



Katja Lahikainen

THE EMERGENCE OF A UNIVERSITY-BASED ENTREPRENEURSHIP ECOSYSTEM



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- Supervisors Professor Timo Pihkala
LUT School of Engineering Science
Lappeenranta-Lahti University of Technology LUT
Finland
- Associate Professor Elena Oikkonen
LUT School of Engineering Science
Lappeenranta-Lahti University of Technology LUT
Finland
- Reviewers Professor Vesa Puhakka
Department of Department of Marketing, Management and International
Business, Oulu Business School
University of Oulu
Finland
- Doctor of Science Elina Varamäki
Vice President, Docent
Seinäjäki University of Applied Sciences
Finland
- Opponent Professor Vesa Puhakka
Department of Department of Marketing, Management and International
Business, Oulu Business School
University of Oulu
Finland

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Abstract

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This thesis investigates the emergence of a university-based entrepreneurship ecosystem (U-BEE). Research on universities as entrepreneurial ecosystems is emerging, and more research is called for to investigate different ecosystem components and interaction mechanisms within an ecosystem. This study addresses this need by providing a nuanced understanding of the perspectives of a variety of ecosystem actors from different institutional backgrounds, and therefore with different motives to engage in U-BEE.

The main objective of this research is to understand the emergence of a university-based entrepreneurship ecosystem (U-BEE) from the viewpoint of different actors. There are four research questions posed in this thesis: 1) How do the expectations of policymakers shape the emergent U-BEEs? 2) What are the motives of different actors to engage in U-BEEs? 3) How do different actors engage with the emerging U-BEEs? 4) How do different actors perceive the university as a catalyst for entrepreneurship? This thesis utilises a mixed methods approach by applying both qualitative and quantitative research methods. In order to gain a holistic and nuanced understanding of the emerging U-BEE, the empirical part of this thesis is largely based on a case-study methodology. The case studies are complemented by quantitative research based on a large student survey.

The findings of this thesis indicate that even if a university highlights a broad range of entrepreneurial actions in its strategic mission, entrepreneurship tends to be associated with research commercialisation. Among university actors, the decoupling of entrepreneurial activities stems from this narrow interpretation of entrepreneurship. This viewpoint further enhances the fragmentation of entrepreneurial activities and the formation of distinct groups that operate in their own silos. Fragmentation and a lack of interaction between different stakeholders lead to a weak U-BEE in terms of network strength. A U-BEE can be strengthened by engaging different actors in the U-BEE and by clearly communicating the university's entrepreneurial mission to internal and external stakeholders.

Keywords: university-based entrepreneurship ecosystem, entrepreneurial university, entrepreneurial ecosystem, institutional logics

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Katja Lahikainen
May 2021
Lappeenranta, Finland

To my children Arttu and Iida.

Dream big.

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List of publications

This dissertation is based on the following papers. The rights have been granted by the publishers to include the papers in the dissertation.

- I. Lahikainen, K., Pihkala, T., and Ruskovaara, E. (2019). European approaches to enterprise education. In: Turner, J. J., and Mulholland, G., eds., *International Enterprise Education: Perspectives on Theory and Practice*. London: Routledge, pp. 1-23.
- II. Lahikainen, K., Kolhinen, J., Ruskovaara, E. and Pihkala, T. (2019). Challenges to the development of an entrepreneurial university ecosystem: The case of a Finnish university campus. *Industry and Higher Education*, 33(2), pp. 96-107.
- III. Lahikainen, K. (2020). Understanding the emergence of the university-based entrepreneurial ecosystem: Comparing the university and company actors' perspectives. In: Laveren, E., ed., *Sustainable Entrepreneurship and Entrepreneurial ecosystems: Frontiers in European Entrepreneurship Research*. Cheltenham, UK, Northampton, MA: Edward Elgar Publishing, pp. 92-111.
- IV. Lahikainen, K., Pihkala, T., and Ruskovaara, E. (2019). High hopes: Regional policy expectations for the entrepreneurial university. In: Daniel A.D., Teixeira, A. A. C. and Preto M. T., eds., *Examining the Role of Entrepreneurial Universities in Regional Development*. IGI Global, pp. 286-301.
- V. Lahikainen, K., Peltonen, K., and Ruskovaara, E. (2019). Students' perceptions of the entrepreneurial culture in Finnish higher education institutions. Conference article. In: RENT XXXIII Conference: "Embracing uncertainty: entrepreneurship as a key capability for the 21st century", ISSN 2219-5572. Berlin, November 2019.

Author's contribution

Publication I: All authors contributed equally to designing and writing the paper.

Publication II: I was the principal author and investigator. I collected the data that was analysed in collaboration with the co-authors. The conclusions were joint efforts with the co-authors.

Publication III: I was the sole author, meaning that I designed, collected, and analysed the data. As an author, I wrote and published the paper.

Publication IV: All authors contributed equally to designing the paper. I collected the data and took the main responsibility for analysing the data and creating the theoretical framework. The conclusions were joint efforts with the co-authors

Publication V: I was the principal author. All authors contributed equally to designing and writing the paper.

List of abbreviations

EC	Entrepreneurial culture
EE	Entrepreneurial ecosystem
HEI	Higher Education Institution
LUT	Lappeenranta-Lahti University of Technology LUT
SME	Small and medium-sized enterprise
STEE	Science and technology entrepreneurship education
TTO	Technology transfer office
U-BEE	University-based entrepreneurship ecosystem

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1 Introduction

1.1 Research background

Due to the increased expectations of the contribution of universities towards innovation, entrepreneurship, competitiveness, and the economic growth of regions, universities are in a state of transformation (Guerrero et al., 2016). Despite the growing importance of the third mission of universities (societal interaction), the university's traditional tasks of teaching and research still dominate. In the current knowledge-based society, which is characterised by rapid changes and uncertainty, universities are in a key position to offer research-based solutions to solve global challenges and to educate a high-quality workforce. Educating knowledgeable employees is acknowledged as a natural role for universities (Wennberg, Wiklund and Wright, 2011), and skilled graduates are one of the most critical mechanisms of knowledge transfer (Bramwell and Wolfe, 2008). However, universities are facing increasing demands for direct technology transfer and new business creation. In a similar vein, current research on entrepreneurial universities is also dominated by technology transfer and research commercialisation (Mascarenhas et al., 2017).

Entrepreneurial universities are expected to contribute to economic and social development independently by utilising the increased autonomy given to universities, but they are still under greater influence from external stakeholders and are responsible to the government (Etzkowitz, 2016). The increased expectations towards third mission activities of universities have caused tensions, since third mission activities are not considered a legitimised duty of universities. Internal tensions stem from trying to do many things that are not considered the main tasks of the university, while external tensions stem from blurry interaction mechanisms between the university and external stakeholders (Benneworth, de Boer and Jongbloed, 2015). The requirements and needs of the multiple stakeholders and the increased importance of the third mission have led universities to apply hybrid organisational models that help them to cope with external pressures and the complexity of different networks and linkages (Jongbloed, 2015). Creating hybrid organisational models requires the alignment of the two institutional logics: academic and market logics (Juusola, 2015, 16-24). Due to the conflict of interests based on these competing institutional logics, universities might have reduced incentives for engagement with small and medium-sized enterprises (SMEs) and for addressing specific economic and social needs of their regions (Sanchez-Barrioluengo, Uyarra and Kitagawa, 2019).

Entrepreneurial ecosystems have gained ground as a context and as a unit of analysis when investigating entrepreneurial universities, since they capture a wide range of relationships with internal and external stakeholders (Belitski and Heron, 2017; Clauss, Moussa and Kesting, 2018; Guerrero et al., 2016). A university-based entrepreneurship ecosystem (U-BEE) offers a lens through which university contributions to regional entrepreneurship and economic development can be examined. The ecosystem

perspective takes into account increased expectations towards universities: Universities are assumed not only to be responsible for teaching and research, but also to engage with regional stakeholders by promoting new commercial or non-commercial knowledge (Huang-Saad, Duval-Couetil and Park, 2018). In U-BEE, all stakeholders should be involved (Rice, Fettes and Greene, 2014). However, in practice, different initiatives, such as entrepreneurship programmes, have focused on supporting either just students or just faculty (Huang-Saad, Fay and Sheridan, 2017).

Consequently, universities need to involve all stakeholders, establish relevant measures for goal setting, and prioritise entrepreneurial actions that acknowledge the needs and desires of different stakeholders within and outside the university (Huang-Saad, Duval-Couetil and Park, 2018). Formal structures can enhance effective collaboration between the university and its regional partners. However, when developing such structures, the attitudes and norms with regard to entrepreneurship at the level of individuals should be considered, since individual views and initiatives can influence university-level functions and policies. These functions and policies, in turn, can have an effect on the functioning of official structures and have an impact on national and regional policies (Foss and Gibson, 2015).

Understanding the emergence and functioning of entrepreneurial ecosystems (EE) can be improved by researching smaller but representative sub-systems of a wider EE (Cavallo, Ghezzi and Balocco, 2018), such as university-based entrepreneurship ecosystems (Fuster et al., 2018; Miller and Acs, 2017). This thesis focuses on deepening the current understanding on the emergence of U-BEES by investigating the motives and behaviours of different actors in an emerging U-BEE.

1.2 Research gaps

This study belongs to the research domain of university-based entrepreneurship ecosystems (U-BEES). The literature on U-BEE has a close relationship with research on entrepreneurial ecosystems, entrepreneurial universities, and university–industry cooperation. These domains partly overlap with the U-BEE literature. Next, the identified research gaps are presented, based on the knowledge needs at the systems level, organisational level, and individual level.

Knowledge needs at the systems level

Research on entrepreneurial ecosystems has gained increased attention among academics. However, research on EEs still lacks conceptual clarity and theoretical frameworks (Alvedalen and Boschma, 2017; Stam, 2015). The current research is focused on investigating the different components that form the ecosystem, but there are not many studies trying to understand the interdependencies between the components (Mack and Mayer, 2016; Roundy, Bradshaw and Brockman, 2018). Moreover, there is not enough understanding of how EEs emerge, their development processes, whether some ecosystem components are more important than others (Alvedalen and Boschma, 2017),

and what kind of impact a weakness in a particular component has on the functioning of an ecosystem as a whole (Cohen, 2006). Resources available in entrepreneurial ecosystems and the strength of social networks between the different actors of entrepreneurial ecosystems are the key determinants in understanding how entrepreneurial ecosystems evolve and transform over time (Spigel and Harrison, 2018). A more nuanced understanding of these interdependencies and their evolution is needed, taking into consideration specific features of different locations (Spigel, 2017). In particular, there is little understanding of the entrepreneurial ecosystems located in regions where the preconditions for entrepreneurial activities are less favourable than in the regions highlighted in success stories, such as Silicon Valley (Mack and Mayer, 2016).

Similarly, as in the general entrepreneurial ecosystem literature, research on university-based entrepreneurship ecosystems lacks understanding of the interrelationships between the different components of U-BEE, and how they are facilitated or prioritised (Huang-Saad, Duval-Couetil and Park, 2018). Literature on U-BEEs is emerging, but hitherto there is little research on the emergence and functioning of U-BEEs. More research is called for, to explore the intersecting perspectives of different ecosystem actors in different contexts (Theodoraki, Messeghem and Rice, 2018). For example, more research is needed to investigate the interactions, underlying interests, and networks between different actors, as well as the outcomes of these interactions in the surrounding region (Guerrero et al., 2016).

Knowledge needs at an organisational level

It is important to understand how resources flow within the ecosystem between different organisations, such as anchor firms that have a key position in the region, high-growth firms, and universities (Spigel and Harrison, 2018). Despite the importance of social relations affecting the emergence and functioning of EEs, current research on EEs is focused on investigating the hard infrastructure and hub organisations that form the ecosystem. For example, the role of universities in technology transfer has received attention in the current literature, but the role of universities as learning organisations connecting universities with businesses for entrepreneurial activity and regional development has been neglected (Pugh et al., 2019).

More research is called for, to investigate entrepreneurial universities from a systems perspective, taking into consideration a broader stakeholder perspective (Clauss, Moussa and Kesting, 2018). A systemic view that includes the broader stakeholder perspective can be captured by analysing universities as part of regional entrepreneurial ecosystems or as university-based entrepreneurship ecosystems (U-BEEs). Companies and students as members of the university community are neglected stakeholder groups in research on entrepreneurial universities. Students' perspectives on entrepreneurial universities and their engagement with entrepreneurial university structures has received little attention in the current literature (Clauss, Moussa and Kesting, 2018). Additionally, in the current literature, there is little knowledge of the interaction between higher education institutions

(HEIs) and the surrounding community. Firstly, more research is called for, to investigate how resources are attained and utilised in an ecosystem, such as among student entrepreneurs and the local community (Björklund and Krueger, 2016). Secondly, there needs to be research on how local policies influence the regional impact of universities (Tripl, Sinozic and Lawton Smith, 2015).

Different institutional backgrounds of the EE actors have seldom been studied in the context of EE (Roundy, 2017), and more nuanced insights from selected universities from different national and institutional contexts are needed (Abreu et al., 2016). Universities may act as a boundary spanning hybrid organisations, or they can form such organisations (Jongbloed, 2015; Shepherd and Woods, 2014). Hybrid organisations may balance the tensions that arise from the competing institutional logics of stakeholders (Roundy, 2017; Shepherd and Woods, 2014). Shepherd and Woods (2014) suggest that underlying competing logics and resistive tension would provide a useful research avenue when exploring academic entrepreneurship, since competing logics and tensions not only restrain actions, but enable innovations and new forms of action. Institutional theory as a conceptual perspective provides a framework within which these tensions and conflicting interests can be studied (Siegel and Wright, 2015). Moreover, Roundy (2017) calls for more research on the effects of the logics of hybrid support organisations in smaller cities and towns.

Knowledge needs at an individual level

Different motives of different ecosystem actors guide their intentions and behaviour in entrepreneurial ecosystems (Roundy, Bradshaw and Brockman, 2018). Furthermore, the intentionality of entrepreneurs and the coherence of entrepreneurial activities influence the emergence of EE (Roundy, Bradshaw and Brockman, 2018). The literature on university–industry collaboration recognises different motivational factors for university and industry actors (Ankrah and AL-Tabbaa, 2015). However, the current research on the knowledge transfer in university–industry collaboration is focused on quantitative studies investigating the phenomenon on a macro level and pays little attention to micro-level constructs such as the motives of individuals (Ankrah et al., 2013). Additionally, the research on individuals as a unit of analysis tends to concentrate on academics, whereas research on the motivation and perspectives from the industry point of view has received considerably less attention (Ankrah et al., 2013; Clauss, Moussa and Kesting, 2018).

In sum, the current literature lacks information on the emergence of U-BEEs. The systems-level research gaps from the emergent U-BEE point of view are related to the interaction mechanisms within U-BEEs, the importance of different ecosystem components and inclusiveness of U-BEEs in terms of resource availability, and the involvement of different actors. At the organisational level, more research is needed to study organisational actors from different institutional backgrounds, and especially the role of the university in entrepreneurial ecosystems in different contexts, particularly in regions which are less favourable for entrepreneurship. The individual-level research

gaps are related to the different institutional backgrounds that influence the motives and behaviours of individuals.

1.3 Research objectives and research questions

To address the aforementioned research gaps, the overall objective of this study is to understand the emergence of a university-based entrepreneurship ecosystem from the viewpoint of different actors. In order to address this objective and identified research gaps on the emergence of entrepreneurship ecosystems (Alvedelen and Boschma, 2017; Mack and Mayer, 2016), four research questions were set. Figure 1 presents the outline of the overall research objective, research questions, and publications.

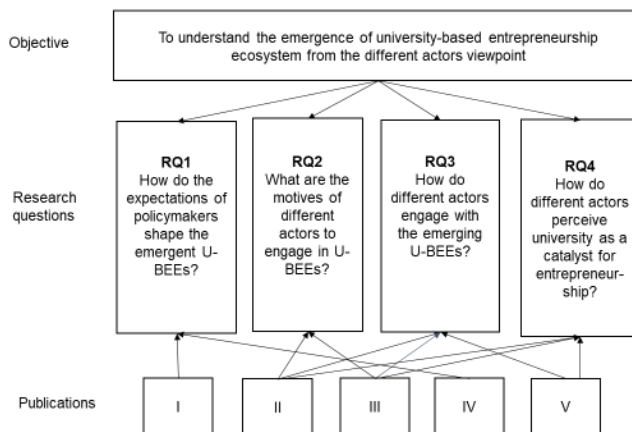


Figure 1. The research objectives and research questions.

RQ1 asks the *How do the expectations of policymakers shape the emergent U-BEEs?* This was explored in Publications I and IV. In Publication I, the influence of the policy is investigated through different national policy initiatives, whereas in Publication IV, policy influence is explored through regional policymakers and regional strategy documents. Thus, RQ1 addresses the knowledge needs on the influence of regional policies on the regional impact of universities (Tripl, Sinozic and Lawton Smith, 2015) and on the role of universities in different regions (Pugh et al., 2019).

RQ2 addresses the research gap on motivational factors of individuals (Ankrah and AL-Tabbaa, 2015), and it asks *What are the motives of different actors to engage in U-BEEs?* The research gap is addressed in Publications II and III by exploring the motives of

academics and company actors that influence their participation in entrepreneurship processes. Publication II concentrates on the university actors' perspectives, and Publication III compares the university and company actors' perspectives, which have received little attention in the current literature (Ankrah et al., 2013; Clauss, Moussa and Kesting, 2018).

Publications II, III, and V address RQ3, which asks *How do different actors engage with the emerging U-BEEs?* The same publications also address RQ4, which asks *How do different actors perceive university as a catalyst for entrepreneurship?* The actors whose perceptions and motivations are explored consist of academics, company actors, and students. RQ3 and RQ4 address the specific knowledge needs on the interrelations of the different components of U-BEE (Guerrero et al., 2016; Huang-Saad, Duval-Coutiel and Park, 2018; Theodoraki, Messeghem and Rice, 2018), including students as stakeholders (Clauss, Moussa and Kesting, 2018).

