. According to Matlay (2008) a great deal of existing knowledge around this topic relies on tenuous causal links between government driven expansion of the educational system and overall increase in entrepreneurial success, so the reliability of some of the studies is questionable. Further criticism claims that entrepreneurial education at worst shows decreasing returns for certain economies and at best in others, reveals only limited increasing returns before reversing (O'Connor, 2013, see also Martinez et al., 2010).

Criticism does not concern only the quality and outcome of entrepreneurial education, but some critics are afraid that increased pecuniary interest and profit motive of universities will lead to universities losing their role as independent critics of society (Krimsky, 1991). The criticism demanding restricting the capitalistic role of universities is stemming also from the industry as some companies that are concerned of university-based firms becoming potential competitors state that universities should confine to traditional academic-industry relationship such as consultation. (Etzkowitz et al., 2000.) From macroeconomic viewpoint, as noted already, the dynamism and restructuring of the market are indeed desired from the viewpoint of increased productivity and economic development (see Stel, Carree & Thurik, 2005).

When targeting criticism towards universities and entrepreneurial education, it must be still noted that the proper functioning of entrepreneurial university and success in outcomes is not only in the hands of individual institutions and that universities are not operating solely in the aim of generating regional and national development and increased entrepreneurial activity. Packham et al. (2010) point out that entrepreneurship education does not necessarily increase the propensity of becoming an entrepreneur, if external barriers still exist. Brown (2016) provides support to this statement by revealing that prioritizing commercialization of university research above other equally valid innovation objectives led the Scottish Regional Innovation System (RIS) under examination to a cycle of policy underperformance, which was found to be a result of poor performance of some of the actors in the process. Brown continues further by stating that the attempt to turn universities into economic development agencies seems a reductionist policy objective meaning aiming at understanding the complex system solely in terms of its components. More engagement of different actors within the innovation policy-making process is needed to get successful outcomes.

Despite the critical voices, some researchers still argue that investment in entrepreneurship education is most likely to deliver long term returns (O'Connor, 2013) and that entrepreneurship education may provide outcomes only after an extended period of time after gaining industry and commercial experience (Matlay, 2008), which is why conducting only short-term studies may provide biased results about the actual long-term benefits. Previously, entrepreneurial intentions have been

assumed to predict entrepreneurial behaviour, but data confirming this has been scarce (Autio, Keeley, Klofsten, Parker & Hay, 2001). Recently, some findings from longer time span studies have been still received.

An UK-based study, conducted by a research sample of 64 graduates that had participated in entrepreneurship education during their third year at the university, revealed that during the ten year span of the research large proportion of the sample expressed a speedy progression from self-employment to micro- and small-business ownership and only eight of the respondents were still in the self-employment stage after the ten year period. Another remarkable finding was that the respondents showed a very low level of turbulence, no failures of business occurred among the sample and none of the graduates adopted an employee status over the ten year period. (Matlay, 2008.)

These findings give support to entrepreneurial education and as the phenomenon is still rather young, judging its actual impact may require a longer time period after which the long-term effects can be more accurately measured. Pittaway and Cope (2007) call also for more evaluative and longitudinal research about the topic to get a better and more reliable understanding of the impacts of entrepreneurial education, as the area of actual venture creation after entrepreneurship education is still under-researched, even though some studies have been conducted (see Matlay, 2008). Katz (2003) supports this and continues that entrepreneurship education is likely to continue as a major and growing academic discipline as there is too much demand from various directions to let entrepreneurship to fall into disuse.

3.5 Theoretical framework

To achieve a comprehensive understanding of the foundation of entrepreneurship education and the context it operates in, entrepreneurship as a phenomenon has been examined thoroughly in chapter two. Chapter three has focused on extensive examination of the concept of entrepreneurial university. Literature reveals the high levels of complexity concerning entrepreneurial university and entrepreneurship education research and that not many generally accepted scientific models have been established so far.

The purpose of this study is to examine the current state of entrepreneurship education and innovation activities at the University of Oulu and to identify the core activities and educational approaches in each of the examined organizations and programs. To do that, a theoretical framework is constructed in the form of an identification matrix. The theoretical framework builds upon Etzkowitz et al. (2019) according to whom universities can conduct their third mission and act as entrepreneurial universities through three different ways, which are conducting entrepreneurial training, engaging in technology transfer activities or in innovation support mechanisms. After this first stage identification, further examination and categorization is done based on Neck & Greene (2011) who identify four different approaches to entrepreneurship education, which are: *entrepreneur*, *process*, *cognition* and *method* presented more detailed in chapter 3.3.

From the two above mentioned categorization an identification matrix (see Figure 2) is drawn to identify the core activity of each of the organizations as well as the primary educational approach they have. Additional “not identified” column and row were added to the framework in case of any of the organizations’ main activities or educational approaches not being identified, but to be still able to map all the studied organizations into same framework for closer examination.

	Entrepreneurial training	Technology transfer	Innovation support mechanisms	Not identified
Entrepreneur				
Process				
Cognition				
Method				
Not identified				

Figure 2. Theoretical framework: Identification matrix of organizations.

The matrix enables easy firsthand interpretation of the data as positioning of each of the organizations as well as possible overlapping and over- and under representations of certain categories can be identified from the matrix. Positioning of the activities and programmes will be done based on the dominating element identified in the

operations, but it must be noted that the organizations may conduct several activities and engage in various educational approaches in their activities.

4 METHODOLOGY

This chapter introduces the methodological choices of this research in detail and justifies the made choices. It starts by giving an introduction of qualitative research method used in this study and continues by describing the data collection process, which was done by conducting semi-structured interviews. Selected data analysis method and concepts of reliability and validity used in evaluation of this study are also presented.

4.1 Qualitative research

This study is conducted by qualitative research. Using qualitative research method is advised when the focus of the research is on getting a comprehensive understanding about a real life phenomenon (Hirsjärvi, Remes & Sajavaara, 2003, 155) and when the detailed structures of the phenomenon are in the interest of the researcher (Metsämuuronen, 2000, 14). As the purpose of this study is to map out the current state of entrepreneurship education and innovation activities at the University of Oulu and to get a comprehensive and holistic understanding about the entity, approaching the research problem with a qualitative method is a natural choice.

Hirsjärvi et al. (2003, 155) present that other characteristics of qualitative research include things such as appropriate and predefined selection of research sample instead of a random sample and using qualitative methods in data collection, so that the viewpoints and voices of the interviewees can be heard to receive an in depth understanding of the examined phenomenon. Both these issues characterise also this study, which further supports the selection of the qualitative method.

In qualitative research the researcher is usually always involved in the data gathering process, which challenges the objectivity of the research. Researcher should always aim at neutrality and being critical so that the researcher considers also the alternative choices and opposite viewpoints to the ones selected. (Hirsjärvi, Remes & Sajavaara, 2003, 23-24). The process of qualitative research is highly based on researchers own intuition and interpretation and it is possible to derive multiple different conclusions based on the same data (Metsämuuronen, 2000, 8) and the same data can be examined from various viewpoints (Alasuutari, 2011, 40). Due to

this, the researcher must be cautious that his or her subjective views do not interfere the process. The researcher must always rely on the data and observations stemming from it and not to his or her personal values (Alasuutari, 2011, 32). Hence, it is highly important to recognize one's personal ties to the topic that might interfere the process and distract the objectiveness.

4.1.1 Semi-structured theme interview

The data collection of this research is done by interviews, which is the most common method used in qualitative research (Hirsjärvi, Remes & Sajavaara, 2003, 192) and was found the most suitable method for the purpose of this study. Interview can be seen as a certain basic method in qualitative data gathering, which applies to various situations (Metsämuuronen, 2000, 41). One of the major benefits of interviews as a data gathering method is that they enable modifying the data gathering process to be more suitable for the situation and the respondent (Hirsjärvi, Remes & Sarajavaara, 2003, 192). Conducting interviews is advisory when it is known beforehand that the topic of the research may produce multifaceted answers that extend to different directions. Using interviews as the primary data collection method enables also the researcher to deepen the received information as justifications and additional questions is possible to be asked to achieve a deeper understanding. (Hirsjärvi, Remes & Sajavaara, 2003, 192.) Ability to ask additional questions may also increase the validity of the research, which is discussed later in this chapter.

Interviews can be divided into three different groups based on how structural and formal the interviewing situation is (Hirsjärvi, Remes & Sajavaara, 2003, 195). The most common division includes three different types of interviews, which are structured interview, semi-structured interview (also referred as theme interview) and non-structured interview (also referred as open interview) (Hirsjärvi, Remes & Sajavaara 2003, 195-196; Metsämuuronen, 2000, 42). For this research, the semi-structured theme interview was chosen as the primary data collection method. Using theme interviews is typical when the themes of the interviews are known beforehand, but the exact form and order of the questions is not defined, or it may change during the interview (Hirsjärvi, Remes & Sajavaara, 2003, 195).

4.2 Data collection and analysis

Data of this study has been conducted by interviewing personnel of the university that are participating in the entrepreneurship education either in the role of a planner or an implementor and from other organizations contributing to entrepreneurial education at the university. The selection of the interviewees started already when conducting the theoretical framework and familiarizing with what institutions and sources of entrepreneurship education is available at the University of Oulu. After examining all the available organizations, the personnel and their roles in these organizations was examined in order to select the best possible alternatives to be interviewed from each of the organizations. This was seen also in the choice of interviewing one person that had just recently changed positions but was still the most experienced person to be interviewed based on the recently ended position in a certain organization.

Data collection of this research started in March 2019 after the theoretical framework was fully constructed and the author had become extensively familiarized with the existing research. Precise understanding about the context, existing literature and in depth familiarization about research methodologies enabled forming well-considered questions and making justified choices concerning the methodology. All the interviewees were contacted by email and the interviews were offered to be held at the university facilities making it easy and efficient for the interviewees to join as most of them worked at the university facilities.

All the interviews were conducted face to face and in Finnish and each of the interviewees was able to communicate with his or her mother tongue. Besides recording the interviews, written notes were made by computer during each of the interviews so that other observations and notes could be made and further questions arising during the interview would not be forgotten to be asked. At the beginning of each of the interviews the procedure of conducting the interview was explained, meaning expressing that the interview would be recorded and transcribed, but no actual names would be used in the final work and all the data would be destroyed afterwards. The interviews were structured so that basic question asking the interviewees to introduce themselves and their role in the organization and describe their organizations were presented in the beginning so that the interviewees would

get a comfortable feeling as proceeding to more specific questions. Room for free word was also given at the end of the interview in case the interviewees had forgotten to mention something before, or some other ideas were brought up during the interview.