1.4 Scope and limitations

Universities can be considered to be sub-systems of wider regional entrepreneurial ecosystems (Fuster et al., 2018; Huang-Saad, Duval-Couetil and Park, 2018; Schaeffer and Matt, 2016) or as self-standing university-based entrepreneurship ecosystems (U-BEE) contributing to regional development and interacting with various regional stakeholders (Huang-Saad, Fay and Sheridan, 2017; Miller and Acs, 2017; Rice, Fettes and Greene, 2014). The concept of a self-standing university-based entrepreneurship ecosystem refers to an individual university campus in the sense that it is not part of a broader entrepreneurial ecosystem, but it possesses its own assets that promote entrepreneurship and the emergence of high-growth ventures from the university campus, in interaction with various regional stakeholders (Miller and Acs, 2017).

This thesis focuses on exploring self-standing university-based entrepreneurship ecosystems (U-BEEs), and especially the emergence of U-BEEs. In this study, a U-BEE consists of university staff and students and of all entrepreneurial actions that they take individually or in teams, with or without entrepreneurship support services provided by the university. Most of the entrepreneurial actions and processes take place in collaboration with the surrounding city or region, and this includes actors such as companies, start-ups, policy institutions, incubators, and investors. The local and regional actors may be participants in one or more entrepreneurial ecosystems, including U-BEEs. The focus of this thesis lies in exploring the emergence of U-BEEs, the interactions that take place, and the motives that guide the behaviours of individual actors.

1.5 Definitions

This section provides a brief overview of the key definitions used in this study and clarifies the heterogeneous terminology that is used in the field. A more comprehensive review of the concepts is given in Chapter 2. The key terms that are defined in this section are: academic entrepreneurship, entrepreneurial ecosystem, entrepreneurial university, university-based entrepreneurial ecosystem, and entrepreneurship education ecosystem.

Academic entrepreneurship aims at the commercialisation of research-based innovations, and it includes actions such as patenting, licensing start-up creation, and university-industry partnerships (e.g. collaborative research, contract research, and consulting) (Grimaldi et al., 2011).

According to the following definitions, an *entrepreneurial ecosystem* refers to interconnected actors located in a specific region:

“An interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures.” (Cohen, 2006, p. 3)

“A set of interdependent actors and factors coordinated in such way that they enable productive entrepreneurship.” (Stam, 2015, p. 1765)

“Entrepreneurial ecosystems are combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative start-ups and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assisting high-risk ventures.” (Spigel, 2017, p. 50)

For the *entrepreneurial university*, there are numerous definitions. One of the seminal definitions of an entrepreneurial university was introduced by Clark (1998), highlighting the autonomous position of the university and the organisational change that an entrepreneurial “turn” requires:

“An entrepreneurial university, on its own, seeks to innovate in how it goes to business. It seeks to work out a substantial shift in organisational character so as to arrive at a more promising posture for the future. Entrepreneurial universities seek to become ‘stand-up’ universities that are significant actors in their own terms.” (Clark, 1998, p. 4)

According to another viewpoint, an *entrepreneurial university* is strongly associated with universities’ third mission, namely societal interaction. This refers to universities that have integrated societal interaction in their strategic mission and have adopted economic and social development in their mission in addition to their traditional tasks of teaching and research (Etzkowitz, 2003). This approach is based on a “triple-helix” model, which is a theoretical framework to describe university–industry–government relations

(Etzkowitz et al., 2000). According to this approach, an entrepreneurial university can be described as follows:

“The university is a natural incubator; providing a support structure for teachers and students to initiate new ventures: intellectual, commercial and conjoint. The university is also a potential seedbed for new interdisciplinary scientific fields and new industrial sectors, each cross-fertilising the other.” (Etzkowitz, 2003, p. 112)

Highlighting organisational renewal and the creation of an entrepreneurial culture and entrepreneurial mindsets throughout the university, an entrepreneurial university is defined as follows:

“1) An organisation taking an entrepreneurial response to addressing the pressures and challenges it faces [...]; an organisation that renews itself to better align with its environment; an institution that inculcates entrepreneurial thinking through its governance structures and managerial policies and practices. 2) An institution that creates an environment, within which the development of entrepreneurial mindsets and behaviours are embedded, encouraged, supported, incentivised and rewarded.” (Hannon, 2013, p. 12-13)

The concepts of the *university-based entrepreneurship ecosystem*, entrepreneurial university ecosystem, and entrepreneurship education ecosystem are used inconsistently. However, they all refer to entrepreneurial actions, structures, and support that foster entrepreneurship in a university and its surrounding region, as illustrated in the following definitions:

“Various members who share the same goal of entrepreneurial support within a local geographic community and who are associated with a specific university.” (Theodoraki, Messeghem and Rice, 2018, p.155).

“A U-BEE is integrated and comprehensive, connects teaching, research and outreach, and is woven into the fabric of the entire university and its extended community for the purpose of fostering entrepreneurial thought and action throughout the system.” (Greene, Rice and Fetters, 2010, p. 2)

“The strategic and collective actions of various organisational components—what we term knowledge intermediaries—in order to maximise both the entrepreneurial and innovative contributions of universities.” (Hayter, 2016, p. 634)

An *entrepreneurship education ecosystem* is more specifically related to education, and it is defined as a sub-ecosystem of an entrepreneurship ecosystem, concentrating on different aspects of entrepreneurship education (Regele and Neck, 2012). *Entrepreneurship education* (or enterprise education, especially in the UK or Ireland), in

turn, is defined as educational efforts that enhance students' venture creation skills, attitudes, values, intentions, and behaviours that ultimately contribute to start-up and job creation, development of entrepreneurial culture, and economic growth development on a societal level (Mwasalwiba, 2010; Nabi et al., 2017). Occasionally, the concept of an *entrepreneurship education ecosystem* is used synonymously with that of an entrepreneurial university ecosystem, or a university-based entrepreneurship ecosystem combining the concepts of university-industry collaboration, research commercialisation, and entrepreneurship education (Belitski and Heron, 2017; Brush, 2014).

In this study, the concept of a university-based entrepreneurship ecosystem (U-BEE) is used to describe the collaborative actions that a university takes with its internal and external stakeholders, and the support mechanisms it provides, with the aim of promoting university-based entrepreneurship.

1.6 Structure of the thesis

This thesis consists of two parts. Part I provides an overview of the study, and Part II includes individual publications that address the research objectives. The thesis begins with an introduction in Chapter 1, which details the research background, identifies research gaps, defines research objectives and limitations, and presents the key concepts of the study. Chapter 2 details the conceptual background and introduces the literature domains upon which this thesis is based, namely the concepts of the entrepreneurial university, entrepreneurial ecosystem, and university-based entrepreneurship ecosystem (U-BEE). In addition, institutional theory is introduced, since it offers an overarching theoretical framework for this study. Chapter 3 introduces the research methodology by explaining the methodological choices, research methods, data collection, and analysis related to the individual studies. Chapter 4 addresses the research questions by summarising the objectives, main findings, and contributions of the individual publications. Chapter 4 also summarises the key findings and presents the facilitating and hindering attributes that influence the emergence of a U-BEE. Chapter 5 presents the conclusions, explains the theoretical and managerial contribution of the thesis, and gives suggestions for future research directions. Finally, Part II collects the five individual publications.

2 Conceptual and theoretical background

This section describes the conceptual and theoretical background of the thesis. It is divided into three subsections, corresponding to the three major research domains on which this thesis is based. These three research domains are: entrepreneurial universities, entrepreneurial ecosystems, and university-based entrepreneurship ecosystems, underpinned by institutional theory (Figure 2).

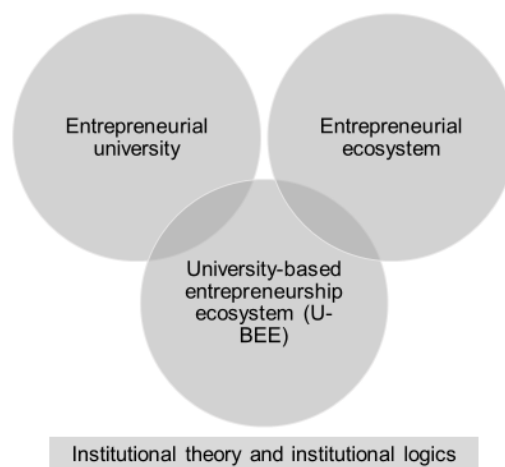


Figure 2. Conceptual and theoretical background.

This thesis applies the selected concepts and theories in a multidimensional way, since applying a single theory would not make it possible to bring out the multidimensional nature of the phenomenon. The entrepreneurial university, entrepreneurial ecosystem, and university-based entrepreneurship ecosystem are research domains that do not currently have firmly established theoretical backgrounds. For example, research on entrepreneurial ecosystems lacks conceptual clarity and theoretical frameworks (Alvedalen and Boschma, 2017; Stam 2015). In addition, research on entrepreneurial universities has applied different theoretical backgrounds, such as a resource-based view (Guerrero and Urbano, 2012) and institutional theory (Foss and Gibron, 2015). The emerging literature on U-BEE is forming, and it builds on the concepts of the entrepreneurial university and entrepreneurial ecosystem. Thus, new theoretical and conceptual knowledge on U-BEE can be produced by applying different theoretical frameworks. This thesis applies the perspectives of institutional theory, and especially institutional logics, as an overarching theoretical framework combined with the concepts of the entrepreneurial university and entrepreneurial ecosystem.

2.1 The entrepreneurial university

The narrow viewpoint of an entrepreneurial university highlighting technology transfer and research commercialisation dominates the current literature on entrepreneurial universities (Mascarenhas et al., 2017). Universities are considered to be natural incubators due to their specific ability to connect teaching, research, and collective entrepreneurship (Etzkowitz and Klofsten, 2005), even though it is acknowledged that the education of qualified employees is a more natural role for universities than the creation of spin-offs (Wennberg, Wiklund and Wright, 2011). The broader definition of an entrepreneurial university highlights the university's role as a provider of entrepreneurial capital, which consists of entrepreneurial thinking, actions, and institutions (Audretsch, 2014), and emphasises entrepreneurship as a collective action (Etzkowitz and Klofsten, 2005). This means concentrating not only on high-growth spin-offs from a university faculty, but also on student entrepreneurship, as well as the creation of collaborative networks, competitions, and accelerators, in addition to job creation in the local region (Siegel and Wright, 2015).

The application of a broader meaning of an entrepreneurial university that goes beyond knowledge transfer and technology commercialisation requires the engagement of different stakeholders in the entrepreneurial activities of the university (Clauss, Moussa and Kesting, 2018; Gibb and Hannon, 2006). It also calls for recognition that stakeholder engagement is more important than establishing different types of support structures for new business creation and the commercialisation of technology (Gibb and Hannon, 2006). Companies are one of the key stakeholders for an entrepreneurial university. They assess technological inventions and collaborate in technological commercialisation with academics and TTOs (Miller, McAdam, and McAdam, 2016), and participate in entrepreneurship education by sharing their experiences through lecturing and mentoring (Bischoff, Volkmann and Audretsch, 2018). Having a broader range of collaborative activities with companies reduces the orientation-related barriers that are associated with the different perspectives of industry and universities (Bruneel, D'Este and Salter, 2010).

Broadening the collaborative entrepreneurial actions of universities by creating formal and informal mechanisms between the universities and regional actors facilitates collaboration and access to resources (Etzkowitz and Klofsten, 2005). These mechanisms consist of encouraging interdisciplinary activities and qualifications, as well as acknowledgement of the personal development of students and staff. They also include the recruitment of entrepreneurial staff and entrepreneurial leaders as change agents, creating reward structures that acknowledge third mission activities, in addition to the integration of entrepreneurial education into the curriculum (Gibb and Hannon, 2006).

The impact of universities within a region may vary considerably from elite to local universities (Siegel and Wright, 2015). For example, research-intensive universities may have a broader scope and may want to take an active role at the national/international level, whereas teaching-led universities are typically more locally/regionally focused (Abreu et al., 2016). Additionally, the institutional strategies of universities influence

their regional impact (Guerrero et al., 2016). Universities that emphasise research commercialisation in their strategy may be less regionally engaged than universities that emphasise softer types of third mission activities (Sánchez-Barrioluengo and Benneworth, 2019). These softer activities include, for example, generating and attracting talent, collaborating with local industry, and acting as anchor organisations in networks facilitating tacit knowledge exchange (Bramwell and Wolfe, 2008). Despite the resources and capabilities that entrepreneurial universities have, they do not necessarily have a strong regional impact, since the HEI's commercialisation efforts and the needs of the regional economy might not be aligned (Tripl, Sinozic and Lawton Smith, 2015). Both university and regional characteristics influence the regional impact of universities. University administrators, together with regional policymakers, need to make a strategic choice, for example, on which technological fields are to be emphasised (Siegel and Wright, 2015). Additionally, both university and regional actors need to invest in the promotion of entrepreneurship, for example in TTOs, by offering public funding and developing efficient knowledge transfer processes (Prencipe et al., 2020), as well as promoting outreach activities with industry and enhancing the development of U-BEES that nurture the entrepreneurial potential and stimulate entrepreneurial mindsets in regions (Guerrero et al., 2014).

In entrepreneurial universities, the most critical factors are the attitudes of the faculty and students towards entrepreneurship. These attitudes can be affected by combinations of different factors, such as entrepreneurship education, teaching methodologies, role models, and reward systems (Guerrero and Urbano, 2012). Among students, informal factors (e.g., attitudes and role models) have a greater influence on the students' entrepreneurial activities than formal factors (e.g., support measures, education, and training) (Guerrero, Urbano and Fayolle, 2016). Universities, however, tend to foster entrepreneurship through top-down initiatives highlighting formal entrepreneurial activities (e.g., creation of technology parks, spin-off formation, patenting, and licensing). This kind of top-down approach can reduce the entrepreneurial activities as whole, since they might lead to the development of entrepreneurial activities in specific academic disciplines only, and neglect considering the university as a whole and fail to bring out informal entrepreneurial activities such as consulting and contract research (Abreu and Grinevich, 2013; Fini, Lacetera and Shane, 2010; Philpott et al., 2011). Perkmann et al. (2013) refer to these types of softer activities as *academic engagement*. They suggest that academic engagement is mainly driven by senior scientists, who have a notable scientific record and well-established networks with industrial partners who consider academic engagement to be a natural extension of scientific output, whereas research commercialisation is seen as a distinct type of activity in which organisational support is more relevant. Moreover, academics are motivated to engage with industry mainly to advance their research, whereas involvement in patenting and spin-off is driven by commercialisation and motivated by personal rewards from the research commercialisation (D'Este and Perkmann, 2011). TTOs tend to focus on formal patent-based entrepreneurial activities, and they do not adequately support entrepreneurship in disciplines that are most suited to informal entrepreneurial activities (e.g. social sciences, creative arts, and humanities). Focusing on formal patent-based activities, such as

licensing and spin-off creation, might result in potential losses in benefits generated through informal non-commercial activities. These informal activities are carried out to obtain indirect benefits such as research funding, student recruitment, and access to equipment (Abreu and Grinevich, 2013; Fini, Lacetera and Shane, 2010).

A large share of the business creation activities carried out by university researchers are not based on disclosed and patented inventions, and formal university regulations have a relatively limited or indirect effect on the entrepreneurial activities of researchers (Abreu et al., 2016; Clarysse, Tartari and Salter, 2011; Fini, Lacetera and Shane, 2010). Researchers may also be unaware of the existence of the infrastructure for entrepreneurship promotion, since the services offered by the university may be fragmented, consisting of various functions that do not necessarily collaborate with each other (Jacob, Lundqvist and Hellsmark, 2003). However, the most recent research on the involvement of TTOs in initiatives concerning science and technology entrepreneurship education (STEE) indicates that older and strategically autonomous university TTOs have taken a broader role in various STEE initiatives at their respective universities (Bolzani, et al., 2020).

Further, attention should be paid to awareness raising, as well as to the attitudes and motivations of academics, who strongly affect the success and legitimacy of the emergence of entrepreneurial universities. Especially when taking the first steps towards becoming an entrepreneurial university, conflicts of interest might arise between the university and academics due to insufficient funding, resources, and incentives dedicated to entrepreneurial activities (Miller, McAdam and McAdam, 2016). Academics may feel that research commercialisation is not part of their work, since the incentive and reward systems in the university may not encourage entrepreneurial actions, or on the other hand, they may lack the required entrepreneurial skills and attitudes (Jongbloed, 2015). However, there is evidence that commercial activities of top researchers may increase their scientific productivity, for example, in the form of joint scientific articles (Jongbloed, 2015).

2.2 An entrepreneurial ecosystem

The concept of an entrepreneurial ecosystem highlights the combination or interaction of elements that support entrepreneurial activity (Malecki, 2018). The elements of entrepreneurial ecosystems consist of cultural, social, and material attributes (Spigel, 2017), and they emerge through self-organisation (Roundy, Bradshaw and Brockman 2018). An EE and its actors are not controlled by a single agent, but EEs primarily emerge and develop from the uncoordinated and semi-autonomous actions of individual agents rather than through top-down control (Roundy, Bradshaw and Brockman, 2018). EEs have open but distinct boundaries that are based on geographic and socio-cultural characteristics (Roundy, Bradshaw and Brockman, 2018; Spigel, 2017). These socio-cultural characteristics consist of guiding rule sets, logics, and values of the actors in the EE (Roundy, 2017; Roundy, Bradshaw and Brockman, 2018). Actors who do not

demonstrate or share certain values can be considered not to belong to the ecosystem (Roundy, Bradshaw and Brockman, 2018).

Cultural attributes are the underlying beliefs and views about entrepreneurship within a region, and they consist of cultural attitudes and histories of entrepreneurship (Spigel, 2017). A favourable entrepreneurial culture means that mistakes, failures, and contrarian thinking are tolerated, and entrepreneurship is considered a worthy occupation (Isenberg, 2010). The community culture in a region defines the ways and means by which individuals and groups interact with and shape their environment, and it has a significant influence on the prevailing rates of entrepreneurship (Huggins and Thompson, 2014). The local culture is a socially constructed phenomenon through the interaction of entrepreneurs together with private and third-sector non-profit organisations and universities. The interactions, shared interests, and goals of diverse ecosystem actors provide coherence within an entrepreneurial ecosystem (Malecki, 2018). The existence of role models and mentors is also one of the key elements that are favourable towards developing an entrepreneurial culture in ecosystems (Audretsch and Belitski, 2017; Malecki, 2018; Spigel, 2017). For example, in the university context, the participation of top scientists in entrepreneurial actions may lead other researchers to imitate the same practices (Huyghe and Knockaert, 2015).