All the interviews were transcribed shortly after the interviews were conducted so that the data would be secured in printed form, too. In total, five persons were interviewed, one of which being in charge of two different operations and interviewed for both. Original plan was to interview a couple of persons from some of the organizations, but this was abandoned for few different reasons as the data gathering process had started. Firstly, all the interviewees were experienced in their positions, so they were able to provide plentiful of information and describe also the historical development of the organizations. Secondly, additional interviewees were assumed to quickly lead to saturation as the information received from the interviewees was so extensive. Saturation in the context of qualitative data gathering refers to sufficiency and means that data gathering can be continued as long as the new interviews provide new information valuable for the research question. The data can be stated sufficient, when same issues start to recur in the data. (Hirsjärvi, Remes & Sajavaara, 2003, 169.)

Total length of the recordings was 4 hours and 21 minutes and the total length of transcribed text was 48 pages. According to Metsämuuronen (2000, 51) transcribing is possible to be conducted selectively, so that only parts valuable for the study are transcribed. Hence, transcribing was done on a basic level so sneering, mumbling and repeating minor filling words were not transcribed as they were considered not meaningful concerning the data and analysis. The experience of the interviewees in their organizations was seen in the easiness of expression and talkativeness, which was seen in the length of interviews and final transcribed text.

After collecting and transcribing the data, the analysis process was started. Analysis, interpretation and constructing the conclusion can be stated to be the core of research (Hirsjärvi, Remes & Sajavaara, 2003, 207). In empirical studies, some preliminary work must be done before the actual analysis can be started. Firstly, the information must be checked in order to examine whether there are severe faults or information is missing. (Hirsjärvi, Remes & Sajavaara, 2003, 207). As the data collection of this

research was done by interviews, excluding data was not a problem as all the data was properly recorded and no parts of the interviews were missing. The second preliminary step is completing the data (Hirsjärvi, Remes & Sajavaara, 2003, 208), meaning for example contacting the interviewee again in order to define certain issue that is left misunderstood. Need for this procedure occurred once as the year of establishment of one of the organizations was checked by email after the interview, as the interviewee could not memorize in the situation the exact year of starting the operations. The third step, and probably the most challenging step in qualitative research is organizing the data (Hirsjärvi, Remes & Sajavaara, 2003, 208).

Compared to quantitative research, where the analysis usually proceeds linearly, in qualitative studies it is typical that the proceeding of analysis meanders more (Hirsjärvi, Remes & Sajavaara, 2003, 209). Hirsjärvi et al. (2003) continue that in qualitative studies the analysis should be started immediately after the data collection as the data still inspires the researcher and data can be still easily completed. Concerning this research, notes and ideas arising were written down on a paper simultaneously when transcribing the data and once finished, all the transcriptions were shortly printed so that they could be handled more easily. Once the data was in a printed form, it was read multiple times over various occasions and organized by theming. Theming of the content was done by highlighting the text with four different colours as issues related to different themes were arising. Main themes selected were (1) primary form of activities and educational content related to activities of the organizations, (2) planning and measurement of activities, (3) challenges faced in the operations and (4) other issues such as financing and development of organizations. Written notes such as a big mind map was filled in throughout the process as new ideas and linkages emerged during the analysis process.

The data of this research is analysed with the methods of content analysis, which is a basic analysis method commonly used in qualitative studies. Content analysis can be conducted with three main methods, which are data based content analysis, theory directed analysis and theory based content analysis. (Tuomi & Sarajärvi, 2018, 103-110.) For this research, the theory directing content analysis approach is chosen to be used for two reasons. Firstly, due to the complex nature of the theoretical background of this research, conducting an all-inclusive theoretical framework for a

case study is challenging, which is why a purely theory driven analysis would restrict deriving a comprehensive understanding about the current state of the examined phenomenon. Secondly, as different categorization concerning the concepts of entrepreneurial university and entrepreneurship education are provided by existing research and utilized in this research, the data based content analysis was abandoned as this would require deriving the concepts and classes from the data (Tuomi & Sarajärvi, 2018, 108). In data driving content analysis chosen for this research, the theory is used as a tool guiding the analysis, but the analysis is not straight and fully based on the theory. Analysis may for example start as data based, but at the end of an analysis the guiding thought of the analysis is derived from the theory. (Tuomi & Sarajärvi, 2018, 109-110.) Choosing this approach has enabled the author with flexibility and ability to align the aim of drawing a comprehensive understanding of the current state with applicable methodological choices.

4.3 Evaluation of qualitative study

When conducting a research, it is highly important that one evaluates the quality of the study as well as its trustworthiness. Reflecting a research through some evaluation criterion increases the transparency of the research process and enables to assess the limitations of the study. In qualitative studies this evaluation is usually done by reflecting the research through concepts of validity and reliability (Hirsjärvi, Remes & Sajavaara, 2003, 213).

Reliability of the research refers to the repeatability of the research results meaning the ability of the research to give *non-random* results. Reliability can be observed in various ways for example if two different researchers end up to same results or if same results are received when same person is examined in various times. Validity on the other hand refers to the ability of the research method to measure and examine what is meant to be measured and examined. For example, structured interview may provide the interviewer with multiple answers, but if the interviewees understand the questions differently from the researcher, the validity of the data suffers. (Hirsjärvi, Remes & Sajavaara, 2003, 213-214.)

Concerning qualitative research, some researchers find it challenging to evaluate their research through the concepts of reliability and validity. Specially, when

conducting a case study, it could be argued that evaluating a study through these lenses is difficult as there are no two exact same cases. Still, evaluation of the research should be done even if the mentioned concepts would not be used. (Hirsjärvi, Remes & Sajavaara, 2003, 214.)

Due to these notions, it is highly important in qualitative research to precisely report the research process and how the data collection has been conducted. The conditions where the data collection has been conducted should be presented clearly and truthfully. Time used, possible disturbing factors as well as the researcher's own evaluation of the situation should be explained to increase the reliability of the research. (Hirsjärvi, Remes & Sajavaara, 2003, 214.) The data gathering process of this research is explained in detail in the previous chapter and evaluation of the study is presented in the last main chapter of the research.

5 RESULTS AND ANALYSIS

This chapter presents the results and analysis of this study and answers the research question presented in the beginning. The first subchapter presents the results concerning the main research question, which aims at drawing a comprehensive understanding about the current state of entrepreneurship education at the University of Oulu providing a linear timeframe of the development as well as identifying the core operations of each of the organizations based on the theoretical framework. It provides also answers to the first sub-question and presents findings about the educational approaches of the organizations.

The second subchapter presents findings concerning the second sub-question presented in the beginning and reveals information about challenges and hindering factors of operations. It provides also insights to planning and measuring of activities as well as to financial and co-operative aspects of the organizations and programs.

5.1 Entrepreneurial activities and -education at the University of Oulu

The examination of the data revealed the network contributing to entrepreneurial activities being multifaceted and the current state being sufficiently functional even though various challenges were identified. The network providing entrepreneurship education and innovation activities at the University of Oulu consists of several different organizations, from which the main operators are Business Kitchen, the entrepreneurship minor-module organized and implemented by Oulu Business School, Oulu Entrepreneurship Society, Demola Oulu, and the newly established University Innovation Centre, UIC. The sixth program considered in this thesis is Avanto Accelerator -program organized until this year under Business Kitchen and possibly transferring in the future to be conducted under the University Innovation Centre. Each of the organizations or activities are presented shortly in the following, after which an in depth analysis of their operations is constructed.

Oulu Entrepreneurship Society (Oulu ES) is a student organization founded in 2011 and formed of students from both University of Oulu and Oulu University of Applied Sciences (OUAS) that are interested in self-development and developing entrepreneurial activities in the region. The operating of Oulu ES is based on

volunteer work of the students. Oulu ES organizes different activities, programs and seminars in which students can develop themselves, build their own networks and engage in entrepreneurial activities and get rid of the possible fear and hesitation related to entrepreneurship. Similar entrepreneurship societies are formed in various cities in Finland, but all societies operate independently, and they do not have a shared roof organization.

Demola Oulu is a Tampere-based concept and company that originated from Tampere University of Technology and was originally established in 2008. Demola describes itself as an innovation platform that brings together companies and higher education institutions to work together among real life challenges provided by actual companies. Today Demola is established in over 50 universities worldwide and more than 700 000 students have participated in Demola Activities. Demola Oulu started its operations in 2013.

Business Kitchen is a co-operative organization and entrepreneurship hub of University of Oulu and Oulu University of Applied Sciences that first started as a pilot project in 2012 as a response to guide and support people that were unemployed after mass layoffs of Nokia and were planning on starting up their own companies. Nowadays Business Kitchen focuses on entrepreneurship education and innovation activities and organizes several seminars and activities throughout the year, operating at both higher education campuses in Oulu.

Avanto Accelerator is a six week long entrepreneurship program established in 2015 that according to its name is an accelerator program for future entrepreneurs and entrepreneur-minded people. In Avanto one can get mentoring from professionals, refine and test ideas and attend workshops where large variety of topics related to establishing and running a business are covered.

Entrepreneurship minor is a minor study program at Oulu Business School that consists of six alternative courses that students from all study fields can take either separately or study a full minor by finishing five of the six courses and total of 25 study credits. The study program is available for all students at the university of Oulu and has been running since 2014, first as a pilot and after 2017 as a fixed study module at Oulu Business School.

University Innovation Centre (UIC) was first founded in its original form in late 1990s and the operation of the new UIC started at the beginning of 2019. UIC provides services for research-based innovations and IPR issues, business development and university-company collaborations. The target group of UIC are the researchers at the University of Oulu.