Social attributes are resources that are composed of, or acquired through, social networks (Spigel, 2017). An EE is a dynamic structure that is socially constructed, and it coevolves through networks of entrepreneurs. These interactions can be enhanced by policy initiatives, but entrepreneurs often prefer to network with and learn from their peers (Malecki, 2018). Entrepreneurs with strong social networks and legitimated positions are in a more favourable position to access resources than their colleagues who are not such visible or active players in a local EE (Spigel and Harrison, 2018).

The resource flow takes place through formal, informal, and social networks, and it is an important determinant in the emergence and development of EEs (Cohen, 2006). Strong and successful ecosystems are resource rich with dense social networks. Ecosystems can also be munificent in terms of their available resources but have poorly functioning networks that hinder learning and cooperation (Spigel and Harrison, 2018). Emerging ecosystems are characterised by sparse social networks, few success stories, educational institutions oriented towards general degrees, and policies oriented towards traditional development efforts such as clusters, and firm attraction and retention. In the growth phase, social networks and entrepreneurial culture are developed, educational institutions start offering entrepreneurship education, and policymakers acknowledge the importance of building the EE and tailor policies towards entrepreneurship (Mack and Mayer, 2016; Spigel and Harrison, 2018).

Individuals form the core of an entrepreneurial ecosystem, and this is characterised by the dynamic interaction between entrepreneurial attitudes, ability, and aspirations (Acs, Autio and Szerb, 2014). An entrepreneur's intentionality and coherence of entrepreneurial activities are key triggering factors in the emergence of an EE. On the micro level, many

actors in an EE share a common set of intentions and action plans for entrepreneurial actions that may result not only in similar behaviours and activities, but also in inter-dependent goals. EE actors may also share common values and follow certain rules. As the EE develops, an entrepreneur's actions, the system-level characteristics that create coherence between EE actors, and the availability of resources stimulate further coherence between the EE actors, and this enhances the emergent structuration of the EE (Roundy, Bradshaw and Brockman, 2018).

The material attributes of an entrepreneurial ecosystem consist of the university, the support services, and facilities, as well as the policy and governance, and open markets (Isenberg, 2010; Spigel, 2017). Universities are important actors in entrepreneurial ecosystems (Cohen, 2006; Isenberg, 2010; Spigel, 2017; Stam, 2015), since they provide ecosystems with new knowledge, provide a well-educated and qualified workforce and entrepreneurs, act as a locus of spin-offs and start-ups, and promote entrepreneurial culture (Audretsch, 2014; Cohen, 2006; Guerrero et al., 2016). Learning in an EE takes place through a social process in which entrepreneurs learn from and with others. Universities may play an important role in an EE by bringing entrepreneurs together, arranging forums and events, and producing technical and market knowledge (Pugh et al., 2019; Spigel and Harrison, 2018). Most importantly, universities produce skilled entrepreneurs and workers, and thereby disseminate knowledge about the entrepreneurial process (Spigel and Harrison, 2018).

2.3 A university-based entrepreneurship ecosystem (U-BEE)

U-BEEs can emerge as a proactive response to stimulate new educational or economic development initiatives, or they may be reactive, meaning that they address specific gaps in educational or economic development resources (Rice, Fetters and Greene, 2014). U-BEE actors consist of different stakeholders, including students, faculty, staff, alumni, and the local community, each with different goals and priorities (Huang-Saad, Duval-Couetil and Park, 2018).

The elements of a university-based entrepreneurship ecosystem consist of the courses and curriculum of the university, outreach programmes, research initiatives, entrepreneurial clubs and support structures (such as entrepreneurship centres), technology transfer offices (TTOs), and incubators that are designed to support entrepreneurs and entrepreneurial students (Huang-Saad, Duval-Couetil and Park, 2018; Rice, Fetters and Greene, 2014). Despite the holistic nature of university-based entrepreneurship, many universities rely on a single academic intermediary, namely TTOs, to promote and supporting academic entrepreneurship (Hayter, 2016). According to Fuster et al. (2018), TTOs have formal role in U-BEEs, and they provide intellectual property management and stimulate social contacts, but they do not act proactively. Instead, university-based spin-offs are more proactive in technology transfer and are more cooperative and better connected with surrounding ecosystem actors. The single academic intermediary approach relies heavily on the expertise and contact network of one individual (e.g., a

technology transfer officer), and it can limit the services provided to specific focus areas. In contrast, the application of a holistic ecosystem model that offers multiple support mechanisms and intermediaries to promote academic entrepreneurship to students and faculties leads to a broader range of contacts and access to more varied resources (Fuster et al., 2018). The existence and interrelationships of these heterogeneous intermediaries who share the same goal of supporting academic entrepreneurship are essential, since they provide academics with access to non-academic contacts that they might not find otherwise (Hayter, 2016).

In U-BEEs, research commercialisation is an important element, and offering commercialisation support is critical and necessary. The more universities highlight entrepreneurship in their strategy, the greater researchers' intentions to engage in spin-off creation and patenting will be. However, this visible element of entrepreneurial culture seems not to have an impact on researchers' interaction with industry, which implies that this type of academic engagement may have been institutionalised before universities started to emphasise the third mission activities in their strategies (Huyghe and Knockaert, 2015). In addition, it is important to acknowledge other aspects of the U-BEE and pay attention to the specific needs of faculty members, students, and the development of an entrepreneurial culture. For example, universities should invest resources and offer support for faculty investors by educating them in different aspects of the commercialisation process, most importantly opportunity recognition (Huang-Saad, Fay and Sheridan, 2017).

The proactive concretisation of entrepreneurial activity and the formulation and reformulation of plans to create synergy have been identified as two key mechanisms for attracting and sustaining resources. This means that an agenda for entrepreneurial actions needs to be formulated and reformulated constantly to achieve synergy for the mutual benefit of the different stakeholders. Proactive concretisation needs to be realised by taking action despite possible resource constraints, instead of establishing vague collaboration agreements (Björklund and Krueger, 2016).

In U-BEEs, formal and informal connections and networks between ecosystem actors enhance access to resources and contribute to the optimal configuration of the ecosystem. Furthermore, common goals, codes of conduct, and common beliefs and perceptions strengthen the relationships between the actors and build a climate of trust, and this contributes to the sustainable evolution of the ecosystem (Theodoraki, Messeghem and Rice, 2018).

2.4 Institutional theory and institutional logics

Institutional theory explains how some organisational practices survive and become sustainable (Lockett, Wright and Wild, 2015). It also offers a theoretical lens that explains how certain rules, norms, and taken-for-granted behaviours become appropriate and gain legitimacy (Bruton, Ahlstrom and Li, 2010). Institutional logics offers a more nuanced view of the relationships between institutions and individual agency on multiple levels

(Lepori, 2016). The concept of institutional logics emerged from part of institutional theory, and it can be defined as: “*the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organise time and space, and provide meaning to their social reality*” (Thornton and Ocasio, 1999, p. 804). For these reasons, institutional theory, and especially institutional logics, provides an appropriate theoretical framework to study third mission activities, which may be seen as contradictory to the more legitimised missions of universities, namely research and education.

In highly institutionalised organisations, such as universities, institutional rules function as myths that organisations need to adapt in order to gain legitimacy and increase their resources and survival capabilities. Organisations that become isomorphic to the myths of the institutional environment tend to decouple their formal structures and activities, since attempts to control and coordinate activities lead to conflicts and loss of legitimacy (Meyer and Rowan, 1977). Many universities have addressed external pressures for increased third mission activities by decoupling their core activities of teaching and research from their third mission activities (Foss and Gibson, 2015; Pinheiro, Langa and Pausits, 2015). Further, some universities have created their own institutional logics of third mission and thus avoided isomorphic pressures to apply similar practices (Kitagawa, Sánchez-Barrioluengo and Uyarra, 2016).

Prevailing institutional logics shape, enable, and constrain the interests, identities, and values of individuals and organisations by providing formal and informal rules of action (Thornton and Ocasio, 2008). Universities are shaped by two types of key institutional logics: academic and market logics (Juusola 2015, 16-24). Academic logic emphasises knowledge production and diffusion for its own sake, and it is based on collegiality and gaining recognition through rigour and relevance that are evaluated by peers. Market (or commercial) logic is based on managerial decisions made by the top hierarchy, and its relevance is evaluated by the market, based on economic values (Juusola, 2015, 17; Lepori, 2016; Murray 2010). To meet the expectations of external and internal stakeholders, universities need to balance these competing logics that might have nearly equal weight but potentially contradictory goals (Jongbloed, 2015). Another strategy for a university is to decouple their academic and commercial missions, as decoupling prevents the academic mission from impeding research commercialisation processes (Rasmussen and Borch, 2010). Additionally, individual academics, especially top scientists, are in an important position in interpreting the outcomes of their actions from the viewpoint of academic and market logics (Jay, 2013; Murray, 2010). Individuals need to find a balance between the two logics, and their behavioural responses might not correspond to the normative and regulative expectations of their institutions (Abreu et al., 2016). Lam (2011) divided academic scientists who engaged in university–industry collaboration into three groups. The first group consisted of researchers who considered science and commerce as distinct functions and used commercialisation as a means to generate resources for their research. The second group consisted of scientists who conformed closely to entrepreneurial norms and were intrinsically motivated by problem solving, but also by financial rewards. In between these two groups were “hybrids”, who

were fully committed to the core scientific values, but who recognised the benefits of commercial engagement in order to achieve their professional goals.

Since academic logic is dominant, universities face challenges in societal interaction, especially concerning commercialisation and entrepreneurship actions (Jacob, Lundqvist and Hellsmark, 2003; Kolhinen, 2015). The identified challenges and conflicts of interest based on different institutional logics (e.g., conflicts of interests between research topics and the long-term orientation of university research) usually relate to the orientation of universities and to the transactions involved in aspects such as conflicts over intellectual property rights (IPRs) and dealing with university administration. Trustful long-term relationships can lower these barriers, whereas increased scrutiny and formalisation of these relationships can increase the transaction-related barriers (Bruneel, D'Este and Salter, 2010). Moreover, common goals and understandings regarding the collaboration and the creation of personal relationships between the companies and universities help to mitigate the collaborative challenges (Steinmo, 2015). Additionally, the collision of these logics can lead to successful outcomes, since altering elements from both logics may reinforce them both, and their combination can lead to better outcomes (Bartunek and Rynes, 2014; Jay, 2013; Murray, 2010). In fact, when comparing the motives of university and industry actors to engage in collaboration, they can be highly similar, despite their differing institutional work environments. For example, on an aggregate level, both company and university actors value stable relationships, efficiency, and providing solutions to society's problems. At a lower, more detailed level, differences exist. University actors are more motivated by acquiring funding for research and seeking publication opportunities, whereas from the company side, collaboration is driven by technological problem-solving. Moreover, legitimacy is more important for academics, for example, to improve their reputations, than it is for companies, whereas companies expect more reciprocity from collaboration (Ankrah and AL-Tabbaa, 2015; Ankrah et al., 2013).

Field, organisational, and individual factors influence the nature and implications of prevailing institutional logics (Besharov and Smith 2014). The effectiveness of institutional work in promoting the institutionalisation of an organisational practice is enhanced when there is alignment between the discourse and metrics (Lockett, Wright and Wild, 2015). Individuals, through their actions, tools, and technologies, execute institutional logics. As individuals engage in certain actions and resist others, they may transform logics and alter their identities. For example, when top scientists participate in entrepreneurial actions, commercial involvement may transform from being unfamiliar and unusual to becoming plausible and appropriate (Powell and Colyvas 2008). Commitment to a particular logic depends, in part, on an individual's social networks and position in the organisation. For example, a person in a boundary-spanning position is exposed to external influences and is more likely to support that logic inside the organisation. When individuals have strong external ties and they are interdependent with their external partners, they are more motivated to develop compatible ways of enacting multiple logics in their organisations (Besharov and Smith 2014).

Universities can be given a role as a hub organisation in a regional EE (Schaeffer and Matt, 2016). When this is the case, universities need to find a balance between the academic and market logic, as well as the logics of the EE, which according to Roundy (2017) consist of entrepreneurial-market logic and community logic. Market logic is characterised by economic values (Lepori, 2016), while entrepreneurial-market logic differs from this in the sense that it also includes specific sets of actions involving the pursuit of innovation, creativity, and the development of new business models (Roundy, 2017). Further, Roundy (2017) argues that hybrid support organisations play an important role in exposing ecosystem actors to these two guiding logics. Universities as hybrid organisations can expose EE actors to entrepreneurial-market logic through entrepreneurship programmes and research commercialisation projects, and thereby enhance the degree of coherence in EE actors' intentions and behaviours, as well directing new business creation around the same technologies or industries (Roundy, 2017). To increase the community value by emphasising a community focus rather than self-interest through cooperation and helping others (Roundy, 2017), universities can organise entrepreneurial events for their staff, students, and entrepreneurs.

In sum, the theoretical background of this thesis draws from four research domains, which are: entrepreneurial universities, entrepreneurial ecosystems, and university-based entrepreneurship ecosystems, underpinned by institutional theory. Publication I focuses on entrepreneurial universities and provides a typology for entrepreneurial activities in universities. Publications II and III contribute to the literature on U-BEEs, especially regarding engagement and perspectives of individuals belonging to U-BEEs. Publications IV and V investigate the entrepreneurial university from the student and regional policy perspectives. The concept of the entrepreneurial ecosystem is closely related to the U-BEE, and it is referred to in all the publications of this thesis. Institutional theory, as a theoretical background, is applied in Publication II. In addition, various perspectives of institutional theory and logics are addressed in Publications I (institutional strategies and missions), III (academic and market logics), IV (institutional capture), and V (institutional strategies and support).

Table 1 summarises how the individual publications of this thesis address the different research domains and research gaps outlined in this literature review section.

Table 1. Research domains and gaps addressed

	Research domain	Research gaps addressed
Publication I	Entrepreneurial university	Comprehensive insights into different approaches to enterprise education from the perspectives of policy actors and universities by applying a broad meaning of entrepreneurial university (Siegel and Wright, 2015).
Publication II	University-based entrepreneurship ecosystem (U-BEE) Institutional theory	Engagement and perceptions of individual actors in the entrepreneurial actions of HEIs (Clauss, Moussa and Kesting, 2018; Gibb and Hannon, 2006; Miller, McAdam and McAdam, 2016) and thereby in the U-BEE. The influence of formal and informal institutions and relations on the emergence of U-BEES. How university actors find the balance between the conflicting institutional logics (Abreu et al., 2016).
Publication III	University-based entrepreneurship ecosystem (U-BEE)	Formal and informal connections and networks (Theodoraki, Messegem and Rice, 2018) focusing on university and industry actors' perspectives (Björklund and Krueger, 2016; Huyghe and Knockaert, 2015).
Publication IV	Entrepreneurial university	The impact of different types of universities in regions (Abreu et al., 2016). Regional policy expectations and alignment of policies with the expectations (Siegel and Wright, 2015; Trippel, Sinozic and Lawton Smith, 2015).
Publication V	Entrepreneurial university	Stakeholder engagement (Clauss, Moussa and Kesting, 2018; Gibb and Hannon) by investigating student perspectives (Siegel and Wright, 2015).

3 Research methodology

3.1 Research approach

The philosophical worldview that has guided this research is based on pragmatism. Pragmatism is not anchored to any system of philosophy and reality, rather it gives researchers the freedom to choose research methods that are appropriate for use in different situations (Patton, 1990). For this reason, researchers who apply pragmatism use multiple methods of data collection, employ multiple sources of data, focus on the practical implications of the research, and emphasise the importance of conducting research that best addresses the research problem (Creswell, 2013). A pragmatist approach acknowledges that concepts/terms are value-laden, and it sees reality as indefinite in that it is grounded in terms of language, history, and culture (Wicks and Freeman, 1998). As an ontological belief (the nature of reality), pragmatists see that reality is what is useful, what is practical, and what works. As an epistemological belief (how reality is known), pragmatists consider that reality is known through the application of research methods that can be both deductive and inductive (Creswell, 2013; Johnson and Onwuegbuzie, 2004).

However, even though this study was conducted by choosing research methods that best address the research problems, certain more specific underlying epistemological and ontological beliefs have guided this research. These beliefs originate from the postpositivist research paradigm, which allows multiple methods to capture reality as much as possible (Denzin and Lincoln, 2011). The underlying ontological assumption of postpositivism is based on critical realism and the idea that a “true” reality exists “out there” but is only imperfectly and probabilistically understandable. From the epistemological point of view, the postpositivist worldview assumes that research is probably true. In this approach, the findings are based on research with minimal interaction with the research subjects, even though it acknowledges that research should proceed towards finding a local, community-bound, interacting form of truth (Creswell, 2013; Lincoln and Guba, 2000). Researchers and research subjects form separate but intertwined communities, and reality can be approached through either or both of them (Järvensivu and Törnroos, 2010). Additionally, according to the postpositivist worldview, there are no strict cause and effect relations, as there are in positivism (Creswell, 2013).

Despite “paradigm wars” and arguments claiming that compatibility between quantitative and qualitative methods is impossible due to the incompatibility of the research paradigms, mixed methods research has become an accepted research approach (Denzin and Lincoln, 2011). This study applies a concurrent mixed methods approach (Creswell, 2009; Creswell and Plano Clark, 2007), and more specifically, a multilevel model of triangulation design (Creswell and Plano Clark, 2007). Triangulation was applied so that qualitative and quantitative data were collected to represent different levels of analysis of a studied phenomenon in order to gain broader perspectives of it (Creswell, 2009; Creswell and Plano Clark, 2007). Qualitative research based on conversational thematic

interviews and written documentation was collected to capture the perspectives of faculty and regional actors. A quantitative survey of university students was used to capture the student perspective in a holistic and generalisable manner. Finally, the results of the qualitative and quantitative research were merged into one overall interpretation (Creswell and Plano Clark, 2007). The research process is illustrated in Figure 3.

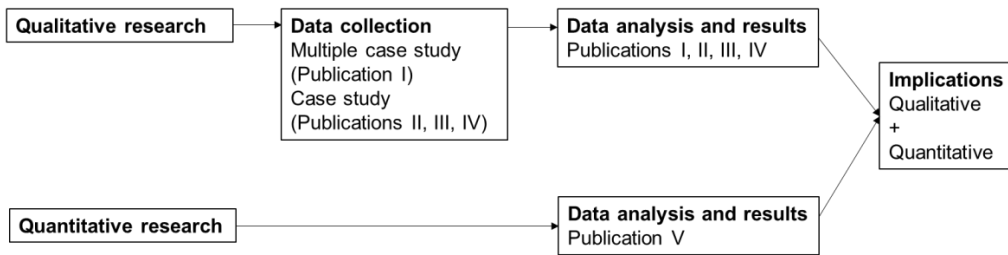


Figure 3. Research process

3.2 Methodological choices

This section will explain the methodological choices in the empirical part of the thesis. Due to the holistic nature of the phenomenon under investigation, the thesis utilised a mixed methods approach. For each individual study, the most suitable research approach was chosen to meet the goals of the study. In order to gain a holistic and nuanced understanding of the emerging university-based entrepreneurship ecosystems, Publications I, II, III, and IV are based on an exploratory qualitative research approach. In turn, Publication V was based on quantitative research in order to capture students' perceptions of the entrepreneurial culture in HEIs.

Moreover, three empirical research methods were used. These methods included case studies, content analyses, and quantitative regression analyses. Publication I applies a multiple case study method. Publications II, III, and IV are based on a single case study. Publications I and IV are based on content analysis methods, and publications II and III on inductive thematic analysis. Publication V utilises quantitative methods. The methodological choices are summarised in Table 2.

Table 2. Methodological choices for the individual publications of the thesis.

	Publication I	Publication II	Publication III	Publication IV	Publication V
Research objective	To find out how enterprise education is guided, encouraged, and implemented in European universities.	To explore academic individuals' engagement in entrepreneurial actions.	To discover the underlying factors that enhance or hinder the emergence of U-BEES.	To examine the expectations that the region sets for the university.	How students perceive HEIs' entrepreneurial culture, and especially, which factors explain their perception of entrepreneurial culture.
Research method	Multiple case study	Case study	Case study	Case study	Quantitative research
Data collection	Public and written documents by informants (3 national/international, 4 university informants)	15 in-depth interviews with individuals in different positions on the university campus	10 interviews with company actors and 12 interviews with university actors	11 local and regional strategy documents, 8 interviews with local and regional policymakers	Student questionnaire survey (2,460 respondents from Finnish HEIs)
Data analysis	Content analysis	Inductive thematic analysis	Inductive thematic analysis	Content analysis	Regression analysis, one-way ANOVA

A case study research method was chosen because this research aims to provide an in-depth understanding of the phenomenon (Creswell, 2013). In order to get a better understanding of the emergence of U-BEES, *instrumental cases* were selected to illustrate the phenomenon (Stake, 1995).

Publication I presents a set of small illustrative cases (Patton, 2002) to analyse state-of-the-art enterprise education approaches applied in European universities. Multiple cases were chosen because they make it possible to focus on distinctive characteristics and to achieve a deep understanding of the dynamics within individual contexts (Eisenhardt, 1989). The cases were selected to showcase good performance in enterprise education and provide variety in terms of nations, organisations, and approaches to enterprise promotion.

Publications II, III, and IV are based on a single case study. A case study research method was selected, since it makes it possible to gain in-depth and information rich data (Patton, 2002). In Papers II and III, a university campus located in South Karelia in Finland formed

the research case. In Paper IV, the university case was investigated from the local and regional policy actors' perspective.

Publication V utilised quantitative research methods based on a large survey conducted among HEI students in Finland. A quantitative research method was chosen, since it made it possible to capture the student perspective in a broader and more generalisable manner.

3.3 Case: LUT University

The emerging U-BEE around the Lappeenranta campus of the Lappeenranta–Lahti University of Technology (LUT) forms the main body of this research. LUT is a relatively young and small university that was established in 1969. It has approximately 5,500 students and 1,000 faculty members. The Lappeenranta campus of LUT is located in the South Karelia region in south-east Finland, which consists of 9 municipalities and has around 129,000 inhabitants. LUT is the only university operating in the region.

Since its establishment, LUT has had a tradition of strong links with the business community. University–business collaboration is complemented by the university's own accelerator, *Green Campus Open*, and investment company, *Green campus innovations*, which support research commercialisation and LUT's research-based start-up companies. Additionally, like many other universities in Finland, LUT has a student-led entrepreneurial society (LUTES) that promotes student entrepreneurship.

LUT is strongly specialised, and in its *Trailblazer 2020* strategy it emphasised clean energy and water, the circular economy, sustainable business, and entrepreneurship. During this strategy period, entrepreneurship was a cross-cutting theme in all university activities. The strategic mission emphasised the creation of solutions for society and industry through inventions and patents, new products, and spin-off companies. Because of the successful implementation of this strategy, LUT was ranked among the top 101–200 out of 766 universities in the 2020 *Times Higher Education (THE) Impact Ranking*¹. In the ranking, LUT obtained top scores for its water and clean energy research, spinoff companies, sustainable development education, and sustainability reporting.

During this research process, the name of LUT University was changed from Lappeenranta University of Technology to Lappeenranta–Lahti University of Technology (LUT). Currently, LUT and LAB University of Applied Sciences (LAB) form a corporate group consisting of two autonomous institutions: LUT is the parent company, and LAB is its subsidiary.

¹ More information on the *Times Higher Education (THE) Impact Ranking*: https://www.timeshighereducation.com/rankings/impact/2020/overall#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/undefined

3.4 Data collection and analysis

3.4.1 Qualitative data collection and analysis

Conversational interviews with representatives of the key stakeholders in the region form the primary data of the study. The research data comprises 31 in-depth thematic interviews. The interviewees were representatives of the key organisations that belong to the U-BEE, namely university administration (4), researchers and teachers (8), the students' entrepreneurial society (1), university-based spin-offs and start-ups (5), industrial corporations (3), the university's investment company (2), governmental organisations (2), and regional organisations and development companies (6).

The interviews were conducted between February 2016 and January 2018. The interviewees were selected based on prior knowledge of the key organisations and active collaboration as individuals with the university. The company representatives were active members in local U-BEE processes, representing co-founders of university spin-offs and start-ups, SMEs, and large corporations.

Each interviewee was made aware that the aim of the research was to explore the university's role in entrepreneurship promotion and knowledge transfer. The interviewees were told that the interviews would be used as data in a doctoral dissertation. The interviewees were encouraged to talk about their experiences in their own way. The idea was to discover the factors that either supported or hindered the functioning of the ecosystem. The interviewees were encouraged to relate their own experiences and describe the collaboration mechanisms in knowledge transfer within the entrepreneurial ecosystem.

The qualitative part of this study is based on conversational thematic interviews. The interviews took 20-60 minutes. The semi-structured interview form worked as guidance for the researcher (Appendix A). However, each interview followed its own path and not all questions were necessarily covered with each interviewee. In addition, the depth to which each main topic was covered varied, depending on the interests of the interviewees. All the interviews were recorded and transcribed.

Publication I utilised data from multiple sources, such as email correspondence and written and online documents. Specifically, for the research purpose, the case informants were asked to describe the current state-of-the-art of entrepreneurship education at their perspective level (international, national, or HEI). In this written description, they were also asked to describe the objectives and needs for future development, as well as the measures and incentives that should guide and support entrepreneurship education.

In Publications II and II, an inductive thematic analysis method was chosen, because the theory on U-BEE is still immature, and an inductive thematic analysis would help to elaborate new concepts and ideas (Gioia, Corley and Hamilton, 2013).

In Publication II, the data analysis was based on an inductive thematic analysis technique, applying initial and focused coding (Saunders et al., 2016). The initial coding involved the categorisation of the research data into three broad categories and subcategories, which were consistent with the main elements of institutional theory, namely regulative, normative and cognitive factors. The category of cognitive factors emerged to be the most prominent in terms of the researched phenomenon. Therefore, it was selected for the more focused coding process.

Publication III utilised an inductive thematic analysis method, and the data analysis followed the approach of composing first-order and second-order analyses, as suggested by Gioia, Corley and Hamilton (2013). Altogether, 75 NVivo codes were selected for further study. The selected codes were exported to an Excel file for further study. The grouping of codes was continued further in Excel and resulted in 20 codes describing the company actors' perspectives and 17 codes describing the university actors' perspectives. These informant-centric first-order concepts were further analysed by conducting within-group comparisons among the company and university informants, as well as inter-group comparisons between the company and university informants. As a result, four second-order themes were created using the research-centric terminology. Finally, at the third level of analysis, the emergent second-order themes were further distilled into three aggregate dimensions.

Regional and local policy documents comprised the main research data for Publication IV. The data contains a set of 11 local and regional documents. The regional strategy documents included the development plan, innovation strategy, business strategy, performance objectives, and entrepreneurship education strategy. The local policy documents comprised the Lappeenranta city strategy and the growth agreement between the city regions of Lappeenranta and Imatra. Eight interviews conducted with local and regional policymakers formed the secondary data set. The content analysis was conducted in two phases. First, the regional and local strategy documents were analysed manually by searching for all the references related to the university and its functions. The transcribed interviews were coded using the NVivo software to identify the expectations of the policymakers toward the university. Second, the policy documents and the interview data were analysed using modified pattern matching (Yin, 2009).

3.4.2 Quantitative data collection and analysis

Publication V is based on quantitative data. The data is owned and was gathered by the Finnish Education Evaluation Centre (FINEEC) as part of a wider national project that aimed to carry out an evaluation of entrepreneurship in vocational education and training, and in higher education institutions, in 2017–2018. Publication V utilises the survey results from HEI students.

In total, 2,460 HEI students responded to the questionnaire online in 2017. The data consists of the answers provided by 1,464 students from 24 universities of applied sciences, and 996 university students from 14 research universities in Finland. All Finnish

HEIs are represented in the survey, except for the National Defence University and Police University College, who do not offer entrepreneurship education. Additionally, all fields of education were covered.

The same survey instrument was aimed at students studying at research universities and at universities of applied sciences. The survey included questions related to entrepreneurship studies, support structures, and entrepreneurial culture at HEIs. The survey was targeted at undergraduate students. At the beginning of the survey, there were questions common to all, and at the end of the survey, there were questions only for those who had completed entrepreneurship studies. Publication V focused on the questions related to entrepreneurial culture and institutional support for entrepreneurial learning among the students who had taken entrepreneurial courses.

The quantitative dataset was analysed using IBM SPSS Statistics (version 26) software. The analysis started by classifying students at a general level, for example, concerning their perceptions of entrepreneurship, whether they had taken entrepreneurship studies, and whether their home university seemed to value, promote, and support entrepreneurship. Second, four sum measures were formed, namely encouragement, institutional strategies, collaboration, and student community, after which an analysis of variance (ANOVA) was conducted for the measures regarding the background variables characterising the respondents. Finally, a linear regression analysis was used to examine how particular elements explained the students' perceptions of the entrepreneurial culture in Finnish HEIs.

3.5 Quality of research

As discussed above, this research applies a mixed methods approach with a strong focus on qualitative research methods. Therefore, evaluation criteria especially for assessing qualitative aspects are applicable for assessing this research (Creswell, 2013; Eriksson and Kovalainen, 2016). Trustworthiness, meaning the quality of qualitative research, can be assessed by evaluating the credibility, transferability, dependability, and conformability of the research (Lincoln and Guba, 1985).

Credibility or *validity* refers to the extent to which the research results reflect reality. The validity of this research was ensured by utilising multiple validation strategies. Firstly, triangulation was used by applying multiple and different data sources, methods, and theories (Creswell, 2013; Yin, 2009). In this research, the emergence of U-BEEs was investigated by utilising different data sources to provide converging evidence to explain the phenomenon (Yin, 2009). The data sources included in-depth interviews, small illustrative cases, strategy documents, and survey results. Triangulation of the methodologies was done by combining qualitative and quantitative research methods. Additionally, multiple theories were used (concerning entrepreneurial ecosystems, entrepreneurial universities, U-BEEs, and institutional theory and logics).

Secondly, prolonged engagement and persistent observation were possible, since the researcher had experience of the topic (Creswell, 2013). The researcher was affiliated with the university campus and region that formed the main case of this thesis. Working in the same organisation made constant reflections and judgements possible concerning what was salient and relevant to the purpose of the study (Creswell, 2013). However, studying one's own organisation has challenges, such as whether good data can be collected due to power imbalances between the researcher and participants. Additionally, there could be a risk that reporting unfavourable data might negatively influence the organisation or the informants (Creswell, 2013). The fact that the researcher was familiar with the case organisation and with most of the informants did not seem to cause any biases, since anonymity was guaranteed to the informants. Additionally, the informants considered the research topic to be very important. For these reasons, the informants discussed the topic very openly and expressed both the positive and negative sides of the university's role in entrepreneurship promotion and knowledge transfer. The negative and unpleasant issues that were brought out are reported in a discreet manner without jeopardizing the anonymity of the informants. Additionally, confidentiality and data protection were secured during the whole research period.

Thirdly, the results were presented at three academic conferences, and the individual publications were peer-reviewed and published in different academic publications.

Transferability or *generalisability* refers to the extent to which the findings can be applied to other contexts. The transferability of this study was improved by employing purposeful sampling in the data collection. Multiple cases were also used in Publication I to achieve a richer understanding of the focal phenomenon, in this case, the emergence of U-BEEs. In order to achieve analytic generalisation (Eriksson and Kovalainen, 2016; Yin, 2009), the results of this study were compared with previously developed theories in different research domains. The generalisability was further enhanced by the quantitative study in Publication V.

Confirmability refers to the extent to which interpretations that stem from empirical observations can be confirmed by others. In Publications II and III, the confirmability of this research was achieved by providing a rich set of direct interview quotations to demonstrate the interpretations that were made.

Reliability refers to the extent to which a study and its findings can be replicated. Regarding the reliability of the qualitative part of this thesis, a specific case study protocol was used (Yin, 2009, p. 123). The qualitative part of this study was based on well-established data collection and analysis techniques, such as interviews, content analysis, and inductive thematic analysis. The applied data collection and data analysis processes were described in detail in the individual publications.

In the quantitative part of this study (Publication V), the reliability of the results was tested using the Cronbach's alpha estimate of reliability, which is one of the most widely used methods for measuring reliability in the social and organisational sciences (Bonett

and Wright, 2015). Cronbach's alpha varied between 0.720 – 0.892. The values 0.7 or 0.75 are often used as cut off values for Cronbach's alpha (Christmann and Van Aelst, 2006), even if there is no universal minimally acceptable reliability value defined (Bonett and Wright, 2015). As the Cronbach's alpha values in this research are all above 0.70, the quantitative results of this study can be considered reliable.

4 Publications and their key findings

4.1 Publication I – European approaches to enterprise education

4.1.1 Objectives

The purpose of the first publication was to provide comprehensive insights into European approaches to enterprise education (in this publication, enterprise education is a synonym for entrepreneurship education) and to address **RQ1 How do the expectations of policymakers shape the emergent U-BEE**. The main aim of the publication was to gain a deeper understanding of the different routes that universities and policy actors have taken, and to gain better understanding of the motives that drive enterprise education policies and entrepreneurial actions at universities. In order to gain a better understanding of these different approaches, the paper asked the research question of how enterprise education is guided, encouraged, and implemented in European universities. To analyse the different approaches taken, the paper examined international and national enterprise education initiatives and university-level cases.

4.1.2 Main findings

The study identified three distinct motives that drive European enterprise education policies. First, enterprise education is used as a vehicle to transform the business culture of the nation. Second, enterprise education is a reaction to competitiveness problems and unemployment. Third, enterprise education is a way to promote a knowledge-based society and increase the added value of the nation. Additionally, the university cases highlighted three main points: 1) university-level strategies are decisive in enterprise education; 2) entrepreneurial movement has extensive implications for universities; 3) the scope of entrepreneurial activities in the university are twofold: some universities follow a holistic approach and pursue a rich variety of enterprising activities, while some aim at a focused target and can thereby direct specialised resources towards those efforts.

4.1.3 Main contribution

This paper adds new knowledge of different approaches to enterprise education in the European context. It provides an overview of different types of approaches in different contexts and introduces a typology to classify the different approaches. The paper shows that there are no single solutions for universities to undertake enterprise education in their activities. However, the university cases demonstrate the importance of a top-level strategy and show that universities still have underutilised potential in combining science, education, and entrepreneurship, for example, in better utilisation of their alumni and enhancing cooperation with their external stakeholders. Lastly, universities' development of entrepreneurial activities should be based on evidence and systematic planning.

4.2 Publication II – Challenges to the development of an entrepreneurial university ecosystem: The case of a Finnish university campus

4.2.1 Objectives

The purpose of the second publication was to contribute to the emerging literature on U-BEEs by highlighting the ways in which academics engage with or decouple themselves from entrepreneurship processes. Thus, the publication addressed **RQ2 What are the motives of different actors to engage in U-BEEs, RQ3 How do different actors engage with the emerging U-BEEs, and RQ4 How do different actors perceive university as a catalyst for entrepreneurship**. The study investigated how individuals' perceptions respond to the societal and institutional demands to foster entrepreneurship. The aim of the study was to find out how individuals identified their roles in participating in the academic entrepreneurship processes in the U-BEE. The publication is based on 15 in-depth thematic interviews conducted with university actors, covering the university's investment company, the students' entrepreneurial society, professors and lecturers, and representatives of the university administration and management.

4.2.2 Main findings

The findings suggest that education and research are regarded as the most highly institutionalised logics of universities, and they tend to be maintained since more rewards are associated with them than are associated with entrepreneurial actions. These competing logics lead to conflicting interests and cause intentional and unintentional decoupling in the adaptation and implementation of entrepreneurial actions in universities. This study shows that the engagement or decoupling of individuals with entrepreneurship depends on two factors: 1) how individuals perceive their roles in the entrepreneurship processes, and 2) whether individuals interpret institutional demands as complementary or counterproductive to their academic work.

4.2.3 Main contribution

This paper contributes to the literature on U-BEEs by illustrating a case that highlights the ways in which academics engage with or decouple themselves from entrepreneurship processes and thereby the emerging entrepreneurship ecosystem. Second, this study provides new insights into the importance of the cognitive and normative influences that guide individual actions in entrepreneurial activities, rather than university regulations. This case shows that even if the promotion of entrepreneurship is high up in regional strategies and it is strongly supported by the university management as a top-down initiative, the university staff tend to interpret the incentive system as counterproductive, and there is some both intentional and unintentional decoupling if the staff are not engaged in entrepreneurship processes, and if the strategic goals and support mechanisms are not aligned.