Figure 3 illustrates the timely development of the entrepreneurship and innovation activities and emergence of organizations and programs contributing to entrepreneurial activities at the University of Oulu:

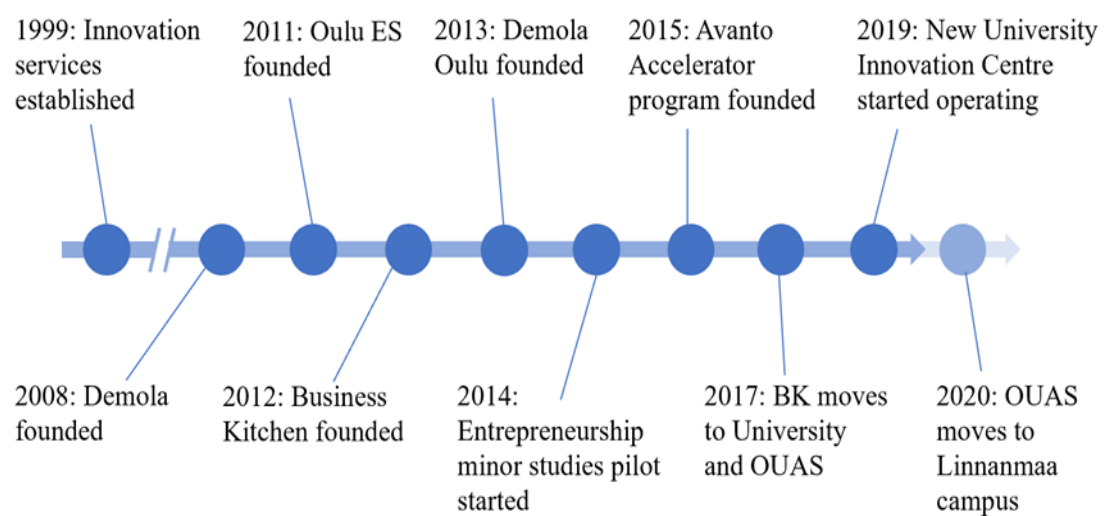


Figure 3. Development of entrepreneurship studies and programmes.

The ground reasons for existence of entrepreneurial activities among the university are two folded. Firstly, some of the current operations have not originally been established at the University of Oulu and for the purpose of educating future graduates about entrepreneurship, but primarily as a response to current regional situation around 2012 when Oulu faced a severe wave of unemployment due to mass layoffs in Nokia. One of the organizations founded on this basis is Business Kitchen, formerly operating purposely in the city centre of Oulu, that was originally focusing on helping and supporting former Nokia employees that were in the process of possibly establishing a new firm. Once the “Nokia wave” was over, the focus of Business Kitchen transferred to students in higher education that were perceived as the next “start-up wave” of Oulu, to whom same type of support could be provided as to former Nokia employees. Another organization having its roots in the ruins of

old Nokia is Demola, but in comparison to Business Kitchen that today focuses on students, Demola has maintained its focus on firms and entrepreneurs to this day.

Besides these industry-related reasons, entrepreneurship education has also started to form inside and around the University of Oulu around the same time with the industry related activities, when Oulu ES was founded in 2011 and entrepreneurship education was started as a pilot project under Täydentävien opintojen keskus (TOPIK, which is a continuing education centre at the University of Oulu) in 2014. Before that, entrepreneurship education was minimal and demand for more education about the topic was observed. Concerning the entrepreneurship minor, after providing good results in the pilot phase, the program was transferred under Oulu Business School to operate as a fixed study module.

Predecessor of UIC was established already in 1999 when demand for support services for research driven innovations were noted increasing. At the time, increasing amount of innovations having potential for commercialized use were emerging at the university and need for supporting activities in the process was observed. According to the representative of UIC, United States was a forerunner at the time in running these innovation centres and emergence of similar activities had also started in other European countries, which were benchmarked when establishing the operations at the University of Oulu. The new Innovation Centre was established in 2019 and it aims at being a “one-stop shop” for researches that are conducting research having also potential for further commercialization.

As it can be seen from the above presented, various entrepreneurial activities started emerging in Oulu both among industry and the university after 2011. Today, entrepreneurship is brought up both in the long-term strategy of City of Oulu and University of Oulu for years 2016-2020. According to City of Oulu’s City strategy 2026, Oulu wants to be “the best place for entrepreneurship growth”. At the University of Oulu, the aim is to integrate more entrepreneurship education to the study programs, which can be seen in higher involvement of the university to different entrepreneurial activities. It is stated in the strategy of the university that *“university is a motor for the innovation environment emerged around it.”*

Concerning the organizations and activities contributing to entrepreneurial activities at the University of Oulu and whether they are focusing on entrepreneurial training, technology transfer or innovation mechanisms and what types of focus they have on the educational side, the matrix constructed for the theoretical framework is filled and placement of each of the organizations is presented in figure 4. What must be noted is that it is possible for the organizations to engage in several of the three activities and conduct their educational content in several different forms. The placement of the organizations and activities to the matrix is done based on the dominating elements found in the operations and possible other activities and approaches emerging in their operations are described in the later parts.

	Entrepreneurial training	Technology transfer	Innovation support mechanisms	Not identified
Entrepreneur	Oulu ES			
Process	Business Kitchen		Avanto Accelerator	
Cognition	Entrepreneurship minor			
Method			Demola Oulu	
Not identified		University Innovation Centre		

Figure 4. Placement of organizations in the matrix.

As it can be seen from the matrix, the organizations and activities are spread in the matrix and none of the organizations appear in the same box revealing that major overlapping in the operations seems not to exist. This illustration is supported by the interviewees that each brought up in the interviews the aim to maintain independence and separation in the operations and to provide complementary activities:

“-...- there is no point in competing because they have clearly the thing that they do and there is no point for us to do content that is similar to theirs -...- “

“We don’t do work that is overlapping and like duplicate what some others are already doing just for the sake of getting for example own credibility, we don’t believe in that.”

Three of the organizations, Oulu Entrepreneurship Society, Business Kitchen and the Entrepreneurship minor, have their main focus on entrepreneurial training while two of the organizations, Demola Oulu and Avanto Accelerator are found to focus more on innovation support mechanisms, while both still indirectly contribute also to entrepreneurial training. University Innovation Centre was the only organization identified to conduct the tasks of technology transfer and it described its target group being researchers of the university. Even though the students of the university could also utilize the services of UIC, this almost never happens and in real terms no link, even an indirect one, could be examined between UIC and the university students. Due to its target group and primary focus being on researchers and not conducting the task of entrepreneurship education, the educational approach of it was left unidentified.

Out of the six organizations or programs, Demola Oulu was the only one expressing their target group being in companies instead of students. Demola Oulu defines itself as a platform, where companies can bring some challenge or problem of theirs, to which Demola Oulu recruits a student team to solve the problem together with the company. This reveals that despite the target group being expressed to be companies, the operations indirectly contribute also to students that learn by working on the challenges. Avanto differs from Demola in a sense that despite being defined as innovation support mechanism-activity that focuses on advancing entrepreneurship and commercializing ideas, the role of students is more central in their operations and they are expressed to be the target group of the program. Despite Avanto being open to anyone to participate, it has been estimated that still around 90% of the participants are students from the University of Oulu and University of Applied Sciences.

While conducting the interviews and examining the data, the primary mode of activities was easily identified as they were clearly expressed among the interviewees. While further analysing the results it was still noted that entrepreneurial training and innovation support mechanisms were often linked with each other as programs aiming at conducting entrepreneurial training were running activities that resembled with innovation mechanisms and vice versa, organizations focusing on innovation support mechanisms were integrating and engaging students to activities that may be seen providing them with entrepreneurial training.

As it can be seen in previously presented matrix, only one of the examined organizations or activities was identified focusing primarily on technology transfer activities and in general, engagement in technology transfer activities was minimal among the other organizations. Business Kitchen as the only organization along UIC engaging somehow to technology transfer organizes few times a year a three day event called Venturing Research Challenge (VRC), where researchers are able to bring something from their research to be milled by interdisciplinary student groups and topics related to commercialization research are covered during the event. Even though conducting such activity may seem as overlapping with the activities of UIC, the differences in approaches concerning the actual implementation methods differs these two organizations and activities from each other. Whereas UIC focuses more on individual support of more “ready” ideas, the focus of the Venturing Research Challenge is more on brainstorming and providing new insights rather than systematic process of advancing technology transfer by supporting the creation of spin-offs or otherwise commercializing research. The Venturing Research Challenge and operations of UIC can be actually seen as complementary to each other, as the representative of UIC expressed some of the innovations being brought to UIC sometimes being too much of a draft or sketch that cannot be yet taken further, but that would require more development, in which activities and group thinking provided by the Venturing Research Challenge could be seen beneficial.

Oulu Entrepreneurship Society, Business Kitchen and the entrepreneurship minor module all describe their target group being the university students and their primary focus being on entrepreneurial training or entrepreneurship education. Despite being placed into this category, none of these groups expressed their goal being emerging and educating future entrepreneurs or contributing to actual generation of new entrepreneurs. In general, one of the main findings was that the goal of most of these programs was expressed to be on developing individuals’ working life skills and capabilities, while only few of the interviewees expressed the goal including aspects of learning entrepreneurial capabilities or developing an entrepreneurial mindset:

“Our goal is that all students would recognize their own strengths that they can utilize in working life -...- also that one learns already during the studies to work with others. And thirdly that one learns to see the world a bit differently and understand what possibilities there are around you -...- “

“We don’t try to make students entrepreneurs but open their eyes so that they find for example new study possibilities and whatever possibilities there are in life”.

“One can developed his/herself through entrepreneurship, build up own networks and learn new skills and the side product of this may be that one gets excited about entrepreneurship.”

“-...- like we concentrate on entrepreneurship and entrepreneurial training and the activities aim at that, but like I said, not all still end up entrepreneurs and that’s ok.”

According to Packham et al. (2006) successful entrepreneurship education programs should develop a wide understanding about entrepreneurship, assist in acquiring an entrepreneurial mindset and gaining knowledge how to start and run a business effectively. Even though academia in general does not define entrepreneurship education very tightly with a straight aim of generating future entrepreneurs and research has revealed that attitudes – which can be affected through education (see Fayolle, Gailly & Lassas-Clerc, 2006) – may have an impact on the propensity of one becoming an entrepreneur one day, it could be still argued whether the goals of some of the programs and activities lack ambiguity or resemble more with general education and enhancing students’ general working life skills.

The increased usage of term entrepreneur has been noted in academia and its meaning has been argued as some academic state it has become a label with little convenience (Gartner, 1990). One of the interviewees also expressed that names of the activities and programs have been reconsidered and reshaped to make them sound more appealing and interesting to attract the students to participate, which triggers the question of how much of the content can actually be stated to be entrepreneurial.