4.3 **Publication III – Understanding the emergence of the university-based entrepreneurial ecosystem: Comparing the university and company actors' perspectives**

4.3.1 **Objectives**

The third publication was a follow-up to Publication II, and it addressed **RQ2 What are the motives of different actors to engage in U-BEES, RQ3 How do different actors engage with the emerging U-BEES, and RQ4 How do different actors perceive university as a catalyst for entrepreneurship**. The main aim of the study was to provide new insights into the theory development of U-BEES by discovering the underlying factors that enhance or hinder the emergence of U-BEES. The study gives voice to individuals and compares the different perspectives of the university and company actors towards the university as a producer of new knowledge, start-ups, entrepreneurs, and a skilled workforce. The publication is based on 22 in-depth interviews consisting of ten interviews with company actors and 12 interviews with academic and administrative staff of the university.

4.3.2 **Main findings**

The analysis showed that entrepreneurship promotion in the U-BEE is not only about new business creation; rather, the most important role of the university is to educate future entrepreneurs and to provide a high-quality workforce. The emergence of a U-BEE is fostered by scientific excellence, focusing on strong dyadic relationships between the university and company actors. However, strong dyadic relationships can also act as a hindering factor, since they hinder further accumulation of knowledge and might lead to the one-sided development of a specific industrial field.

4.3.3 **Main contribution**

The study suggests that the current theories on U-BEES should place more weight on the entrepreneurial culture and social relations and should acknowledge students as important intermediaries and members of the U-BEE. From the practitioner's point of view, the study implies that the centralisation of entrepreneurship-related functions may lead to additional bureaucracy, which may hinder the emergence of the U-BEE.

4.4 **Publication IV – High hopes: regional policy expectations for the entrepreneurial university**

4.4.1 **Objectives**

Especially when there is a single university in a region, the university can have a significant impact on regional development. There is a broad array of research on the role

and impact of universities on regions (Audretsch et al., 2012; Bramwell and Wolfe, 2008; Guerrero et al., 2016), while less attention is paid to the expectations that a region sets for a university. The fourth publication addressed **RQ1 How do the expectations of policymakers shape the emergent U-BEE** by investigating the regional policy expectations towards the university. Furthermore, the publication examined the influence of the university on these expectations. This study utilised local and regional strategy documents and eight conversational thematic interviews conducted with central policymakers in the region.

4.4.2 Main findings

The results of the study showed that in peripheral regions, the existence of a single university easily leads to a university-dominated policy and thus to a regional policy lock-in. Consequently, the implementation of the regional policies may be in the hands of the university, leaving other regional stakeholders with a minor role. In order to fully utilise the potential of the university to address specific regional challenges, the university should not only be seen as a locus of new spin-offs and start-ups, but rather as a producer of qualified graduates and future entrepreneurs.

4.4.3 Main contribution

This publication adds new knowledge concerning the expectations of local and regional policymakers towards the university. The results of the study showed that the existence of a single university in a region can lead to a university-dominated policy and a policy lock-in. The dominant role of a university may be a preferable situation for most of the policy decision-makers in the region, since the university guides the organisations to invest regional and local resources in the same direction, which enables economies of scale in regional development. However, policy lock-in also has a disadvantage, since it may hinder industrial renewal and the full utilisation of the university's resources.

4.5 Publication V - Students' Perceptions of the Entrepreneurial Culture in the Finnish Higher Education Institutions

4.5.1 Objectives

The final publication brought out the student perspective and highlighted students' perceptions of the entrepreneurial culture (EC) in higher education institutions (HEIs). Students are important but often neglected actors when studying U-BEEs. This publication addressed **RQ3 How do different actors engage with the emerging U-BEEs and RQ4 How do different actors perceive university as a catalyst for entrepreneurship** from the student perspective. The specific aim of the study was to investigate how students perceived EC and what factors explained the students' perceptions. In order to reach a large sample of students covering all fields of education,

a quantitative survey was conducted in 24 universities of applied sciences and 12 research-focused universities in Finland.

4.5.2 Main findings

The study showed that entrepreneurial culture has gained steady ground in Finnish HEIs, and students considered that entrepreneurship is valued on individual and institutional levels. Students from universities of applied sciences viewed EC more positively than students studying at research universities. Institutional-level activities had the strongest impact on students' perceived EC. Furthermore, the results highlighted that teachers have a great influence on the students' perceptions of EC. Therefore, entrepreneurship promotion, including among teachers, is decisive.

4.5.3 Main contribution

The results of the study highlighted the importance of institutional strategies and institutional-level activities. They seem to have the greatest significant impact on the perceived entrepreneurial culture. From a practical point of view, the findings indicate that if HEIs seek to build up an entrepreneurial culture and operate entrepreneurially, it is vital to support teachers' entrepreneurial behaviour and thinking as, from the students' perspective, they are the key persons promoting entrepreneurship.

4.6 Summary of the findings

The objective of this thesis was to understand the emergence of a university-based entrepreneurship ecosystem (U-BEE) from the different actors' viewpoint. The individual publications provide an understanding from the different levels of U-BEE and from the viewpoints of individual actors belonging to the U-BEE. Table 3 summarises the main findings and presents the contribution of each publication to the main objective of the thesis.

Table 3. Summary of the main findings and contributions of the publications.

Publication	Main findings	Main contribution to the thesis
Publication I: European approaches to enterprise education	In HEIs, top-level strategic guidance is decisive. Additionally, entrepreneurial movement has extensive implications for universities, regions, and the national enterprise policy.	Introduces a typology that enables the classification of different approaches to enterprise education in universities.
Publication II: Challenges to the development of an entrepreneurial university ecosystem: The case of a Finnish university campus	Education and research are regarded as highly institutionalised logics of the university, and these logics tend to be maintained. The competing logics lead to conflicting interests and cause intentional and unintentional decoupling of entrepreneurial actions.	Intentional and unintentional decoupling occur if the strategic goals and support mechanisms are not aligned, if there are contradictory expectations regarding each other's roles, and if entrepreneurial activities do not complement the academic work.
Publication III: Understanding the emergence of the university-based entrepreneurial ecosystem: Comparing the university and company actors' perspectives	Focused actions and strong dyadic relationships based on scientific excellence reinforce the interaction between companies and the university in the emergence of the U-BEE. However, the dyadic relationships, as well as focusing on spin-offs and start-ups, can hinder the emergence of the U-BEE and horizontal networking between the actors.	The study suggests that research on U-BEEs should place more weight on the entrepreneurial culture and social relations, as well as acknowledging students as important intermediaries and members in the U-BEE.
Publication IV: High hopes: regional policy expectations for the entrepreneurial university	In peripheral regions, the existence of a single university easily leads to a university-dominated policy and policy lock-in. This might result in overemphasis of selected focus areas leaving other areas and actors outside the inner circle of the entrepreneurial ecosystem.	A university-dominated policy and policy lock-in might be a preferable situation for local and regional policymakers: however, it may hinder industrial renewal and the full utilisation of university resources.
Publication V: Students' Perceptions of the Entrepreneurial Culture in the Finnish Higher Education Institutions	An entrepreneurial culture has gained steady ground in Finnish HEIs. Institutional-level activities, such as different support services, information, facilities, and events, have the strongest impact on students' perceived EC.	Institutional strategies and institutional-level activities have the highest significant impact on the perceived EC among students. Additionally, teachers have a greater influence on students' perceptions of EC than fellow students.

Publications I and IV are connected to the first research question **How do the expectations of policymakers shape the emergent U-BEES?** The findings of Publication I provide comprehensive insights into different policy approaches to enterprise education by applying a broad meaning of an entrepreneurial university that goes beyond research commercialisation and technology transfer (Siegel and Wright, 2015). The results show that in addition to university-level strategies, national and regional policies have a great influence on the emergence of the U-BEE. The expectations of policymakers stem from distinct motives that may be connected to transforming the business culture of nations, responding to the competitiveness and unemployment of regions, and promoting a knowledge-based society.

Publication IV provides new information on the influence of regional policy expectations on the regional impact of universities (Trippel, Sinozic and Lawton Smith, 2015), and on the role of universities in different regions (Abreu et al., 2016; Pugh et al., 2019). The case of a technological university shows that regional policy expectations can be successfully aligned with the expertise and strategic mission of a university (Siegel and Wright, 2015; Trippel, Sinozic and Lawton Smith, 2015). However, alignment of strategic missions easily leads to the dominance of a university and a policy lock-in that has both positive and negative effects.

Publications II and III addressed **RQ2 What are the motives of different actors to engage in U-BEES?** The results of Publication II, which focuses on the university actors' perspectives, shows that advancing their own research motivates academics most to engage in the U-BEE. However, when addressing the specific research gap of how university actors find the balance between the conflicting institutional logics (Abreu et al., 2016; Miller, McAdam and McAdam, 2014), the findings suggest that to enhance the motives of academics to engage in the U-BEE, entrepreneurial actions need to complement the academic work, meaning the research and teaching that are considered as institutionalised logics of universities. In addition, strategic goals and support mechanisms needs to be aligned, otherwise individuals tend to decouple from entrepreneurial actions. When investigating company actors' perspectives that have received less attention in the current literature (Ankrah et al., 2013; Clauss, Moussa and Kesting, 2018), the findings of Publication III show that company actors consider scientific excellence and solving of concrete problems as the main motives to engage in U-BEES. Different institutional logics cause surprisingly few tensions between the university and company actors. Conflicting interests can be avoided and motives to engage in the U-BEE enhanced, if the collaboration is based on trusting, long-term relationships with senior academics and company representatives.

Publications II, III, and V addressed **RQ3 How do different actors engage with the emerging U-BEES?** The research question and related publications addressed the specific knowledge needs on the interrelations of the different components of the U-BEE (Guerrero et al., 2016; Huang-Saad, Duval-Coutiel and Park, 2018; Theodoraki, Messegem and Rice, 2018), and on the formal and informal interaction mechanisms

(Theodoraki, Messeghem and Rice, 2018) between the university and industry actors (Björklund and Krueger, 2016; Clauss, Moussa and Kesting, 2018; Huyghe and Knockaert, 2015). The findings show that the interactions between the university and company actors are based on strong dyadic relationships in specific focus areas. For this reason, horizontal networks and institutionalised collaboration mechanisms are not developed. In addition, this study is aligned with previous studies (see Clauss, Moussa and Kesting, 2018) in confirming that students are a neglected stakeholder group in U-BEEs, and they tend to operate in their own silos.

Further, Publications II, III, and V were connected to the last research question **RQ4 How do different actors perceive university as a catalyst for entrepreneurship?** The perceptions of the different actors regarding the university as a catalyst for entrepreneurship varies, depending on the context. In education, university–industry collaboration is seen as an important element, for example, during assignments, thesis work, and guest lectures. Company actors and academics share the same view that the most important role of the university is to educate future entrepreneurs and to provide a high-quality workforce. It is notable that neither university staff nor companies consider universities to be the locus of new spin-offs and start-ups. This finding contradicts previous research stating that universities are natural incubators (Etzkowitz and Klofsten, 2005) and supports the statement that the education of qualified employees is a more natural role for universities than spin-off creation (Wennberg, Wiklund and Wright, 2011). From the students' perspective, institutional strategies and institutional-level activities, such as support services, information, and facilities, have the highest significant impact on the students' perceptions of entrepreneurial culture. Additionally, teachers have a greater influence on students' perceptions of entrepreneurial culture than fellow students.

4.7 Facilitating and hindering attributes influencing the emergence of the U-BEE

This thesis focused on exploring the emergence of the U-BEE, and especially the perceptions of individuals and the interactions that take place at individual and organisational levels. Figure 4 illustrates the main individual and organisational-level attributes that shape the system-level emergence of the U-BEE.

	<i>Facilitating attributes</i>	<i>Hindering attributes</i>
<i>System/ Organisational level</i>	<ul style="list-style-type: none"> ▪ Institutional strategies and guidance by the top management ▪ Focusing on educating future entrepreneurs and high-quality workforce ▪ Teachers as role models for students ▪ Specific focus areas help to target the scarce resources in the region 	<ul style="list-style-type: none"> ▪ Fragmented infrastructure and support services ▪ Focused TTO services on specific fields ▪ University bureaucracy, especially for SMEs ▪ Specific focus areas enhance the development of a specific field of industry
<i>Individual level</i>	<ul style="list-style-type: none"> ▪ Academics engaging with industry to advance their own research ▪ Concrete development projects solving real problems 	<ul style="list-style-type: none"> ▪ Narrow view on entrepreneurship focusing on commercialisation ▪ Misalignment between the expectations and actual funding enhances decoupling ▪ Students operating in their own silos ▪ Dyadic relationships between academics and companies

Figure 4. Facilitating and hindering attributes influencing the emergence of the U-BEE

Institutional strategies and guidance by the top management play an important role in promoting entrepreneurship at universities. At an organisational level, universities have applied various paths in their institutional strategies and policies (Kitagawa, Sánchez-Barrioluengo and Uyarra, 2016). These strategic measures can be holistic, covering a broad range of entrepreneurial actions within the whole university, or they can be focused and targeted at specific actions and units of the university (Pittaway and Hannon, 2008). The findings of this thesis show that even if a university applies a holistic approach in entrepreneurship promotion, entrepreneurship tends to be associated with the commercialisation of research results. Moreover, these holistic measures do not appear as a coherent whole across the university. Infrastructure and support services for entrepreneurship seem to be fragmented, and their availability is not communicated in a clear manner.

Individual-level interactions and behaviours have a great influence on the emergence of the U-BEE. Since teaching and research are the main missions of universities and are highly institutionalised, individuals tend to decouple themselves, either intentionally or unintentionally, from entrepreneurial actions. Academics tend to interpret entrepreneurial actions from the narrow perspective associating it with the hard forms of entrepreneurship, namely the commercialisation of research and the creation of start-ups and spin-offs. When this narrow view of entrepreneurship prevails, a sort of “us and them” thinking arises, and some academics may consider entrepreneurship a thing for a very few: a thing for those exceptional individuals who are involved in research commercialisation actions. The “us and them” type of thinking also concerns students. Academics may consider that they can conduct real forms of hard entrepreneurship, whereas student entrepreneurship may be viewed as concentrating on less demanding things that are not interesting from a scientific point of view. As a result, based on these perceptions, entrepreneurship is considered a task for TTOs and a few top scientists who

are experienced in research commercialisation and are well networked with their industrial partners. Consequently, emerging U-BEES will be focused on the commercialisation of research of specific scientific disciplines, and their interactions may mainly be based on dyadic relationships between top scientists and company actors. In a similar vein, the services of the TTO exist, but they are highly focused on supporting specific technological fields. This leaves a large number of entrepreneurial initiatives of students and staff beyond the scope of the support services offered by the university TTO. In an emerging U-BEE, this leads to further fragmentation and sparse networks consisting of top scientists and TTO officers.

Fragmentation of entrepreneurship functions can also be identified among students. Students operate in their own silos, and they are not fully aware of the existing support mechanisms for the promotion of entrepreneurship. Previous research shows that informal factors, such as attitudes and role models, have a greater impact on students' entrepreneurial activities than formal factors such as support measures and education (Guerrero, Urbano and Fayolle, 2016). This research highlights the important role of teachers as role models instead of peer students. This implies that "us and them" is also common among students. For example, students' entrepreneurship clubs do not reach the vast majority of students, but they serve as a forum for the most enthusiastic students interested in entrepreneurship. For this reason, teachers and institutional support mechanisms play an important role in raising awareness and fostering entrepreneurial activities among students.

The point of view that the most important role of the university is to educate future entrepreneurs and to provide a high-quality workforce is commonly shared. University or company actors consider universities' role as producers of new spin-offs and start-ups to be less important. However, the narrow view of entrepreneurship is dominant, emphasising research commercialisation, when measuring the impact of strategic actions. The case of the technological university shows that institutional strategies and the top management of universities highlight entrepreneurial actions that are easy to measure, for example, by means of the number of patents and spin-offs. Accordingly, the incentive and reward systems are built based on these quantitative measures. Further, governmental funding for universities rewards universities for achieving targets related to teaching and research and neglects the third mission activities of the universities. This misalignment between expectations and actual funding enhances intentional decoupling from entrepreneurial activities, especially at an individual level.

The results of this thesis correspond to previous research showing that the main driver for academics to engage with industry is to advance their own research (D'Este and Perkmann, 2011). This may be contradictory to company expectations, since company actors value concrete development projects more than long-term research projects (Bramwell and Wolfe, 2008). This applies especially to SMEs, who do not have similar resources to large companies to participate in longer research projects. Both academics and company actors recognise that universities cannot follow a "one-size-fits-all" approach to business collaboration. All agree that bureaucracy should be minimal when

collaborating with SMEs. Heavy bureaucracy caused by university administration can be a hindering factor to the emergence of U-BEEs, as well as the inadequate resources of SMEs to participate in research projects. Consequently, large numbers of regional SMEs are not as capable as large companies of accessing the same resources provided by U-BEEs. As argued by Spigel and Harrison (2018), the inability of entrepreneurs to access the resources available in the entrepreneurial ecosystem might lead to a sparse and poorly functioning EE characterised by a lack of dense social networks, and this may hinder entrepreneurs' access to critical resources. Therefore, little recycling of resources takes place locally, and existing resources may leak to other regions.

In general, regions consider the university as a vehicle to gain economic prosperity and new jobs. In the case of a single technological university located in a peripheral region, the university's dominant role in the region and in regional policies has resulted in a policy lock-in, as stated by Brown (2016). Institutional capture, which causes the policy lock-in (Brown, 2016), is in turn caused by the strong influence of the university management and a few top scientists, who are in a powerful position to promote the specific focus areas of the university to be included in the regional development targets. The policy lock-in has both negative and positive effects on regional development. From the perspective of the emerging entrepreneurial ecosystem, the focusing of actions based on such a policy has a negative effect, since it leads to the development of stronger vertical networks within a specific field of industry. This is an undesirable situation for the emergence of an entrepreneurial ecosystem, since well-functioning entrepreneurial ecosystems tend to possess holistic networks across different fields of industry (Spigel and Harrison, 2018). On the positive side, focusing actions on specific focus areas helps to target scarce resources, and it is possible to achieve economies of scale and smart specialisation in a region.

5 Conclusions

This chapter presents the overall conclusions of the thesis in terms of theoretical and practical implications. In addition, limitations and suggestions for future research are given.