Concerning the ambiguity of the activities and programs and understanding the concept of entrepreneurship education, the data reveals also an interesting yet possibly significant finding that some difficulties and differences seem to be related to Finnish terminology as the term entrepreneurship education has two different alternative translations with different tone of voice in each. When talking about entrepreneurship education, some of the interviewees expressed to perceive the

meaning of the term more as schooling (kasvatus) and others as training (koulutus). How this possibly affects the planning and implementation of the activities and study programmes cannot be evaluated based on the data of this research, but it still brings up a question that could require further consideration.

5.1.1 Educational approaches of the activities

From educational viewpoint, all four approaches presented by Neck and Greene (2011) are found in the operations. Oulu Entrepreneurship Society is the only organization that has a clear focus on the entrepreneur-approach and characteristics related to this approach were clearly found. The activities of Oulu ES aim at developing oneself and developing entrepreneurial features and thinking and engaging in entrepreneurial activities. Oulu ES has organized few seminars where the focus is on keynote speakers that are either successful entrepreneurs or inspirational influencers reflecting with the hero figure-notion related to the entrepreneur approach. In addition to this, Oulu ES runs a Human Accelerator-program that according to its name focuses on developing individual capabilities during an eight week program. The program utilizes workshops and short introductory lectures reflecting hence also with the cognition approach on practical side. Characteristic and themes related to the latest run of the program included things such as recognizing own capabilities, performing and adapting growth mindset, which can be seen reflecting with the entrepreneur approach.

Whereas the focus of Oulu Entrepreneurship Society is on individual and developing personal skills and enhancing the inner entrepreneur, the rest of the organization have more process oriented and practical action approach. Business Kitchen and Avanto Accelerator program were found to have their focus on the process approach. Instead of embedding certain traits to individuals and enhancing the idea of an inner entrepreneur, their operations focus more on the process of generating ideas and triggering innovative thinking, assessing, testing and validating ideas and going through the entrepreneurial process step by step. This was recognized especially in the operation of Avanto Accelerator, where lecturing about different aspects related to entrepreneurship is given in chronological order throughout the whole duration of the six week program. Topics are covered from opportunity recognition and validation to financing, taxation and marketing covering the whole life span from idea creation

to actually establishing a business. Besides lecturing, students participating in Avanto are working in workshops and replicating actions typical to entrepreneurship, which strongly resembles with the process approach of education.

The entrepreneurship minor is the most challenging entity to be evaluated as it consists of multiple courses that have differing focuses. Some of the courses are described focusing more on knowledge and capabilities and consisting more of lectures and theory as the others have their focus on learning by experiences, from which the most extreme example is course called “Business through creativity and collaboration” that aims at teaching entrepreneurial skills to students through making art and is conducted in co-operation with a Parisian business school. Still, it could be stated based on the data that as a whole, the minor module best reflects with the cognition approach. The cognition approach is characterised by delving into “entrepreneurial mindset”, which can be stated to be the common thread of the entrepreneurship minor module.

Lastly, Demola Oulu is found to clearly reflect with the method approach that places the student into the role of being an entrepreneur and learn through the experience of being entrepreneurial. Working with a real life cases with industry professionals and with actual companies simulates the real entrepreneurial life and can be found a core element in Demola’s activities, which reflects strongly with the core of the method approach. Instead of learning about or for entrepreneurship, the students learn through it and are active operators in the problem solving process.

Entrepreneurship education is often noted to reflect high levels of homogeneity (Katz 2003). This was noted to be true for some of the organizations, when asked if contents of the activities or education are modified based on the educational field of the participating students. So far, especially among the entrepreneurship minor, the courses are provided to all students the same despite their educational field or level of studies, but with the current number of participants, modifying the contents based on the educational background and knowledge-level of participants could be stated as inefficient use of resources. Despite the homogeneity among some of the programs, in general the entrepreneurship education provided at the University of Oulu could be stated extremely versatile and diverse. Etzkowitz et al. (2019) list various forms how entrepreneurship education may be conducted, including things such as simulation

of practice, providing courses and mentoring, conducting business plans and organizing entrepreneurial training, which all can be found among the organizations of this study.

From the students' viewpoint the whole supply of available programs, courses and activities is heterogeneous as there are various different activities available and the activities are conducted through different pedagogical perspectives providing the students with the ability to engage with activities with the most favourable approach to them. Also, concerning the entrepreneurship minor, the whole minor is possible to be finished with high levels of heterogeneity as some of the courses are conducted in co-operation with Business Kitchen and Avanto, where the students have the ability to affect what kind of activity he or she wants to participate in.

Concerning the supply of entrepreneurship education, the only missing piece in the puzzle could be stated being a basic level course concerning the basic principles of entrepreneurship and issues related to establishing a business. Currently, the Avanto Accelerator-program provides the most comprehensive education concerning different issues among the lifespan of a company, but this information is bound to workshops of the Avanto-program and no basic course in the form of lecturing exists, which was noted among some of the interviewees and expressed as needed. The entrepreneurship minor program considers establishing an Entrepreneurship 101-type of course, which could be implemented online, so that taking the course would be most easy for students. The idea is still in a planning phase and no guarantee of its actual implementation still exists.

Concerning the above examined spread of the activities from resource perspective, the results of the matrix can be interpreted positively as no overlapping activities seem to exist, but activities of individual organizations are rather complementary to each other, meaning that resources are not wasted by multiple organizations focusing on same type of activities. From the interviews it was still noted that some improvements concerning usage of resources could be done. Some of the interviewees expressed that individual faculties are currently conducting activities that these organizations are already doing, so resources are wasted when individual persons in different faculties are appointed to conduct the same activities that could be conducted by these organizations by providing for example visiting lectures based on invitations to do so. This was assumed being partially a consequence of not being

aware of these external possibilities existing, which is why communication between the organizations and faculties should be emphasized. Issues related to co-operation and communications are discussed in more detail in later chapter.

5.1.2 Planning, measuring and developing of activities

Concerning planning of the activities, the study revealed that planning was mostly done by benchmarking other similar activities in Finland. The current form of activities today was described to be a result from a learning by doing-process, where best practices from previous experiences were maintained. For example, the length of the programs had varied in most of the organizations and variation between the shortest and longest run was several weeks. In general, the planning of the activities showed low levels of systematic and strategic approach and not being highly research- or knowledge-driven:

“Well, there is probably not many things we knew beforehand but we have just started doing things.”

Entrepreneurial education programs are characterized by difficulty of measurement and confusion and vagueness of actual impact of it due to these difficulties (Pittaway & Cope 2007; Matlay 2008). This was noted also among the organizations of this study, who brought up that measurement focuses mostly on measures such as reach, number of participants, number of applications and number of ECTS per year. Measurement of long-term impacts was minimal to non-existing as it was described extremely challenging, which is why it has not been pursued.

Demola Oulu was an exception concerning measurement of activities, as Demola has developed more defined measures and utilizes today a measurement tool developed with ZEFFI. Their primary target group being companies, receiving feedback was not brought up as a challenge as it was in other organizations. In other organizations and programs, receiving feedback that would enable further development of the activities was described a difficulty: receiving feedback from students was described extremely challenging and it was mostly received when there was some complain:

“What we report to our investors is in particular the reach, how many people come to our events -...- what comes to measuring the learning, we haven’t started that, and I believe we won’t either.”

“No one has ever demanded it, so that kind of systematic measuring has honestly not been done much.”

“Number of participants and naturally study credits -...- That is basically the only thing, we have tried to follow the ideas created a little and how they develop, but we have no follow-up.”

Concerning the measurement and number of participants, the numbers express certain levels of variety due to differences in capacities. According to the representative of Oulu ES, all their activities engage estimated 1500-2000 people per year. From the activities of Business Kitchen, Avanto workshops are estimated to gather around 20 people per workshop, Venturing Research Challenges around 50 people and Start-Up Weekend organized also by Business Kitchen around 60-100 people. Entrepreneurship minor program had 150-200 students participating in at least one of the courses during the previous year. Demola Oulu is able to take 100-120 students per year to its programmes even though the number of applicants per year is at least double. All the interviewees expressed that higher number of participants would be welcome, especially concerning how small percentage the current numbers form out of the around 16 000 students of the university. Still, increase in the number of participants is seen year by year and some of the interviewees expressed that word of mouth among students seem to increase awareness and activity affecting positively the number of participants. Some of the interviewees expressed that their programs are able to take more students in without extra resources required, but for example representative of Demola Oulu expressed that with current resources and facilitators the amount of students that can be taken to programs has reached its maximum and additional resources would be needed to scale the operations up. Avanto Accelerator -program was stated also being close to its current capacity, but it has also a mandate to recruit more people if the number of participants increases.

In addition to the number of participants, the organizations have gathered information concerning the distribution of participants from different study fields. Most the interviewees expressed that majority of the participants in the past have come from the Business School and Faculty of Engineering, especially from industrial engineering. Reaching and engaging students from other study fields was expressed an ultimate challenge. The situation has yet faced a change during the recent years as all the interviewees brought up that more and more students from different study fields have started participating in the programs. Last year the entrepreneurship minor gathered students from 27 different study fields and representatives of other programs expressed clear increase in the number of students from the Faculty of Education followed by Faculty of Humanities and even from the Faculty of Medicine, which was considered a positive signal as the faculty is not located in the main campus of Linnanmaa. Interviewees did not have any actual information concerning what has led to the increase in number of participants from other study fields, but some of them assumed it being a result from better marketing actions as well as increased credibility that some of the organizations expressed having received during the few last years. Most of the students participating are master's students, but interviewees expressed that bachelor and doctoral level students have also participated in the programs, which was considered a positive thing increasing diversity among the participants.

Concerning how to distinguish general education and entrepreneurship education, previous research has also argued that it is difficult to distinguish which results and outcomes can be contributed to entrepreneurship education and which to general education as entrepreneurs usually reflect higher levels of general education (O'Connor 2013). This was noted also in the results of this research and brought up also as a hindering factor for long-term measurement of the impacts of the activities:

“The founding of the company goes so far to the future that one cannot say what kind of impact XX (referring to one's own organization) has had on it.”

As governments and policy makers invest in entrepreneurial activities and support them, they expect these activities to contribute to regional development for example in the form of start-up creation (Autio et al., 2014). In this sense the measurement of results is essential as the funding may be threatened if the organizations are not able

to provide convincing and reliable results justifying further financing of their operations. More systematic gathering of feedback would also provide the organizations with better understanding about the impact the activities have on students, their self-perception as potential future entrepreneurs and attitudes towards entrepreneurship, for example. Gathering and handling of feedback requires naturally resources, especially knowing the complexity of the topic and difficulties in measuring it, but it would most likely outweigh the costs in the long run.