5.1 Theoretical implications

The major theoretical implications of this thesis contribute to the literature on university-based entrepreneurship ecosystems (U-BEEs). Since research on U-BEEs is still emerging, and it does not have firmly established theoretical frameworks, the research domains of the entrepreneurial ecosystem, entrepreneurial university, and university–industry collaboration were utilised in order to gain better understanding of the emergence of U-BEEs. Moreover, insights from institutional theory, and particularly institutional logics, were applied in the individual publications and in the key findings of this thesis.

The main aim of this thesis was to contribute to the knowledge on the emergence of U-BEEs. From the theoretical perspective, the main theoretical contributions are: 1) that a lack of interaction between different stakeholders leads to a weak U-BEE, 2) decoupling stems from a narrow interpretation of entrepreneurship, and 3) the entrepreneurial-market and community logics of a university can be enhanced by engaging different actors in the U-BEE. In the following section, these main implications are discussed in detail.

Lack of interaction between different stakeholders leads to a weak U-BEE

This study investigated the emergence of the U-BEE from the viewpoint of different stakeholders. Previous research on U-BEEs, as well as research on entrepreneurial universities and university–industry collaboration, has largely focused on investigating studied phenomena from the university point of view, neglecting a broader stakeholder perspective (Ankrah et al., 2013; Clauss, Moussa and Kesting, 2018). Moreover, a systemic perspective of entrepreneurial ecosystems that includes different actors from different institutional backgrounds is missing (Roundy, 2017). This study finds that different institutional backgrounds cause tensions, and these tensions are more visible in distinct subgroups than between the different actors in general.

The findings of this study show that different institutional backgrounds between university and company actors cause surprisingly few tensions. In well-established collaboration between top scientists and company actors, most of the tensions are caused by the administrative processes of the university. Different institutional backgrounds are more visible between universities and SMEs in cases when well-established relationships do not exist. Again, the tensions arise mainly due to administrative bureaucracy, but also due to a lack of previous contacts with university researchers. In universities, despite sharing the same institutional environment, distinct groups with their own institutional logics are formed. Different actor groups tend to operate in their own silos, which maintain the distinction between these groups. If the distinction between these different

groups is further enhanced by “us and them” thinking, it can lead to the creation of a specific “elite group” that forms the core of the U-BEE. In emerging U-BEEs, this implies that maintaining the distinctions between different actors might lead to the development of an ecosystem that is munificent in terms of specific recourses, but poor in network strengths. Additionally, reducing the distinctions between the different actors is more likely to lead to the development of strong and munificent entrepreneurial ecosystems, as defined by Spigel and Harrison (2018).

Decoupling stems from the narrow interpretation of entrepreneurship

The most critical factors in entrepreneurial universities are the attitudes of faculty and students towards entrepreneurship (Guerrero and Urbano, 2012). In a similar vein, the motives and behaviours of individual actors in U-BEEs play an important role in the emergence of the U-BEE. This study shows that academics tend to decouple themselves from entrepreneurial activities intentionally or unintentionally for various reasons. First, academics may consider that entrepreneurial activities do not complement their academic work. Second, academics may have contradictory expectations regarding each other’s roles. This study suggests that decoupling stems from the fact that entrepreneurship tends to be interpreted through a narrow meaning, focusing on technological transfer and research commercialisation. This interpretation increases the “us and them” sort of thinking, as discussed above, and the majority of academics may not feel engaged in the U-BEE. Instead, they may continue to hold strong dyadic relationships with their industrial partners. This study agrees with Perkmann et al. (2013), who found that academics consider academic engagement to be a natural extension to scientific research, whereas research commercialisation is seen as a distinct activity in which organisational support is more relevant.

Entrepreneurial-market and community logics of university can be enhanced by engaging different actors in the U-BEE

This study addresses the calls for more research on entrepreneurial ecosystems, especially concerning hybrid support organisations (Roundy, 2017) such as universities (Abreu et al., 2016) in regions that are less favourable for entrepreneurship, such as smaller cities and towns (Roundy, 2017). Roundy (2017) states that diversity among hybrid organisations leads to a greater diversity of venture types in entrepreneurial ecosystems. This study shows that in a region that is dominated by a single technological university, the university’s influence can lead to a policy lock-in that might hinder the development of diverse companies in the region, and consequently the development of a sparse entrepreneurial ecosystem (Spigel and Harrison, 2018). The results of this study also imply that when the academic logic of a hybrid support organisation is dominant, entrepreneurial-market and community logics (Roundy, 2017) play a minor role. This implies that if the university is given or takes a role as a hub organisation in a local entrepreneurial ecosystem, the local business community may have difficulties in engaging with the emergent entrepreneurial ecosystem. To enhance the development of a well-functioning and munificent entrepreneurial ecosystem (Spigel and Harrison, 2018),

the university should aim to find an appropriate balance between the different logics (Jongbloed, 2015), emphasising entrepreneurial-market and community logics in addition to academic logic. This can be achieved by the broader engagement of different internal and external actors in the U-BEE, including teachers and students.

5.2 Practical implications

In addition to its theoretical contribution, this thesis offers several implications for practitioners, including policymakers, university management, businesses, and entrepreneurs. The main managerial implications of this thesis are presented in the form of recommendations.

Funding and other support mechanisms should be aligned with the expectations for entrepreneurial actions

Universities have capabilities to be natural incubators (Etzkowitz and Klofsten, 2005), but despite these capabilities, most of the actions of universities are focused on teaching and research, which are the traditional legitimised missions of universities. In a similar vein, reward structures and incentives highlight actions related to teaching and research. Teaching and research are also emphasised in the governmental funding targeted at the universities. Since the existing reward and incentive systems do not encourage university staff to participate in entrepreneurial activities, the funding and reward systems should be changed so that they would acknowledge entrepreneurial activities separately, or entrepreneurial activities should be better integrated with teaching and research so that they would complement each other. In sum, better strategies for incentives should be developed (Guerrero and Urbano, 2012).

All stakeholders should be engaged in the U-BEE

U-BEEs seem to be easily dominated by research commercialisation actions and led by individuals who are active in commercialisation of research outcomes. Additionally, initiatives for various entrepreneurial activities have traditionally been separated, supporting either students or faculty (Huang-Saad, Fay and Sheridan, 2017). In order to strengthen U-BEEs in terms of their network strength and resource munificence (Spigel and Harrison, 2018), all stakeholders should be engaged in the U-BEE. First, TTOs should be better integrated as part of the teaching mission of universities, as already indicated by Bolzani et al. (2020). Additionally, a large share of the business creation activities do not take place through licensing, patenting, or spin-off creation carried out by TTOs and formal university regulations (Abreu et al., 2016; Clarysse, Tartari and Salter, 2011; Fini, Lacetera and Shane, 2010). For this reason, the activities of TTOs should be extended, or additional support mechanisms should be created. These support services should be accessible to all staff and students, and information on the availability of these services should be presented in a clear manner. Information should be distributed in a way that would engage and invite those persons who are interested in entrepreneurial activities, but who have not actively participated in the entrepreneurship processes.

Furthermore, teachers have an important but underutilised role in U-BEEs. Teaching activities could be better connected to the U-BEE, and not just the courses and activities that are directly related to entrepreneurship. Potential connecting points could be thesis and course work, guest lectures, and so on. Engaging teachers in the U-BEE requires the development of strategies, structures, and culture to reinforce the development of education and training that would support creativity and the entrepreneurial experience (Guerrero and Urbano, 2012). As the education of future entrepreneurs and a high-quality workforce is considered to be the most important task of a university, students should be better integrated into various activities of the U-BEE. For example, previous studies show that graduate students may play a similar role to faculty members in the creation of university-based spin-offs. The development and success of student-run spinoffs can be enhanced further by engaging with and offering relevant contacts in the surrounding region (Hayter, Lubynsky and Maroulis, 2017). The engagement of students in the U-BEE can also be related to experiences of thesis work and company assignments. Furthermore, SMEs should also be better engaged with the U-BEE. This can be done by offering various low-threshold opportunities to allow participation in collaborative actions with universities.

The university's entrepreneurial mission should be communicated clearly to internal and external stakeholders

Top-down entrepreneurial initiatives and subsequent value shifts in university culture must be communicated clearly, since there can be resistive inertia and uncertainty about the appropriateness of the entrepreneurial mission among university staff (Jacob, Lundqvist and Hellsmark, 2003). As entrepreneurship in a university setting tends to be associated with commercialisation actions, the university management should clarify what entrepreneurship specifically means in the university missions and policies. Should the focus be on patenting and new business creation, or on the education of entrepreneurial graduates, or on the promotion of university–business collaboration, or on a broad range of activities? The university should communicate in a clear manner what the different action points mean and how their implementation will be evaluated. It is very important to communicate clear evaluation strategies, and the incentives related to them, to the faculty members.

5.3 Limitations of the thesis

Like any research, this study has its limitations. As the major part of this thesis is based on qualitative research, the generalisability of the findings may provoke concerns, even if the study includes quantitative research that was used to gain broader perspectives on the emergence of U-BEEs.

First, regarding the generalisability, Publications II, III, and IV focused on the specific case of a technological university located in south-east Finland. The case university is a technological university that has had close industrial relations since it was established in 1969. Therefore, the results of this thesis might be biased and not applicable to

multidisciplinary universities. Additionally, the university is rather small and is located in a peripheral region outside the capital region of Finland. For these reasons, the results might not be applicable in different contexts or in countries with different social systems.

Second, as discussed in previous sections of this thesis, entrepreneurship promotion in universities is strongly associated with technology transfer and research commercialisation (e.g., Mascarenhas et al., 2017). In a similar vein, this research started with a strong focus on research commercialisation, since the data gathering was started in a project with the main aim of fostering the commercialisation of research-based results. This fact may have limited some of the discussions with the interviewees, even if the themes of the interviews were composed in such a way that they would cover university-based entrepreneurship as broadly as possible.

5.4 Suggestions for future research

As the research on U-BEEs is relatively novel, it offers several interesting research avenues for further research. Based on the findings of this study, some particularly interesting future research topics can be suggested.

The majority of the findings of this thesis are based on the case of a technological university located in Finland. Future research could investigate the emergence and development of U-BEEs in different types of universities in different regions, such as regions with different demographic and economic characteristics, and regions with different types of industrial base. The perspective of universities as hybrid support organisations in the above-mentioned different contexts would make specifically interesting research avenues for the future.

Malecki (2017) called for longitudinal research on the emergence and development of entrepreneurial ecosystems. Like many other studies, this thesis could not address this specific research gap. Future research could continue to follow a similar path to that started by Matt and Schaeffer (2018), who investigated building a U-BEE promoting student entrepreneurship by utilising longitudinal data.

Further, the role of students in university spin-offs (Hayter, 2016), and student entrepreneurship in general, offers interesting research avenues. First, university TTOs tend to concentrate on commercialisation and research-based innovations, and they form their own distinct organisations within universities. The study by Bolzani et al. (2020) notes that some TTOs could have an even a broader role in entrepreneurship education. As also suggested by Bolzani et al. (2020), the motivations of TTO professionals to be involved in EE actions and educational activities could be investigated further. Second, more knowledge is needed regarding the impact of different support mechanisms available for students, such as dedicated entrepreneurship spaces and collaborative learning environments that connect students with the U-BEE. Another interesting aspect to investigate concerning the involvement of students in U-BEEs would be to explore university–business collaboration from the students' and company actors' perspectives.

Finally, this study agrees with the study by Jacob, Lundqvist and Hellsmark (2003) about the importance of communicating entrepreneurial strategies and policies at universities. It would make an interesting piece of research to investigate how an entrepreneurship strategy is communicated in universities, and what the interpretation of the strategy is among different actors, such as university staff and students, company actors, and national and regional policymakers.

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Appendix A: Interview frame

About you:

Position, organisation, brief description of current roles and responsibilities

Networking and collaboration:

In which knowledge and technology transfer (KT) activities related to the university is your organisation involved?

How important is this collaboration to you and the organisation you represent?

How did this collaboration start?

What are the most important means of collaboration?

Who are the other key players and what roles do they have? Is the division of roles clear?

Do the institutions play well together?

Why is KT from universities to industry important, and what are the drivers for it?

What have been the most successful outcomes and why?

What have been the less successful attempts and why?

Communication

Is there frequent communication with the university and within the entrepreneurial community?

Who is represented in this conversation?

Governance and leadership

Does the regional government have a clear, stated strategic intent to grow entrepreneurial activity?

Do civic officials take advantage of encouraging entrepreneurs?

Do civic officials have a visible presence in the entrepreneurial community?

Does government actively promote exchanges of ideas with other cities/regions/countries?

Do the community's leaders support changing to more entrepreneurial culture?

How easily are the new ideas and new work methods accepted in your immediate work environment and in the wider network of stakeholders?

Barriers and concerns:

What, if any, are the barriers to collaboration that you have come across?

How, if at all, were you able to overcome these barriers?

Do you have any concerns about collaboration and your organisation's involvement in it?

Support:

How does your organisation encourage/support/facilitate collaboration with external stakeholders?

Which of these activities are successful and why?

What more could you or your organisation do to support KT?

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European approaches to enterprise education

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CHAPTER 1, Part 1

EUROPEAN APPROACHES TO ENTERPRISE EDUCATION

Katja Lahikainen

Elena Ruskovaara

Timo Pihkala

Lappeenranta University of Technology, Finland

INTRODUCTION

For the past 10-15 years, European universities have faced growing expectations for their role in promoting enterprise, innovation and small business development. As a response, European universities are rapidly developing new approaches to incorporate enterprise promotion in the university structure.

The increasing pressure on the universities' enterprise activities comes from different sources. First, the growing interaction between universities and businesses has stemmed from the need to increase non-governmental funding, due partly to decreasing governmental funding. Second, university students' growing interest in enterprising is transforming the universities from the inside. The objectives and intentions of university students are changing to include entrepreneurial careers, and as a consequence, students expect university education to provide

extensive opportunities for entrepreneurial learning. Therefore, a dynamic, effective and holistic entrepreneurial profile has become a competitive advantage for universities.

Enterprise education has been reviewed in European universities since 2000. Hytti (2002) provides a state-of-the-art description of European enterprise education. She suggests that enterprise education is seen in terms of three partly converging aims: learning to understand entrepreneurship, learning to become entrepreneurial, and learning to become an entrepreneur. European universities have become important partners in regional and national development together with administration and business. This development has been supported by the rise of the third generation university (cf. Wissema, 2009) and the triple helix model (e.g. Etzkowitz and Leydesdorff, 2000). Close industry relationships are expected to accelerate the commercialisation of innovations, employment of young people and updating of skills and competences. Wright et al. (2007) focus on academic entrepreneurship in Europe, analysing especially the commercialisation of university research. They suggest that besides the traditional licensing of innovations, a new approach to creating new business is emerging: spin-off businesses based on technologies and knowledge generated in universities.

Wilson (2008) assesses enterprise education in European higher educational institutes and compares it to the US. She considers enterprise education to be the first and most important step in developing an innovative culture in Europe. Furthermore, most enterprise courses are offered within business and economic studies (European Commission, 2008¹). So, the real challenge is to make enterprise education systematically accessible to all students in every institution. Zahra and Welter (2008) examine the role of enterprise education in the former

¹ See European survey on Higher Education Institutions at: https://ec.europa.eu/growth/smes/promoting-entrepreneurship/support/education/projects-studies_en

Soviet Bloc. They point out that in many respects, the central, eastern and south-eastern countries in Europe differ largely in their valuing of enterprise and entrepreneurs. This has important implications for the promotion of enterprise education in Europe.

The purpose of this chapter is to provide comprehensive insights into European approaches to enterprise education. Even if universities are facing the entrepreneurial turn (Goldstein, 2010), the development in European higher education seems to have taken varying routes. To analyse this, we introduce different approaches and identify examples of national and academic enterprise education in Europe. The research question we address is: **How is enterprise education guided, encouraged and implemented in European universities?**

This chapter is organized as follows: First, we review the literature relating to enterprise education in Europe and universities. Second, we present the methodology and describe the cases and examples. Finally, we conclude by discussing the findings and limitations of the study.

POSITIONING ENTERPRISE EDUCATION IN UNIVERSITIES

Enterprise education within European universities varies vastly (European Commission, 2008). To catch the variance, we present a framework to position enterprise education in universities (Figure 1). The framework emphasises two important aspects related to entrepreneurial activity: the unit of activity (single vs. multiple) and the mode of activity (facilitation vs. enterprising). We stress that entrepreneurial activity in this context may refer simultaneously to different numbers of actors. While the university could be considered a single decision-maker, it also comprizes multiple individual and collective actors that operate both jointly and independently. However, while most activities related to enterprising in universities involve

facilitation and the creation of an infrastructure, also the actual concept of being enterprising can be recognized in the university setting.

INSERT FIGURE 1 Typology of entrepreneurial activities in universities NEAR HERE.

1) First quadrant: institutional strategies

In the first quadrant, the central actor is the university as an institution. Universities have been identified as distinct actors promoting and supporting enterprise and even acting entrepreneurially. A university with an entrepreneurial mission based on technology or knowledge transfer (third generation university, cf. Wissema, 2009) supports economic growth by fostering academic enterprise. (Kolhinen, 2015) Academic enterprise refers to the efforts and activities that universities and their industry partners undertake in commercialising research outcomes (Wood, 2011). Hence, entrepreneurship is an intentional choice for the organisation. To operate entrepreneurially, educational institutions adopt different strategic, structural and administrative solutions (Pittaway and Hannon, 2008). Besides the commercialisation process, academic enterprise also includes promoting an entrepreneurial mind-set and skills for entrepreneurs, resource providers, suppliers, customers and policy makers (Rice, Fetters and Greene, 2010). The concept of an entrepreneurial university is based on this holistic view that enterprise is embedded in all activities of the university, starting from its strategy. The entrepreneurial turn of a university requires new governance, management and institutional capacities; for example, teaching, rewards and incentives, strategic alliances, and teams and intermediate functions, e.g. technology transfer offices (TTOs) and business incubators (Goldstein, 2010).