5.1.3 Financing and co-operation

When examining how the operations of the organizations are funded, most of them receive their funding either straight from the university or from a budget allocated by the university to innovation activities. During the first years of operations the funding of most of the organizations and programs has been in the form of project funding that has been applied and agreed for certain amount of time, but in recent years most of the operations have been transferred to basic funding, so a portion of university's budget is allocated for the operations. Oulu Entrepreneurship Society receives funding besides University of Oulu also from Oulu University of Applied Sciences and the city of Oulu. In the case of Business Kitchen, before getting basic funding from the University of Oulu, Business Kitchen received funding from Centre for Economic Development, Transport and the Environment (ELY-keskus), Business Oulu and from European Union. Demola Oulu is the only organization that has not received neither currently does receive funding from the university or any other external organization, but all of its monetary resources come from the income they get as fees from the companies participating in the programs.

The results imply that importance and significance of these organizations are understood as the university and other institutions have engaged to their operations by providing funding, most of it being transferred from project funding to budget funding in recent years. Despite most of the organizations describing the current amount of financing being reasonably sufficient, it could be argued that some of the problems and challenges in the operations are due to lack of resources, in which increased financing could help. For example, concerning Oulu ES, despite it receives financing, the operations are still based on volunteer work as the organization does not have the ability to hire any employees. This leads to many of the volunteers

changing yearly increasing inefficiency. Secondly, some of the organizations are given a permission to recruit more people as the number of participants increase, but with the restrictions of the current resources, enough marketing and branding efforts cannot be done to attract new students. Much of the engagement of new participants relies on the power of word-of-mouth among students.

Also, as seen from the previous chapter, the current state of measuring the operations is rather low and non-systematic. Some of the interviewees expressed this being a consequence of lack of resources while others emphasized the general difficulty of measuring. It could be assumed that changes in the funding could also place the organizations with more demands concerning measuring the outcomes of the activities, but at the same time the current amount of funding and resources may restrict such actions, which may create a death spiral. More discussion about the financing and its sufficiency and efficient allocation would be advisory to tackle some of the existing issues.

In general, some differences were observed depending on if the operations of the organizations were based on external funding or if they were generating their income and financing themselves. Demola Oulu being part of an actual firm and the only organization operating fully on the income received by the payments that companies make when participating in Demola-activities expressed highest levels of efficient use and allocation of resources so that different activities among the operations were more balanced. Demola provides pre-made material and guidelines for all the facilitators running the programs to ease their work and form a certain backbone for running the programs, which was described as easing conducting the work and making it more efficient. Measuring of the outcomes was also the most systematic among Demola as noted in the previous chapter and the more systematic approach to running the operations may be seen in high levels of good feedback received from the participating companies: 80% of the companies that have participated once to Demola say that they could participate a second time. When companies have participated two or more times, the recommendation for Demola-activities rise to 99%.

This is not to say that the other organizations would do something wrong, but the differences could be stated arising mostly from the fact that the operations of the

organizations are based on different basis. Demola being an actual company is supposed to generate profits and services provided to companies may be priced so that enough resources exist for conducting the other activities and support functions enabling the running of the business. Increasing resources is more difficult for other organization as financing relies on negotiations between the organization and the ones financing parties.

Concerning the co-operation between the organizations and externally to other organizations in the region, most of the interviewees agreed the level of co-operation among the organizations at the University of Oulu being satisfactory, but some of them were recalling that the co-operation could be still more close and frequent so that movement of students from one activity to another could be more smooth and active as organizations are better aware of operations of each other and able to guide students to other activities if needed. As the organizations want to maintain independence and be able to be complementary with each other, the enhanced co-operation could also improve avoiding possible overlapping in the activities of individuals organizations. According to one of the interviewees the assumption was that currently the network of activities may seem fuzzy to students and all the possibilities that exist are not clear for the students, which could be improved by enhanced co-operation. The assumption concerning fuzziness is supported by some of the other interviewees. The perceptions of students towards the entrepreneurial activities will be discussed in more detail in the following chapter.

Some of the organizations also expressed enhanced relationship and co-operation with organizations and institutions external to the university. This was assumed to be a consequence of increased credibility and general reputation in the eyes of other institutions and interviewees of these organizations expressed that their opinions and ideas were being heard and valued. For example, increased co-operation with the City of Oulu was taken as an evidence of successful operations as the interest from these types of parties and institutions was not taken for granted and something that could be received easily.

5.2 Operational challenges

Despite differences in the core operations of each of the organizations, the data reveals that most of the organizations share the same challenges and hindering factors in their operations, which are described in the following.

One of the hindering factors brought up by almost all of the organizations was **reaching Finnish students**. When asked what the proportion of Finnish and international students participating in the activities is, the answers varied from the distribution being 50/50 to international students forming around 80% of the total participants, while the number of Finnish students was only 20%. In the case of one organization expressing the distribution being 50/50, the situation has become such just recently, while being also dominated by their foreign students during the previous years.

Most of the interviewees stated the lack of Finnish students being either a problem of some extent or an actual failure of meeting the organizational goals, in which the proportion of Finnish students was aimed at higher. When considering the economic viewpoint, the purpose of entrepreneurial universities and entrepreneurship education is to enhance entrepreneurial activity and hence contribute to regional and national economic development. One of the interviewees worded the problem as following:

“... because if we think in the bigger picture, even the economic viewpoint, so most of the international students, when they have a finished degree, they leave...”

The higher fraction of international students, either exchange students or degree students, plays a potential threat of information leakage as these graduates go back to their home countries or employ themselves to some other country after finishing their studies, which is why attracting higher amounts of Finnish students into these activities is essential in order to get a reasonable return on investment made in entrepreneurship education and to actually gain regional and economic developments instead of educating workforce for other countries. According to earlier studies, justification and financing provided for these activities relies on the expectation of the activities contributing to regional development, which is why the high fraction of

international students that not stay in the region places a threat for the organizations and their continuity.

UIC was noted an exception in reaching people as the approach they have is different from the others. Both of the current employees of UIC have been in the operations of UIC and its predecessors for multiple years, one of them actually since the operations have started, which is why their names and roles are known quite well in different faculties. In general, UIC seems also very active in engaging with researchers and it was brought up by the interviewee that usually when the university appoints a new researcher, UIC contacts the person and informs him or her about the services of UIC and this way spreads the knowledge around the university.

When considering the hindering factors preventing Finnish students from participating in these entrepreneurial activities, few common themes arose in the interviews. **Language barrier** was stated to be a moderate or significant hindering factor preventing Finnish students from joining the activities. Most of the entrepreneurial activities at the University of Oulu are implemented in English, which seems to decrease the likelihood of Finnish students to join the activities as the students feel either insecure or otherwise uncomfortable expressing themselves in English. Some of the activities are organized simultaneously at both higher education institutions, in English at the University of Oulu and in Finnish at the University of Applied Sciences. According to one of the interviewees a recent workshop of the same topic gathered 40 participants at the OUAS where it was organized in Finnish, and only six at the university, where the event was organized in English. Also, even though the university students would be allowed to join the activities also at the OUAS, transfer from University to OUAS does not occur *“for convenience and quality issues”*.

One of the interviewees expressed that conducting all the activities in English has been written down even to the organizational strategy, but the language question has been given some reconsideration lately due to the problem of reaching Finnish students and as the language problem has been noted a significant reason hindering the participation. The named organization expressed also a significantly higher fraction of international students, but a seminar event organized fully in Finnish

revealed that there is an underlying interest also among the Finnish students, but the language indeed is a preventing factor:

“... and now the XX-event brought us the validation that the Finns are interested in this entrepreneurship side as well, but the barrier of joining an English-speaking event is unfortunately very high”

“... but still there is the thing that when one comes once, he comes a second time, too...”

“It is the prejudice that one does not trust his own capabilities with the language, but if you have come once, I’ve seen the same person joining quite many times also after that.”

It seems that organizing the events in Finnish is not the essential solution, but hindering the barrier for the first steps, as the return rate of those students that have once come seems rather high.

Considering reaching and engaging Finnish students, **communication** was expressed as one of the challenging factors and being described as a major problem by one of the interviewees. University of Oulu being a large university with multiple faculties and study fields, reaching the students university wide has emerged a challenge and it is clearly seen and stated by the interviewees that the messages do not reach all of the students.

Problems concerning communication seem to be both internal in the organizations as well as external with other parties such as university’s communication department. The internal problems related to communication are expressed to be highly resource bound as time resources are allocated to other activities and no possibilities to appoint a person to properly conduct communications has been possible. Also, finding the right people in other faculties that would be in charge of delivering the information further seems difficult as clear understanding of responsibilities lack in some cases. Some of the interviewees stated that despite some of the programs having been ongoing for several years now, some of the university students are still totally unaware of available opportunities.

“It is maybe a little comical when sometimes discussing with for example students studying in the faculty of Humanities, when they are like “we are not even allowed to take those studies” and I am just being that of course you can!”

“It has been said even straight -...- that are we even allowed to come to Tellus, as this is perceived as a place for business students only.”

One of the interviewees stated that a significant impact had been gained since more resources to communication was received last year. Also, one of the interviewees stated that the impact of word-of-mouth is clearly seen in the increase of interest from more students and from larger variety of study fields, which was seen positive. In general, the lack of effective communication does not seem to be due to lack of capabilities in any of the organizations, but merely bound to narrow resources or other challenges.

Concerning the external communication, cooperating with the University’s communication department was expressed to be challenging:

“Co-operation with our communications department is challenging, it is extremely challenging to get a message through to whole university, nearly impossible -...- one has to go through long negotiations -...- but it seems like an impossible task.”

The underlying reasons to the difficultness seem unclear. As integrating entrepreneurship education to study programs in different faculties is part of Oulu University’s strategy for years 2016-2020, this notion of difficulties in co-operation seem surprising and could be a sign of poor acknowledgement and implementation of actions putting the strategy into practice.

Lack of motivation of Finnish students was stated also one of the major reasons hindering the participation of students. It seems that Finnish students do not consider the benefits of joining to outweigh the time and effort required by complementing the programs. Some of the activities enable students to gather study credits, which is noted to positively affect the likelihood of joining, but otherwise the benefits are considered small or they are not understood.

“Maybe they (the students) are from those kinds of fields that they do not understand entrepreneurship or its possibilities -...- as we are an engineer society, we just go and work, but whatever studies you look, they state that working life is changing and more and more people are employing themselves.”