2) Second quadrant: contextual relationships

The second quadrant refers to the involvement and support of the university in local entrepreneurial ecosystems, regional innovation systems (RIS) and other contextual platforms (Foss and Gibson, 2015; Stam, 2015). From this perspective, the various actors operating in the context or infrastructure – like possible customers, networking partners and competitors – form an abstract group necessary for new entrepreneurial ventures. The individual actors are seldom recognized separately because in this perspective the main interest is in the functioning of the innovation system as a whole (Kallio, Harmaakorpi and Pihkala, 2010). Instead, the focus is on the relationship between universities and their operational context from the perspective of enterprise development. These relationships can be studied through the triple helix model, which consists of trilateral networks and hybrid organisations between academic entities, governmental organisations, and business (Etzkowitz and Leydesdorff, 2000). The concepts of entrepreneurial and innovation ecosystems have emerged to describe the enterprise and interactions of independent actors in a given context (Stam, 2015). Universities contribute to local and regional ecosystems by promoting an entrepreneurial culture, generating and attracting talent, conducting basic and applied research, and providing formal and informal technical support for companies. Moreover, universities act as catalysts for start-ups and spin-offs and offer links to international academic networks. (Bramwell and Wolfe, 2008; Cohen, 2006; Isenberg, 2010; World Economic Forum, 2013)

3) Third quadrant: entrepreneurial movement

The third quadrant concerns the social aspect of enterprise. Academic entrepreneurs tend to collaborate with their peers, their own social network, and actors beyond the university (Hayter, 2016; Rasmussen, Mosey and Wright, 2011). In addition to single entrepreneurial teams,

enterprise has become interesting also for wider audiences and attracted people to join in. Altogether, the widespread activities are characterized by the emergence of new social groupings (Gibb, 2005). These entrepreneurial teams, networks and student societies create a platform or 'the entrepreneurial movement'. They also promote an entrepreneurial culture, spirit, learning and ventures in universities and their entrepreneurial ecosystems. The enterprising activities of different collective actors are important in universities. (Morris, Shirakova, and Tsukanova, 2017; Pihkala, Ruskovaara and Hytti, 2016) Meanwhile, being emergent, independent and separate from the university organisation, they seem to be difficult to manage with traditional mechanisms. Therefore, the contributions of universities depend on the existence and interrelationships of loosely coordinated knowledge intermediates, and spin-off success relies upon these academic and non-academic networks connected by the intermediates (Hayter, 2016).

4) Fourth quadrant: acts of enterprise

The different individual actors – students and academics – compose an important group. While the distinct measures to promote enterprise seek to facilitate the entrepreneurial behaviour of single actors, the actual academic enterprise and student enterprise depend on the entrepreneurial spirit, intentions, risk-taking propensity and entrepreneurial competences of the individuals (Mwasalwiba, 2010; Liñán and Fayolle, 2015; Piperopoulos and Dimov, 2015). This quadrant is central in the sense that without the actual enterprising of individual people, the abstract, collective and organisational efforts to support enterprise may be a waste of time and resources. The promotion of entrepreneurial action, however, bears some challenges. Most academics see themselves as teachers and researchers, not entrepreneurs (Lundqvist and Williams Middleton, 2013; Kolhinen, 2015). Furthermore, it has been argued that faculty

members do not necessarily see or understand their role as an enterprise promoter (Mwasalwiba, 2010; Kothari and Handscombe, 2007). Fostering academic enterprise would require overcoming these barriers and conflicting norms.

METHODOLOGY

In this chapter, we present small illustrative cases (Patton, 2002) to analyse the state-of-the-art of the approaches of the European enterprise education in universities. Cases allow us to focus on distinctive characteristics and achieve a deep understanding of the dynamics within individual settings (Eisenhardt, 1989). In this chapter, we focus on three national or international cases and four university-level cases.

The national cases were selected based on the following criteria (Patton, 2002): 1) they represent different parts of Europe, 2) they represent different organisations and 3) they are demonstrably able to promote enterprise. As a result, we selected the South East European Centre for Entrepreneurial Learning (SEECCEL), Portugal and Finland as the cases. The following criteria were applied to the university cases (Patton, 2002): 1) they operate in different countries, 2) they successfully promote enterprise, and 3) their approaches to enterprise differ. Consequently, we selected the Norwegian University of Science and Technology (Norway), Swansea University (UK), Lappeenranta University of Technology (Finland), and the University of Wuppertal (Germany).ⁱ

We collected data from multiple sources, such as email correspondence and written or electronic documents, between September 2016 and February 2017. The case informants were invited to describe the current state-of-the-art of enterprise education briefly at their respective levels, depending on the informant's national (decision-maker, researcher) or academic

position. Furthermore, they were asked to describe the objectives and needs of future development, and measures and incentives that guide and support enterprise education.

Manual content analysis was applied to the data. The material was read repeatedly with care to understand it fully. The data was used to illustrate the entrepreneurial practices of the case institution. From the theory, the analytical perspectives of the enterprise activities were identified, and the characteristics of these elements were drawn from the data. Finally, we applied comparative analysis to determine the similarities or differences of the cases.

As with any methodological tool, the qualitative content analysis of small illustrative cases has its limitations. Our cases enable no statistical generalisations on the issues studied and therefore suit exploratory or pilot studies best. Hence, we emphasise that the cases were selected to showcase good performance in enterprise education and to provide variety. Furthermore, the in-depth case study strongly reflects the researchers' personal preferences, which is likely to cause researcher-based bias in the data collection, analysis and interpretation. To minimize this bias, the research group continually discussed the enterprise education, the participants, and the data and its analysis.

ENTERPRISE EDUCATION IN EUROPE – CASES AND EXAMPLES

National guiding frameworks and country-specific approaches to enterprise education

Portugal

Institutional focus on employability, collaboration and local development

In Portugal, the present higher education policies linked to *employability*, economic growth, science and technology promote *the local knowledge economy*. Significant investments and support have strengthened the *collaboration between higher education institutions and the business sector*, bringing innovation to companies, aiding technological research centres, and developing incubators. The Portuguese enterprise education policy mainly aims to stimulate the development of higher education institutions and their specific characteristics in their territorial, economic and social contexts. There is an emphasis on developing academic areas that have meaning and stimulating the exchange of activities linked to research and enterprise within a regional framework. (Heitor and Horta, 2014)

Progress in Portuguese universities

In Portugal, the first enterprise courses were offered in the 1990s, but the more systematic promotion of enterprise education in Portuguese higher education institutions (HEIs) started in the early 2000s (Redford and Trigo, 2007). Later, from 2006 onwards *enterprise was included in the curricula in most Portuguese universities* (Saraiva and Paiva, 2014). Since the late 2010s, universities continued to develop their *enterprise programmes*. The enterprise courses offered at the time were mainly postgraduate courses of doctoral programmes. Portuguese HEIs focus on both *business creation* and, more recently, *enterprise as a transferal of competence* within the curriculum and *through extra-curricular clubs and activities*. (Saraiva and Paiva, 2014)

Growing outreach for entrepreneurial capacity

Portuguese universities have acknowledged that they should be connected and work in partnership with other institutions that offer the conditions and support for enhancing the potential of new entrepreneurs. Some *incubator and start-up programmes have emerged beyond the university system*, and these national partners *have increased entrepreneurial support and the needed follow-up to enterprise within the education system* (e.g. Global Startup

Program; The MIT Portugal Program; BETA-I Accelerator). Many universities benefit from connecting to these outside programmes, as they do not have their own accelerators, incubators or co-work spaces.

Future challenges

Portugal has achieved much over the past ten to fifteen years in enterprise education, but some challenges still need to be addressed through education policy development and a culture shift. The culture in Portugal is not favourable to enterprising, especially risk-taking and graduate entrepreneurs (Silva, Gomes and Correira, 2009). Efforts are needed to *change the mind-set* and embrace competitiveness, innovation and enterprise as keys to future growth. A way to move forward would be to raise awareness of entrepreneurial role models, entrepreneurial opportunities related to university studies and entrepreneurial career prospects for university graduates. Promoting innovation in universities *should mainly be understood as a learning process* and not just an inventory of definitions and priorities.

Finland

Governmental guidance for universities to provide citizens with entrepreneurial skills

The promotion of enterprise has been one of the aims of the Finnish higher education policy for a decade. In 2006, the Ministry of Education and the Ministry of Trade and Industry established a working group for promoting enterprise in higher education. The most important document for the Finnish enterprise education policy has been the national guidelines for entrepreneurship education (Ministry of Education, 2009). The guidelines underlined that *enterprise education is part of lifelong learning*; in it, *entrepreneurial skills* are developed and supplemented at different points in life. Furthermore, the Government Programme (2011) specified that efforts will be made to *increase interest in, and preparedness for, enterprise* by

means of training at all levels of education and to *highlight the links between education and the working world*.

Building incentives for enterprise education

Based on the Finnish Universities Act, Finnish universities have extensive freedom of research, art and teaching. Consequently, the Ministry of Education and Culture can only promote enterprise policies through non-binding incentives and steering. A recent survey by the Ministry of Education and Culture (2016) shows the extensive variation between universities in terms of how they implement enterprise policies. For example, some universities have developed a full range of enterprise activities, while others co-operate with businesses and support entrepreneurship rather limitedly. In this regard, technical universities seem to excel in connecting with businesses and the other external stakeholders. (Ministry of Education and Culture, 2016) Furthermore, the Ministry of Education and Culture is including enterprise in the yearly objectives of and negotiations with the universities for the period 2017-2020. Additionally, the ministry has set up a new governmental project and guidance group for enterprise education. The guidance group defines the objectives for the whole education system based on good practices identified.² The unique approach of the Finnish Ministry of Education and Culture effectively engages educational institutions. Furthermore, it indicates the importance of enterprise education for Finland.

Entrepreneurial community built on students' and researchers' activities

The Finnish entrepreneurial scene is largely built on students' activities. Student entrepreneurial societies have become popular, and currently nearly all universities have them. This has impacted regional and national enterprise policies. Student initiatives also have

² http://www.minedu.fi/export/sites/default/OPM/Julkaisut/2009/liitteet/opm07.pdf_1924203533.pdf

international importance – Europe’s leading start-up event Slush³ is closely related to the Aalto University Entrepreneurship Society. Furthermore, to foster the generation and leverage of entrepreneurial knowledge, the Scientific Association for Entrepreneurship Education was established in 2011. It brings together Finnish enterprise researchers and teachers in annual meetings.

Future challenges

Finland’s approach to enterprise education can be attributed to the collective efforts of government, institutions, teaching staff, researchers and students. However, only some Finnish universities have a clear strategy for promoting entrepreneurship. In addition, the universities co-operate with businesses in very different ways, and raising the level of industry co-operation may be one of the key tasks for the Finnish universities in the future. (Suomen yliopistot ry, 2016).

South East European Centre for Entrepreneurial Learning (SEECEL)

Institutional mission

The South East European Centre for Entrepreneurial Learning (SEECEL) was founded in 2009 in Zagreb, Croatia, by the joint initiative of eight countries⁴. SEECEL develops policies at the regional (South-east Europe) and EU levels and frameworks for implementing enterprise education, and coordinates regional initiatives. SEECEL’s mission is the systematic development of lifelong entrepreneurial learning in the context of the Small Business Act for

³ See www.slush.org/about/what-is-slush/

⁴ The eight SEECEL member states are Albania, Bosnia and Herzegovina, Croatia, Kosovo, the former Yugoslavia Republic of Macedonia, Montenegro, Serbia and Turkey.

Europe⁵ through structured regional cooperation. SEECCEL applies evidence-based policy-making, and its operations are either integral or complementary to various key EU policy documents, such as the Europe 2020 Strategy, the Entrepreneurship 2020 Action Plan, the South East Europe 2020 Strategy, the EU Strategy for the Danube Region, and the EU Strategy for the Adriatic and Ionian Region.

Introducing enterprise in universities

The piloting activities of SEECCEL were developed within a regional pilot project framework, on which SEECCEL based its 2013-2016 work programme. The project concerned 16 higher education institutions in South-east Europe and Turkey. The specific objective of the project was *to incorporate entrepreneurial learning* into existing study programmes and *develop awareness of and aspirations for enterprise among students*. This was done, for instance, by developing and embedding curricula for enterprise (e.g. pedagogical support and assessment practices) and by engaging students in enterprise learning (e.g. extracurricular events and societies and business idea competitions). Entrepreneurial learning was considered an integral part of the learning outcomes and of all study programmes and courses. Another crucial aspect of the framework programme was that it focused on universities' programmes beyond the academic disciplines of business or engineering, such as natural sciences, education, humanities and social sciences.

Entrepreneurial learning in focus

The framework project approached *entrepreneurial learning holistically*, including changes not only in the curriculum, teaching, learning and assessment practices, but also in teacher training and educational institution management. The project regarded entrepreneurial learning

⁵ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52008DC0394>

as a gradual process, *in a region in which entrepreneurial learning was not yet included in the higher education policy* Moreover, SEECEL avoided using a ‘top-down’ or ‘one size fits all’ approach; instead, it provided pilot institutions with helpful tools to define *their own needs, activities and methods*. Each pilot institution established Entrepreneurial Learning Teams, which began their interaction with other stakeholders within the university and implemented selected activities in five key areas: 1) developing and embedding curricula for enterprise, 2) engaging students in enterprise learning, 3) partnering with external stakeholders, 4) engaging senior managers, and 5) generating third stream projects like business incubation and knowledge transfer. The piloting actions between the institutions varied. For example, the University Entrepreneurship Centre at the University of Banja Luka (Bosnia and Herzegovina) provided 30 hours of training for 13 students from different faculties of the university. The main aim was to introduce and involve students in the world of entrepreneurship, to teach them to analyse themselves and their personal skills, to recognize new opportunities and to develop their own business ideas.

Promising results for further promotion of enterprise education

The project results exceeded SEECEL’s expectations. The project showed that there is *fertile ground for entrepreneurial learning* in all participating institutions. Both management and teaching staff felt that *entrepreneurial learning should be incorporated* in their study programmes. The participation of non-business students showed that entrepreneurship is relevant beyond business studies. Students of technology, humanities and other fields recognized that entrepreneurship was more largely about turning ideas into action (whether in a business or non-profit context). However, students were not highly motivated to take part in extracurricular entrepreneurship events. In institutions where the management staff played a leading role by enhancing the *development of new modules and courses*, the project paved the way for real changes and sustainable results.

Future challenges

The project showed that in addition to carrying out administrative work, leadership is necessary in engaging academic staff and students in entrepreneurial learning and in addressing potential obstacles, such as the lack of time or implementing changes to existing study programmes or extracurricular activities.

Cases from Universities

Norwegian University of Science and Technology (NTNU), Norway

The history of the Norwegian University of Science and Technology (NTNU) dates back to 1910. After several mergers, NTNU is currently the largest university in Norway and offers education in humanities, social sciences, economics, health sciences, education science, and aesthetic disciplines. However, about half of the 39000 students study technology and natural sciences, which is the focus of NTNU.

Institutional facilitation created the momentum

The university has a 30-year history of research and education in the field of innovation and technology-based enterprise. Enterprise education started out as a combination of technology students requiring more knowledge about how to start a company and a dedicated professor who wanted to test out new ways of teaching enterprise and small business management.

Enterprise programme creating businesses and entrepreneurial skills

The NTNU School of Entrepreneurship (NSE), founded in 2003, is a *two-year master's programme* with a focus on business development and technology-based entrepreneurship. The programme combines academic insight with hands-on experience. The students are working in interdisciplinary teams of three to five. Through three semesters, they have to develop a

business idea of their choice to ensure its commercial success. A deeply rooted culture of contributing, engagement and mutual support enables *student-to-student learning in a community* of both current and previous students. NSE strives to be *a resource for the university and the whole of Norway*, and seeks to spread enterprise competence (e.g. marshalling resources, seeking opportunities and risk tolerance) across study programmes and regions. At the university, NSE spreads *enterprise competence* through a course for 1200 master's students annually.

Entrepreneurial movement

The NSE students are an important part of Spark NTNU, which the local energy company TrønderEnergi and NTNU established as a joint venture in 2013. Spark NTNU, *run by students and supported by faculty members and industry partners*, facilitates idea development and venture creation with students from all programmes of study. It has guided approximately 230 start-up teams between 2014 and 2016. Currently, *about 70 start-up teams* with students from 36 different study programmes receive guidance from 17 student mentors drawn primarily from the senior class of NSE. Moreover, the NSE students together with the Spark NTNU students compose the core of FRAM, *the students' innovation centre*, where students interested in enterprise from all study programmes meet and learn from each other. *The growing community of students interested in enterprise* is in line with the strategies of NTNU. University actors focusing on seed funding, incubator services and technology transfer therefore support the development.

Making a difference in the ecosystem

In Norway, NSE has created the Centre for Engaged Education through Entrepreneurship (ENgage). In 2016, ENgage was appointed as a Centre for Excellence in Education by the Norwegian Agency for Quality Assurance in Education. The vision of ENgage is *to increase*

the number of students in Norway and around the world with entrepreneurial skills and the mind-set to become change agents in all contexts. ENgage consists of NSE, Spark, Nord University and Troll Labs (experimental living labs of NTNU). It provides action-based, challenge-based and experience-based learning models for interdisciplinary interactions and complementary skills and approaches. Students and student organisations are an important part of ENgage in its endeavour to combine, develop and disseminate action-based learning, student-to-student learning, collaborative skills, rapid prototyping and student engagement. ENgage provides train-the-trainer (student-to-student learning) courses and activities for students in all disciplines to increase the number of higher education students with entrepreneurial skills. ENgage's interpretation of entrepreneurial learning seems to be comprehensive, wide and successful, and focuses primarily on student engagement. Furthermore, students' role in the learning process is crucial. However, the example does not explicitly show elements of intentional 'learning from the failure' kind of an approach (e.g. Cope, 2011).

University of Wuppertal, Germany

The University of Wuppertal (Bergische Universität Wuppertal, BUW) was established in 1972. BUW offers education in multiple disciplines covering engineering, art and design, economics and humanities. The university has around 20000 students.

Institutional strategy driven by the governmental policy

The efforts to establish enterprise education at BUW began in the late 1990s with a policy initiative of the German Government for improving enterprise at German higher education and research institutions. This resulted in the programme EXIST – Start-ups from universities, which aimed to increase the number of technology and knowledge-based business start-ups

and supported university graduates, scientists and students in establishing technology and knowledge-based start-ups. This early-stage institutionalisation of enterprise is still important for the *structure and “policy thinking” of enterprise* at BUW today. The initial project contributed to *the establishment of two chairs* in entrepreneurship education, which still represent *the main infrastructure of staff and resources* for teaching enterprise at Wuppertal. Aside from the curriculum, there is a hands-on seminar series for students and external parties on start-up building offered through the Bizeps network which was established as a regional venture support network during the EXIST project.