“No one tells at the beginning of studies, that the teacher path is like this, but have you considered that with this kind of knowledge and capabilities you have this collateral path, which enables you doing this and this kind of stuff.”

In general, it was stated that Finnish students are not active in engaging to activities external to their mandatory studies. Some of the interviewees expressed that foreign students from certain cultures are accustomed to higher levels of competition, which is why dissociation from others by being active in these kinds of activities motivates them to join. Also, working through group work and ability to work with real-life companies and problems is rare to many international studies providing them with unique chance as for Finnish students the forms in which the activities are conducted are much more common.

Some of the interviewees expressed that universities should conduct more co-operation with vocational school and upper secondary school so that the first steps towards understanding entrepreneurship as a phenomenon would be taken already before entering the university. Also, the general atmosphere of discussions around entrepreneurship faced criticism:

“This higher education is like the final stop of education so what we do before that is critical in order for us to concentrate here on other things.”

“It does not happen just by snapping your fingers and that everyone starting at the University of Oulu participates in Future Factory where you are entrepreneurial for like a day. It does not change anyone’s perceptions and it can create reverse reaction quite easily.”

“Maybe the wording (of entrepreneurship) that it is not scary. In general, in Finland the attitudes towards entrepreneurship, it goes wrong already there.”

Scheduling was brought up also as one hindering factor as many students have difficulties either in fitting the entrepreneurship studies taking place during working hours to their study programs or then entrepreneurship studies not fitting to their curricula in such way that would enable them participating without these studies being something extra meaning that they are additional to other studies. Most of the programs are now scheduled to evenings or weekends and the entrepreneurship minor program aims at establishing some courses online in the future making it easier for students to study at their own time and own pace making it easier to participate.

Last thing brought up as a minor challenge possibly hindering the engagement of students was the **fuzziness and buzz** around the entrepreneurship activities and the terminology itself. Entrepreneurial activities seem to be perceived by some as activities that are doing little to nothing and are just doing something for the sake of doing things. The interviewees brought up that certain stigma around the entrepreneurial activities can be noted:

“When you talk to some people that have never been to Tellus, even though it is right in the centre of the university, well it tells something about this bubble that exists there.”

“-...- Tellus is considered as a place, where only business students are allowed to come”

“These probably show up to students as little fuzzy.”

“The buzz is perceived that one just waves hands and does nothing, but if going deeper one sees that actually quite many things are done there. It is just that when you don't have the knowledge and awareness -...-.”

In general, some of the interviewees stated that room from branding and creating favourable perceptions exists, but it requires more resources. One of the interviewees stated that after their programs have now been running for a couple of years, lessons have been learned and things are done better, their status and reputation have increased. This could be assumed possible also for other organizations specially as

they have stated their operations having now found a solid base and programs have developed to their best versions so far.

In addition to these challenges related to reaching Finnish students, some of the interviewees expressed **reaching of the companies** and **high concentration of knowledge to one person** as challenges that could actually form problems in the future. One of the interviewees expressed that major part of the companies recruited to the programs was relying on personal networks and relationships of one person. In case of the core person leaving the organization, the problem of reaching and engaging companies would most likely emerge:

“-...- it is the networks, like what happens if I go away? These things are very person bound and then it means that the operations are quite fragile -...- they are my networks, even if I would give names it does not help much if someone else takes contact”

Last challenge brought up by some of the interviewees was **bringing the two higher education institutions to the same campus** as the OUAS starts its operations at Linnanmaa Campus in 2020 adding the number of students at Linnanmaa campus by 4000-6000 students. Some of the interviewees stated that the impact of this change is most probably minimal as their operations are already stable. Other organizations such as UIC expressed that certain insecurity and challenge may be related to the change, as the services of UIC should cover both schools in the future. The nature and level of studies and research was expressed to be that differing from the ones at the University of Oulu that applicability of current operations as such was questioned by some of the interviewees. Moving of OUAS to the facilities of University of Oulu revealed also certain level of misinformation that had not been yet cleared, but that was assumed to be only a short-term issue. The above described challenges are summarized in table 5.

Table 5. Main challenges of operations.

Main challenges found
Difficulty of reaching Finnish students and disproportion in the number of Finnish students compared to international students
English language forming a barrier for participation of Finnish students
External communication, difficulties in co-operation with university communication department
Lack of motivation of Finnish students
Scheduling issues and non-flexible study program structures
Credibility issues, fuzziness and buzz around the activities
High concentration of knowledge to single individuals
Moving of Oulu University of Applied Sciences to Linnanmaa Campus in 2020

As it can be noted from the results, most of the challenges identified in this study are shared by most or all of the organizations interviewed. It could be stated based on this that the challenges faced by the organizations may be typical for these types of activities and in the context of Finnish educational system and general attitude towards entrepreneurship and employment. For the continuation of the activities and programmes, the problems in reaching and engaging Finnish students could be stated as the most critical ones if evaluating the performance of the activities from the viewpoint of regional development and contribution. In its current form the network could be stated providing valuable and high quality education that is leaked to other countries as exchange students are international students are over represented among the participants.

In addition to reaching and engaging the Finnish students, more precise measurement of outputs of the activities and programmes may become needed in the future, so that better understanding of the actual outcomes of the activities is received, which further justifies continuation of the activities as well as could reveal possible further points for development.

As most of the organizations share the same obstacles for increased, more efficient or optimal performance, the importance of co-operation is emphasized as solutions for the challenges could be solved more easily while working together and solutions could be shared with all the organizations.

6 CONCLUSION

This chapter summarizes the key results of this study and discusses the key contributions the study provides. Also, assessment of the study and conducting the research process are presented. Suggestions for future research are provided at the end of this chapter.

6.1 Key results

From the detailed results and analysis presented in the previous chapter it can be concluded that entrepreneurship education and other forms of conducting the entrepreneurial university concept at the University of Oulu form a solid and stable networked entity that after few years of operations has now adopted the best practices from various iterative phases and settled into somewhat solid and stable state. A certain type of internal ecosystem has been established inside the university, in which the Tellus Innovation Arena at the heart of the university serves as an implementation arena and hub for the various activities. Individual organizations and activities among the network have avoided providing services and activities that are overlapping, but that are merely complementary, which increases also effective use of resources.

From the data and results it can be stated that the meaning and importance of engaging in entrepreneurial activities at university level is understood by the university management, which is seen in the form of funding provided by the university, promise and allowance to recruit more people to operations in case they manage to scale up their operations and the flexibility and freedom of implementation reflecting understanding of uniqueness related to the topic that differs from the traditional manners that are perceived more inflexible.

Despite the theoretical baseline given to entrepreneurial university and entrepreneurship education that ultimately aims at increasing entrepreneurial activity on regional and national level, major part of the entrepreneurial activities at the University of Oulu aim at something else than straight education and generating of future entrepreneurs. Even though entrepreneurship education can be implemented in various ways, it could be argued whether the goals set for these operations are too

loose and if they lack ambiguity and hence do not managed to deliver the societal benefits expected from them or utilize their full potential. At the moment the activities are mostly defined by the goal of developing one's working life capabilities and self-awareness, which are good goals as such, but their contribution to future entrepreneurial activity may be criticized and questioned at least as long the measurement of impacts and actual outcomes remains poor. Even though existing education may contribute strongly to development of individuals, it may be argued that as such the system does not provide enough return on investments or that if focusing solely on enhancing students' working life skills and capabilities, less resource intensive approaches could possibly be found.

If entrepreneurial university and actions conducted within it are defined as contribution to regional and national economic growth and increasing entrepreneurial activity in a society, the current form of actions may not be an efficient producer to meet these goals. It could be argued that more knowledge and understanding about the phenomenon of start-ups and high growth ventures and their impact should be provided to people in charge of planning and conducting these programs, so that adopting the societal role would be enhanced further and the goals concerning actual outcomes would be set higher.

Also, concerning the regional contribution, the lack of participation of Finnish students may become a problem in the future. If provided funding is bound to results generated, the disproportionate distribution of Finnish and international students may lead to declined funding placing continuing the operations a threat. If looking purely from the regional development perspective, funding these programs may not be justified if the generated knowledge leaks out and does not stay in Finland. From a broader and more global viewpoint the information leak may provide positive results in the long run, as the high number of international students participating in these programs may enhance formation of skilled professional networks and global ventures receiving skilled and growth-minded workforce.

To summarize and to answer the main research question, the current state of the entrepreneurship education and more largely the entrepreneurial network established in and around the University of Oulu can be stated to be at good level and showing multiple good characteristics. Organizations have found their positions and stable

practises and each of them express engaging a continuously increasing number of students and reaching more students from various study fields. This is a positive direction as the current number of participants forms only a minor fraction of all the around 16 000 students of the university and potential for scaling up the operations exists.

Organizations and programs have found their focus areas and no overlapping activities exists, but the activities are merely complementary with each other, providing the students with diverse possibilities to increase their entrepreneurial knowledge and capabilities. This spread of the organizations and activities may be stated to result also in an efficient use of resources. Representatives of organisations also expressed that increase in credibility in the eyes of both students and other institutions in the region is clearly seen, which has a positive impact on the future development of the operations. Organizations and their representative themselves are optimistic about the future and the development as individuals and as a network.

Even though some of the organizations expressed minor levels of hesitation concerning the moving of Oulu University of Applied Sciences to the same facilities with University of Oulu in 2020, the impacts of this approaching change were not described as threatening or worrying to current operations. In general, this study provides the organizations with possibilities to recognize common challenges and hindering factors enabling them to further develop their operations and provide better outcomes.

6.2 Contribution of the study

The purpose of this study has been to conduct a current state analysis of entrepreneurship education at the University of Oulu, provide comprehensive and timely information about the current state and reveal what are the success factors and possible challenges hindering the successful implementation of activities. The received results have been then reflected with earlier research about entrepreneurial university and entrepreneurship education. The target group of this research has been the different programmes and organizations contributing somehow to entrepreneurship education and entrepreneurial activities at the University of Oulu, either actually being part of the University or operating at the facilities provided by

the university and with students of the university. Some of the organizations operate also at the Oulu University of Applied Sciences, but the scope of this research has been only at the network operating in the context of Oulu University.

This study supports earlier findings concerning research about entrepreneurial university and entrepreneurship education by revealing that entrepreneurial activities are characterised by challenges in planning the activities suitable for highly heterogeneous group of students, difficulty of measurement and long-term evaluation of results and impact of the activities. Due to the certain blurriness and generic defining of goals and difficulty to define what entrepreneurship education and activities are exactly, it seems difficult to define what to measure, how to measure and how to distinguish and recognize which results are due to contribution by entrepreneurial activities and which by general education, issue highly noted also in earlier studies (see O'Connor 2013). Also, in the light of earlier research, the lacking or poor implementation of measurement triggers criticism as the impact of these educational programs remains unclear and justification for conducting such programs is not received, which might form a challenge for some of the programs also at the University of Oulu.

The study contributes to earlier research also by highlighting that successful planning and implementation of entrepreneurial activities and entrepreneurship education requires comprehensive understanding about entrepreneurship, entrepreneurial university and entrepreneurship education in larger context. If aiming at contributing to regional or national development and increasing entrepreneurial activity, the core of entrepreneurship and impact of different types of enterprises should be better understood. In its current form it could be argued whether some of the activities and education programs labelled as entrepreneurship education actually resemble with core of entrepreneurial education or better reflect with general enhancing of working life skills and capabilities. As it was brought up in the data, naming of study programs was considered also from the viewpoint of them being attractive to students, even though from a critical viewpoint the contents would not be aligned with the given name. Some differences were also noticed in how the English term "education" was perceived when translated into Finnish, even though the impact of this finding to planning and implementation of the activities could not be evaluated in this study.

As this research is context bound, the results are not generalizable to other similar networks or ecosystems, but the results of this research can be used as benchmark both when similar studies are conducted elsewhere, and similar programmes are planned and implemented. Despite the non-generalizability of the results, this study contributes to existing research by providing support to some of the earlier findings as well as revealing new interesting notions that could be studied further to receive greater understanding of the factors hindering successful implementation. Suggestions for future research are proposed at the end of this chapter.

In addition to the theoretical side, this study provides practical contributions for the case organizations by providing understanding about the background of entrepreneurial university and entrepreneurship education and illustrating the current state of the operations in a networked level. The study reveals and highlights the issues that should receive more attention in order to further develop and improve the operations. Many of the interviewees expressed that working intensively among the topic has created a bubble, which is why someone being able to examine the operations through objective lenses and from external perspective was expressed highly valuable. In larger perspective, the study provides valuable information in regional context about the contents and success of the programs and hopefully brings the organizations and other contributing institutions to closer co-operation. High levels of interest towards the results of this study have been expressed from various people and conducting this study has been expressed needed and valuable. Author of this research has been asked already during the study process to present the final results to an entrepreneurship interest group in Oulu emphasizing the extent of interest the results of this study have.

6.3 Assessment and limitations of the study

The validity of this research can be stated to be at good level due to careful interviewee selection and question formation and ability to conduct interviews as planned. The number of interviewees is rather small due to the fact that one of the interviewees has been simultaneously in charge of two different operations having now moved to a new position, and due to experience of this person, she was concerned the best one to provide information concerning the operations both in the previous position as well as concerning the new position.. All the interviewees had

been in their positions for a reasonable amount of time and were experienced in their positions being able to provide accurate and valid information.

In addition to the careful interviewee selection, all the interviewees expressed the topic being valid and interesting, which was seen in high involvement, reasonable and abundant time for conducting the interviews as well as making sure all the needed information was received and offering to respond to any further questions via phone or email, which can be seen enhancing the validity of the study as data could have been concluded later, if needed. The original plan was to interview more than one person from some organizations, but during the interviews the number of interviewees was decided to be limited as the experience and interest of the interviewees enabled the author to gather excessive and detailed data increasing the likelihood of the data saturation if additional interviews would have been conducted as well as the likelihood of additional interviews not providing new ideas valuable for this study. Also, the interest of the interviewees towards the topic created a comfortable and discussing atmosphere so making detailed questions of issues that were not immediately understood was possible guaranteeing that any misunderstanding was eliminated from the interviews.

As the study aims at mapping out the current state of activities and examining the operating of individual organizations, it could be argued that the validity of the study is threatened by the endeavour of the interviewees to give polished and favourable answers biasing the results. This was considered in the formation of questions so that some strict and straight forward questions concerning for example the number of participants and challenges of operations were included so that receiving this information would not be relied on interviewee openly and independently bringing up the issues. In general, the interviewees openly admitted and expressed the challenges they face and implied that the results of this research could provide valuable information for them, so the threat of polished answers biasing the results should not be considered affecting the validity negatively.

In qualitative studies the researcher is often involved in the data gathering process and the analysis is author-driven, which is why objectivity of the author should always be questioned when evaluating the quality of the study. Concerning this study, the author has no previous experience about the programs and activities

covered in this research nor has the author ever participated in any of the named activities. Additionally, author has no personal or professional ties to the interviewees, which could have impact on conducting the interviews. These things combined, the author being entirely external to the activities can be stated to increase the objectivity and hence the quality of this study.

As the study is a qualitative case study, assessing the reliability according to the definition given to it is difficult as no two same cases exist (Hirsjärvi, Remes & Sajavaara, 2003, 214). The problem of assessing reliability has been tackled by providing a detailed description of the whole data gathering process, as well as explanation concerning handling of the data and the analysis method used in this study to provide a high level of transparency in the work. The detailed description of the research process is presented in chapter 4.2.

The extent, diversity and complexity of the topics of entrepreneurship and entrepreneurship education placed conducting the research with a minor yet interesting challenge. Constructing the literature review about the topic might not be the easiest task due to high levels of disagreement and complexity concerning even the basic concepts. The field of entrepreneurship consists of vast amount of research in which the skills and ability of the author to approach scientific journals and skim through them properly was easing the process. On the other hand, entrepreneurship education being a much younger field of research required more extensive information search to be able to find reliable and high-quality information about the topic.

As various streams of research are constructed around the topic, narrowing down the topic and carefully focusing on chosen issues was required. The second chapter focusing on describing entrepreneurship as a phenomenon and its economic and societal impacts is extensive and lengthy, but it was considered necessary in order to get a comprehensive understanding about the nature and impact of the phenomenon providing also reasoning and justification for the whole phenomenon of entrepreneurial education and ability to reflect the current state of the activities at the University of Oulu with what is known from the previous research. As it was seen from the results of the study, most of the education has a focus on enhancing work life competencies instead of aiming at generating future entrepreneurs, which reveals

that more information about the vast importance and nature of entrepreneurship and generating future entrepreneurs is needed.

Even though literature clearly identifies the almost superior employment power of gazelles, none of the organizations or activities expressed any signal of high ambiguity in contributing to general employment on national level through generating of new entrepreneurs. By providing in depth understanding about the impact and nature of entrepreneurship, hopefully in the future the goal of some of these programs is more clearly expressed and shows higher ambiguity in contributing to increased entrepreneurial activity. From the viewpoint of value and utilization of this study, the comprehensive examination of entrepreneurship in the second chapter was considered justified and needed.

The process of conducting this research has been pleasant and somewhat easier than anticipated. Author's other obligations in school and work emerged some time restrictions, but with careful time management and organizing it did not form an issue. Master's thesis is often described as a giant and challenging task, but due to analytical and descriptive nature of master studies in this field, conducting this research was only an extension of already existing skills and much of the work was similar to previous school work, just in a larger extent and with greater possibilities for deepening the already existing skills with a more challenging topic.

The practical utility of the topic for multiple different parties has been a motivational factor for conducting this study as there are many organizations and groups that find the topic valid and are interested in the results. Conducting this research with high quality enables all the parties individually and together receive valuable information that enables them to improve their operations and provide better education and outcomes in the future. Propose of one of the interviewees to later present the findings to an entrepreneurship interest group confirmed the impact of this study, which is why conducting this thesis has felt meaningful.

6.4 Suggestions for future research

This study reveals the high demand for further research in the field and the variety of potential research streams around the topic, which is aligned with the general

agreement in academia that entrepreneurship education still requires more research. In order to enhance the activity of Finnish students, which can be seen essential for the future operations and regional contribution, it should be understood what the hindering factors are preventing their participation and hence, further study about the topic is advisory. Also, the general attitudes of university students towards entrepreneurship education could be examined and the sources where the negative or withering attitudes stem from. The higher fraction of international students in entrepreneurship studies implies potential information leak, which is why focus on Finnish students should receive more interest. Future research could also focus on long-term follow-up of graduates that have completed some entrepreneurship studies in order to examine its long-term impact on entrepreneurial intentions and activity. Employment of the graduates could be also studied to see whether involvement in entrepreneurship education has an impact on the graduate employment. Lastly, the measurement of results in current programs requires also support, emphasizing the need for longevity in research.

In general, more research is still needed in the field of entrepreneurship education in order to be able to successfully plan, implement and measure entrepreneurship education programs and better plan successful innovation enhancing policies at higher education institutions.

REFERENCES

- Abu-Saifan, S. (2012). Social entrepreneurship: Definition and boundaries. *Technology Innovation Management Review*, 2(2): 22-27.
- Acs, Z., Parsons, W. & Tracy, S. (2008). *High-Impact Firms: Gazelles Revisited*. Washington, DC.
- Alasuutari, P. (2011). *Laadullinen tutkimus 2.0*. Vastapaino. Tampere. 4th edition.
- Anderson, A. & Jack, S. (2008). Role typologies for enterprising education: the professional artisan? *Journal of Small Business and Enterprise Development*, 15(2), 259-273.
- Audretsch, D. & Thurik, A. R. (2001). What's new about the new economy? Sources of growth in the managed and entrepreneurial economies. *Industrial and Corporate Change*, 10, (1), 267-315.
- Audretsch, D. (2014). From the entrepreneurial university to the university of the entrepreneurial society. *Journal of Technology Transfer*, 39(3), 313-321.
- Autio, E., Keeley, R., Klofsten, M., Parker, G. & Hay, M. (2001). Entrepreneurial intent among students in Scandinavia and in the USA. *Enterprise and Innovation Management Studies*, 2(2), 145-160.
- Autio, E., Kenney, M., Mustar, P., Siegel, D. & Wright, M. (2014). Entrepreneurial innovation: The importance of context. *Research Policy* 43(7)1097-1108.
- Brown, R. (2016). Mission impossible? Entrepreneurial universities and peripheral regional innovation systems. *Industry and Innovation*, 23(2), 189-205.
- Carland, J., Hoy, F., Boulton, W. & Carland, J. (1984). Differentiating entrepreneurs from small business owners: A conceptualization. *Academy of Management Review*, 9(2), 354-359.
- Carlsson, B. (1992). *The rise of small businesses: Causes and consequences. Singular Europe, Economy and Policy of the European Community After 1992*, 145.
- Carree, M. & Thurik, R. (2003). The impact of entrepreneurship on economic growth. In *Handbook of Entrepreneurship Research* (557-594). New York: Springer.
- Centobelli, P., Cerchione, P., Esposito, E. & Shashi. (2019). Exploration and exploitation in the development of more entrepreneurial universities: A twisting learning path model of ambidexterity. *Technological Forecasting & Social Change* 141,172-194.
- Collini, S. (2012). *What Are Universities for?* London: Penguin.

- Cramer, J., Hartog, J., Jonker, N. & Van Praag, C. (2002). Low risk aversion encourages the choice for entrepreneurship: an empirical test of a truism. *Journal of Economic Behaviour & Organization*, 48(1), 29-36.
- Cunningham, J. & Lischeron, J. (1991). Defining Entrepreneurship. *Journal of Small Business Management*, 29(1), 45-61.
- Dawson, C, & Henley, A. (2012). “Push” versus “pull” entrepreneurship: an ambiguous distinction? *International Journal of Behaviour and Research*, 18(6), 697-719.
- D’Este, P. & Perkmann M. (2011). Why do academics engage with industry? The entrepreneurial university and individual motivations. *The Journal of Technology Transfer*, 36(3), 316-339.
- Douglas, E. & Shepherd, D. (1999). Entrepreneurship as a utility maximizing response. *Journal of Business Venturing*, 15(3), 231-251.
- Douglas, E. & Shepherd, D. (2002). Self-employment as a career choice: Attitudes, entrepreneurial intentions and utility maximization. *Entrepreneurial Theory and Practice*, 26(3), 81-90.
- Etzkowitz, H., Webster, A., Gebhardt, C. & Terra, B. (2000). The future of the university and the university of the future: Evolution of ivory tower to entrepreneurial paradigm. *Research Policy*, 29(2), 313-300.
- Etzkowitz, H. & Leydesdorff, L. (2000). The dynamic of innovation: from national systems and “Mode 2” to a Triple Helix of university-industry-government relations. *Research Policy*, 29 (2), 109-123.
- Etzkowitz, H. (2017). Innovation lodestar: The entrepreneurial university in a stellar knowledge firmament. *Technological Forecasting and Societal Change*, 123, 122-129.
- Etzkowitz, H., Germain-Alamartine, E., Keel, J., Kumar, C., Smith K. & Albats, E. (2019). Entrepreneurial university dynamics: Structured ambivalence, relative deprecation and institution-formation in the Stanford innovation system. *Technological Forecasting and Social Change*, 141, 159-171.
- Fayolle, A., Gailly, B. & Lassas-Clerc, N. (2006). Assessing the impact of entrepreneurship education programmes: a new methodology. *Journal of European Industrial Training*, 30(9), 701-720.
- Gartner, W. (1990). What are we talking about when we talk about entrepreneurship? *Journal of Business Venturing* 5(1), 15-28.
- Guerrero, M. & Urbano, D. (2012). The development of an entrepreneurial university. *The Journal of Technology Transfer* 37(1), 43-74.
- Hannon, P. (2006). Teaching pigeons to dance: sense and meaning in entrepreneurship education. *Education + Training*, 48(5), 296-308.

- Hébert, R. & Link, A. (1989). In search of the meaning of entrepreneurship. *Small Business Economics* 1(1), 39-49.
- Henrekson, M. & Johansson, D. (2009). Gazelles as job creators: a survey and interpretation of the evidence. *Small Business Economics*, 35(2), 227-244.
- Hirsjärvi, S.; Remes, P. & Sajavaara, P. (2003). *Tutki ja kirjoita*. Helsinki: Kustannusosakeyhtiö Tammi. 6.-9. edition.
- Hytti, U. & O’Gorman, C. (2004). What is “enterprise education”? An analysis of the objectives and method of enterprise education programmes in four European countries. *Education + Training*, 46(1), 11-23.
- Johnson, D. (2001). What is innovation and entrepreneurship? Lessons for larger organisations. *Industrial and Commercial Training*, 33(4), 135-140
- Katz, J. (2003), Chronology and intellectual trajectory of American entrepreneurship education 1876-1999. *Journal of Business Venturing*, 18(2), 283-300.
- Klosten, M., Fayolle, A., Guerrero, M., Mian, S., Urbano, D. & Wright, M. (2019). The entrepreneurial university as driver for economic growth and social change – Key strategic challenges. *Technological Forecasting & Social Change* 141, 149-158.
- Koellinger, P. & Thurik, R. (2012). Entrepreneurship and the business cycle. *The Review of Economics and Statistics*, 94(4), 1143-1156.
- Krimsky, S. (1991). Academic-corporate ties in biotechnology: a quantitative study. *Science Technology and Human Values* 16(3), 275-287.
- Lam, A. (2010). From “Ivory tower traditionalists” to “Entrepreneurial scientists”? Academic scientists in fuzzy university-industry boundaries. *Social Studies of Science* 40(2), 307-340.
- Light, P.C. (2006). Reshaping Social Entrepreneurship. *Stanford Social Innovation Review*. 4(3), 47-51.
- Litwin, A. & Phan, P. (2013). Quality over quantity: Reexamining the link between entrepreneurship and job creation. *ILR Review*, 66(4), 833–873.
- Long, W. (1983). The meaning of entrepreneurship. *American Journal of Small Business*, 8(2), 47-59.
- Martin, R. & Osberg, S. (2007). Social entrepreneurship: The case for definition. *Stanford Social Innovation Review*.
- Martinez, A. C., Levie, J., Kelley, D. J., Sæmundsson, R.J., Schøtt, T. (2010). Global entrepreneurship monitor special report: A global perspective on entrepreneurship education and training.

- Matlay, H. (2008). The impact of entrepreneurship education on entrepreneurial outcomes. *Journal of Small Business and Enterprise Development*, 15(2), 382-396.
- McClelland, D.C. (1967). *The Achieving Society*. New York: Free Press. 9th edition.
- Metsämuuronen, J. (2000). *Laadullisen tutkimuksen perusteet. Metodologia-sarja 4*. International Methelp. Helsinki.
- Miller, K., McAdam, R. & McAdam, M. (2018). A systematic literature review of university technology transfer from quadruple helix perspective: toward a research agenda. *R&D Management*, 48(1), 7-24.
- Nabi, G., Linan, F. (2013). Considering business start-up in recession time. The role of risk perception and economic context in shaping the entrepreneurial intent. *International Journal of Entrepreneurial Behaviour & Research*, 19(6), 633-655.
- Neck, H. & Greene, P. (2011). Entrepreneurship education: Known worlds and new frontiers. *Journal of Small Business Management*, 49(1), 55-70
- O'Connor, A. (2013). A conceptual framework for entrepreneurship education policy: Meeting government and economic purposes. *Journal of Business Venturing* 28(4), 546-563.
- Oosterbeek, H., Van Praag, M. & Ijsselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review* 54(3), 442-454.
- Packham, G., Jones, P., Miller, C., Pickernell, D. & Thomas, B. (2010). Attitudes towards entrepreneurship education: a comparative analysis. *Education + Training* 52(8), 568-586.
- Parker, S. & van Praag, M. (2006). Schooling, capital constraints and entrepreneurial performance. *Journal of Business and Economic Statistics* 24(4), 416-431.
- Parker, S., Storey, D. & van Witteloostuijn, A. (2010). What happens to gazelles? The importance of dynamic management strategy. *Small Business Economics* 35(2), 203-226.
- Pittaway, L. & Cope, J. (2007). Entrepreneurship education: A systematic review of the evidence. *International Small Business Journal*, 25(5), 479-510.
- Rauch, A. & Frese, M. (2000). Psychological approaches to entrepreneurial success: A general model and an overview of findings. *International Review of Industrial and Organizational Psychology*, 15, 101-142).
- Schumpeter, J. A. (2017). *The Theory of Economic Development*. New York: Routledge.
- Shane, S. & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217-226.

- Slaughter, S., & Leslie, L.L. (1997). *Academic capitalism: Politics, policies, and the entrepreneurial university*. Baltimore, MD: The Johns Hopkins University Press.
- Soetanto, D. & van Geenhuizen, M. (2019). Life after incubation: The impact of entrepreneurial universities on the long-term performance of their spin-offs. *Technological Forecasting & Social Change* 141, 263-276.
- Stel, A., Carree, M. & Thurik, R. (2005). The effect of entrepreneurial activity on national economic growth. *Small Business Economics*, 24(3), 311-321.
- Suomen virallinen tilasto (SVT): Aloittaneet ja lopettaneet yritykset [online publication]. ISSN=1797-0660. Helsinki: Tilastokeskus [cited: 9.11.2018]. https://www.stat.fi/til/aly/2018/02/aly_2018_02_2018-10-25_tie_001_fi.html
- Thurik, R. (2009). Entrepreneuromics: Entrepreneurship, economic growth and policy. *Entrepreneurship, Growth and Public Policy*, 219-249.
- Thurik, R; Carree, M., van Stel, A. & Audretsch, D. (2008). Does self-employment reduce unemployment? *Journal of Business Venturing* 23(6), 673-686.
- Timmons, J. & Spinelli, S. (2008). *New venture creation: Entrepreneurship for the 21st century*. Boston: McGraw-Hill/Irwin. 9th edition.
- Tuomi, J. & Sarajärvi, A. (2018). *Laadullinen tutkimus ja sisällönanalyysi*. Helsinki: Kustannusosakeyhtiö Tammi.
- Tuunainen, J. & Knuutila, T. (2009). Intermingling academic and business activities. A new direction for science and universities? *Science, Technology and Human Values*, 34(6), 684-704.
- Van Praag, M. & Versloot, P. (2008). The economic benefits and costs of entrepreneurship: A review of the research. *Foundations and Trends in Theoretical Computer Science*, 4(2), 65-154.
- Van. Praag, M. & Versloot, P. (2007). What is the value of entrepreneurship? A review of recent research. *Small Business Economics*, 29(4), 351-282.
- Verheul, I., Wennekers, S., Audretsch, D., Thurik, R. (2001). An eclectic theory of entrepreneurship. In *Entrepreneurship: Determinants and policy in a European-US comparison*, 11-81. Boston, MA: Springer.