Contextual relationships

Through *the regional network approach* of EXIST, entrepreneurship education has long been integrated in the regional entrepreneurial ecosystem of the ‘Bergische’ region around Wuppertal (e.g. university start-ups coached and domiciled in the city’s technology park, venture funding through local investors, and external staff from the region teaching entrepreneurship courses). Additional resources for enterprise education and research are provided by two university institutes: the Jackstädt Centre of Entrepreneurship and Innovation Research and the Institute for Entrepreneurship and Innovation Research.

Building incentives for enterprise

The university leadership employs different measures and incentives to define its strategic focus in research and education. Typically, incentives are set indirectly by allocating university resources to individual themes and *supporting efforts of faculty members to attain external third-party funding* for novel projects (e.g. hands-on design-thinking courses and extra-curricular project-based entrepreneurial learning) and to increase the visibility and reputation of faculty members through the university’s communication and public relations efforts. At the faculty level, enterprise is at the heart of the Schumpeter School of Business and Economics, a

whole department dedicated to enterprising and innovation. At the chair level, the concept is based on three core pillars: 1) a portfolio of entrepreneurship teaching modules, 2) extra-curricular activities, and 3) social responsibility and entrepreneurship related to the chair's UNESCO activities. One example of BUW's new initiatives is to increase the organisation's visible engagement in civil society projects within its third mission. The UNESCO chair's extra-curricular 'Enactus Student Team' has been advocating this initiative since 2004. Enactus is an international organisation where students collaborate with corporate and organisational partners to propel societal development through entrepreneurship.

Growing entrepreneurial capacities

Enterprise education modules are integrated into further curricular and extra-curricular courses and targeted also for non-business students. Overall, extra-curricular initiatives constitute a flexible and fast means to engage in action and project based forms and new themes of teaching enterprise, recently in particular with regard to ecosystems as well as sustainable and socio-cultural enterprise. The most salient single aim of enterprise education is to support and broaden not only business and technological enterprise but also social, sustainable, and cultural enterprise. This is also reflected in encouraging students to think and act entrepreneurially, for example the 'Enactus Student Team' addressing social or ecological problems in civil projects. Correspondingly, BUW strives further to increase its education in social, cultural, and sustainable enterprise. This has led to the expansion of the *portfolio of regional partners in enterprise education*, e.g. with the Wuppertal Institute for Climate, Environment and Energy and the 'Neue Effizienz' initiative, connecting the university, which provides basic and applied research, with the private sector and the local community in order to find practical solutions to social challenges.

Lappeenranta University of Technology, Finland

Lappeenranta University of Technology (LUT) is located in South-east Finland and established in 1969. LUT operates in the fields of technology, science and business and has roughly 6000 students. Clean energy and water, the circular economy and sustainable business are the key focus areas to which LUT seeks solutions through technology and business.

Institutional strategy

LUT's latest strategy, Trailblazer 2020, was prepared in 2014. Entrepreneurship formed its core, setting a competitive target: 'We will be the first Finnish entrepreneurial university'. To fulfil this strategic target, LUT has action plans for entrepreneurship and education. The *action plan for entrepreneurship* takes a holistic approach to entrepreneurship and the entrepreneurial university, as it emphasizes LUT's strategic management, commercialisation of research results, entrepreneurial culture, collaboration with businesses, and promotion of entrepreneurial competencies of students and staff. Furthermore, the development is followed and guided by HEInnovate, a self-evaluation tool prepared by the OECD and the EU. The *action plan for education* aims at incorporating entrepreneurial learning into all degree programme contents and methods. This means that from introductory courses onwards, students' active role in learning processes is emphasized, degree programmes are cultivated to further the development of transferable skills, and teachers are trained to adopt entrepreneurial teaching methods.

Activities and incentives for enterprise

The *action plan for entrepreneurship* includes activating enterprise-related communication, expanding the range of enterprise support services, and creating guidance and incentives for entrepreneurship. For example, LUT rewards its researchers for inventions and patents. Its intellectual property rights (IPR) portfolio, generated through research results, is larger than

that of any other Finnish university. LUT aims for the rapid *commercialisation of research results and start-up acceleration*. LUT builds on active collaboration with businesses and interaction in entrepreneurial ecosystems. In 2015, it received the THE ranking⁶ award for business interaction. Moreover, the university has organized a special seed fund company to support the fast development of spin-offs and start-ups, and it is initiating new activities to develop the university's role as a business accelerator. For example, the seed fund company plays a key role in building a new clean-tech ecosystem that brings together large corporations, SMEs, internationally networked clean-tech intermediate organisations, and universities. Universities provide the ecosystem with state-of-the-art research knowledge and new ideas for further development according to open innovation practices.

LUT has committed to using the EU Commission's and OECD's HEInnovate⁷ self-evaluation tool to follow its development as an entrepreneurial university. LUT seeks to improve its entrepreneurial culture through wide-ranging trials and learning environments and promotes the entrepreneurial competencies and entrepreneurial activity of both students and staff. Furthermore, LUT is expanding its range of enterprise-related courses. For example, LUT has developed a new entrepreneurship course for all doctoral students in the university.

Building entrepreneurial capacity

In a recent report by NORDTEK (Gulieva 2015), LUT was recognized for building entrepreneurial capacity. Furthermore, according to the Ministry of Education and Culture (2016), LUT is one of the entrepreneurial universities in Finland. For the past decade, LUT has offered the Master's Programme in Technological Entrepreneurship and a Master's programme

⁶ Times Higher Education World University Rankings is one of the world's most highly regarded university ranking systems. The areas assessed are research, teaching, international outlook, and funding.

⁷ See www.heinnovate.eu

focusing on innovation, and as of 2016, all LUT students have been able to minor in enterprise. Additionally, LUT offers its undergraduate and postgraduate students venture creation programmes, course modules, and individual enterprise courses. In continuing education, its co-operation with industry is long-standing, and it trains teachers of all levels in enterprise education.

Entrepreneurial community

As in most Finnish universities, LUT has a very active *student-driven entrepreneurship society* (LUTES) that organizes different entrepreneurial student networking events, such as business boot camps, hackathons and guest lectures, and helps students create and develop business ideas. The events organized by LUTES are free of charge and open to everyone. The most important event organized annually by LUTES is the Summer Launchpad. During the ten-week programme, the participating teams are given the opportunity to develop their business ideas together with business professionals. The goal is for the teams to set up a company after the programme and realise their business ideas. The Summer Launchpad has attracted student teams also from other HEIs in Southern Finland.

Additionally, *regional enterprise developers are co-operating with LUT* e.g. in the Willi idea⁸ (wild idea) business competition, which annually attracts more than *100 competitive business ideas*. In 2016, the winning team of the competition was a start-up established by a group of LUT students who are currently developing a hearing aid application for mobile phones. During the years some of the business ideas have proved successful.

⁸ See <http://www.startupmill.fi/en/willi-idea-competition>

Swansea University, United Kingdom

Swansea University, founded in 1920 and located in Wales, the United Kingdom, is a full-scale university with 16000 students. In 2015, it opened a new campus focusing on science and innovation.

Institutional strategy

Swansea University recognizes the benefits of enterprise education to students regardless of their faculty or discipline. The need for enterprise education has been acknowledged for several years. Swansea University now has a defined, high-level strategy designed to give all students enterprise skills and entrepreneurial support for those who desire it. The aim is to develop entrepreneurial graduates as well as graduate entrepreneurs, but the main goal is to increase the employability of all students regardless of their subject. Furthermore, different staff training sessions have been organized to progress entrepreneurial teaching and related curriculum work. The university has excellent relationships with industry and the regional Welsh Government departments, which support the university financially and operationally.

Tools and methods for promoting enterprise education

Swansea has two dedicated institutions – the Institute for Entrepreneurial Leadership (IFEL) and the Swansea Employability Academy (SEA) – which have developed cross-campus enterprise modules, events and awards. During the past year, 3400 students participated in events developing enterprise thinking and entrepreneurial or intrapreneurial capacity. Furthermore, Swansea University participates in the Global Enterprise Week initiative⁹, which showcases the entrepreneurial activities for students and staff throughout the year. The Global Enterprise Week includes various events, activities, and competitions for students who are

⁹ See <http://gew.co/>

looking to build their entrepreneurial skills, e.g. a business idea competition, pitching competitions, networking events, role model entrepreneurial talks and employability information.

Objectives and needs of enterprise education development

At present, the institution provides enterprise education widely. The university aims to integrate entrepreneurial modules into different disciplines and offer enterprise modules to students to increase employability. The ultimate target is awareness at an academic level and educating practitioners to understand that enterprise education is not solely about teaching people to start businesses, but helping them adopt tools, skills and a mindset that make them well-rounded and employable graduates. Moreover, the university provides continuous professional development opportunities for staff to cultivate their entrepreneurial teaching and embed enterprise skills into existing curricula or new programmes. The primary focus of the latest institutional strategic plan is to develop entrepreneurial graduates and graduate entrepreneurs.

Measures and incentives to guide and support entrepreneurship

Swansea University is committed to increasing the perception of itself as an entrepreneurial institution, providing enterprise education to all students and support to those interested in venture creation. Respectively, Swansea has received recognition in the quality of teaching and student satisfaction. Furthermore, the overarching aim of the university is to be recognized as the THE Entrepreneurial University of the Year¹⁰. Swansea's active work in organising different events and activities for students and staff has been recognized: for many years, the

¹⁰ See <http://ncee.org.uk/leadership-and-management/the-entrepreneurial-university/>

university has won the High Impact Host Award during the Global Entrepreneurship Week, but has also been recognized for having the second most events of any institution globally.

HEInnovate¹¹ is one of Swansea's strategic support mechanisms for assessing and benchmarking its progression as an entrepreneurial university. Additionally, Swansea University has close relationships with industry and regional Welsh Government departments, which support the university both financially and operationally.

DISCUSSION AND CONCLUSIONS

The cases display three distinct motives driving European enterprise education policies:

- 1) enterprise education is a vehicle to transform the business culture of the nation
- 2) enterprise education is a reaction to competitiveness problems and unemployment
- 3) enterprise education is a way to promote the knowledge-based society and increase the value added of the nation.

The promotion of enterprise education in Europe has faced the challenge of taking the national circumstances into account. Our cases show vividly that differences in national circumstances largely determine the national policies and targets of enterprise education. That is, in some European countries entrepreneurship education may concern the introduction and acceptability of the market economy and liberalism to the population. In that sense, SEECCEL has an important societal mission. Meanwhile, other countries have progressed with their enterprise policy and are fine-tuning their educational targets regarding employment and competitiveness. Portugal prioritises the development of the knowledge society, and enterprise education is a

¹¹ See www.heinnovate.eu

way to promote that. It seems, however, that none of the countries systematically measure their progress in enterprise education, although both LUT and Swansea mention using the HEInnovate tool for self-reviewing their progress. As a holistic, multidimensional phenomenon with several intertwining levels, entrepreneurship has proved to be difficult to measure and evaluate.

The university cases highlight three main points:

- 1) university level strategic impetus is decisive in enterprising education
- 2) the entrepreneurial movement has extensive implications for universities, regions and the national enterprising policy
- 3) the scope of enterprising activities in the universities seems twofold: some universities follow a holistic approach and pursue a rich variety of enterprising activities, some aim at a focused target and can thereby direct specialized resources for those efforts.

The university cases demonstrate the importance of a top-level strategy. This is somewhat surprising even though we intentionally chose prime European examples, presenting holistic and strategy-oriented approaches. All case universities seem to have strategies encompassing enterprise education. Especially Swansea University and LUT seem to emphasize the top-level enterprising strategy guiding their action plans and enterprising activities. Surprisingly, none of the universities give examples of how the faculty members or other internal stakeholders are encouraged to implement enterprise education. Still, universities organize training for teachers to improve their knowledge and develop their entrepreneurial learning practices. For universities, the personnel's own entrepreneurial activity remains a difficult issue, and incentives for enterprising or entrepreneurship education remain low. From our perspective, however, university staff are in a key position to promote entrepreneurship, and new approaches to exploit this opportunity are sorely needed.

The variation in enterprising activities between universities is significant. All case universities highlight enterprise-related courses and programmes. In Wuppertal University, the enterprise programmes and courses are the main vehicle for promoting entrepreneurship. Wuppertal also shows serious interest in local and regional development through enterprise promotion. In contrast, Swansea employs multiple ways of promoting enterprise: start-ups, programmes and courses. Likewise, LUT invests in enterprising education but also stresses the role of patents, start-ups and the community. NTNU emphasizes the students' role in creating new ventures and supporting the community.

As enterprise courses and programmes were deemed important in enterprise education, it is no wonder that extra-curricular activities were mentioned infrequently. All informants in this study represented the staff, and as such, their perspective is naturally restricted. However, we think that universities need to learn more about extra-curricular activities and integrate them into entrepreneurial learning. LUT reports about the students' entrepreneurship society and Wuppertal about active students in enterprising courses, and Swansea continuously keeps the student movement vibrant and creative. Finally, NTNU's enterprising activities revolve around the enterprising movement stemming from the enterprise programme and student activity. NTNU's approach is strongly student-led, and therefore, the students' entrepreneurial movement has even modified university practices. Furthermore, NTNU is pursuing a stronger national role in Norway. As emergent models, all the cases show very different approaches to student-led processes – each model is specific to a country, region, or university, and it would be difficult to determine the best one. At the moment, the best approach to evaluate the models would be to examine their ability to generate entrepreneurial outcomes: that is, student start-ups, entrepreneurial learning activities, entrepreneurial networks, etc.

Finally, the cases highlight the introduction of enterprise education through different projects. We cannot currently estimate whether project-based practices will be embedded into

universities. New activities started through short-lived project funding have a tendency to cease after the funding stops. Moreover, it was somewhat surprising that universities did not mention utilising their alumni in enterprise education. Especially successful entrepreneurs could bring novel approaches to entrepreneurial learning and courses. The alumni could contribute knowledge and even funding, thus helping the university in its resource challenges. European universities may currently have no real incentives to approach their alumni, but we think they are very likely to develop contacts with alumni in the future to exploit opportunities related to both funding and learning. Furthermore, entrepreneurial learning in the case universities seems to occur in classrooms, whereas companies might have seemed a more logical setting. In that sense, universities still have a great deal to learn about ‘the world out there’ – co-operation with outsiders is a fast track to entrepreneurial learning.

The results of our study underline the need for further research. It seems evident that there are no single solutions for universities to undertake the enterprise education in their activities. However, we still know relatively little of successful models of entrepreneurial universities. For example, it would be interesting to study the pathways universities take to promote their enterprise education. In that sense, universities start from the very different standing points and they set their targets regarding enterprising in very different ways. Furthermore, more comprehensive studies are needed to understand universities’ technology transfer and entrepreneurial university processes and their combinations. Besides the policy-guided HEInnovate self-evaluation tool, there may be need for development of research-based evaluation tools to help universities measure and develop their enterprise education practices. It is our conviction that universities’ development of enterprising activities should be based on evidence and systematic planning. Combining science, education and enterprising is a complicated task that should not be underestimated.

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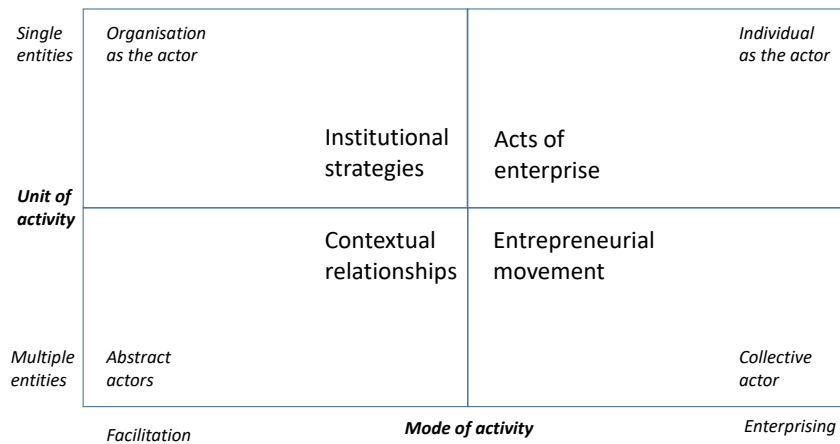


Figure 1 Typology of entrepreneurial activities in universities

Publication II

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**Challenges to the development of an entrepreneurial university ecosystem:
The case of a Finnish university campus**

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**Katja Lahikainen**

Lappeenranta University of Technology, Finland

Johanna Kolhinen

University of Helsinki, Finland

Elena Ruskovaara and Timo Pihkala

Lappeenranta University of Technology, Finland

Abstract

The purpose of this study is to add to the literature on entrepreneurial university ecosystems by highlighting the ways in which academics engage or decouple in entrepreneurship processes and thereby in the emerging entrepreneurial ecosystem. The study extends our understanding of the emergence of an entrepreneurial university ecosystem by providing an in-depth analysis of a Finnish university campus, investigating how individuals' perceptions respond to societal and institutional demands for the fostering of entrepreneurship. The findings suggest that education and research are regarded as the highly institutionalized logics of universities, and these logics tend to be maintained since more rewards are associated with them than are associated with the logic of entrepreneurial actions. These competing logics lead to conflicting interests and cause intentional and unintentional decoupling in the adaptation and implementation of entrepreneurial actions in universities.

Keywords

academic entrepreneurship, entrepreneurial ecosystem, entrepreneurial university, entrepreneurship, institutional theory

The entrepreneurial ecosystem has emerged as a concept for describing entrepreneurship in regions. An entrepreneurial ecosystem consists of a set of interdependent actors (Cohen, 2006; Spigel, 2017; Stam, 2015) who produce high-growth entrepreneurship, spin-offs and start-ups, as well as new jobs, through entrepreneurial activities (Cohen, 2006; Stam, 2015). In the university context, an entrepreneurial ecosystem echoes the Triple Helix concept, in which academia, government and industry form trilateral networks and hybrid organizations, the actions of which are often encouraged, but not controlled, by the government (Etzkowitz and Leydesdorff, 2000; Ranga and Etzkowitz, 2013).

Universities have become important contributors to the development of entrepreneurial ecosystems through the research and education of a skilled labour force. Besides

providing knowledge and human capital (students and staff), universities promote entrepreneurial culture and provide and act as catalysts for start-ups and spin-offs (Cohen, 2006; Guerrero et al., 2016). Despite this acknowledgement, relatively little is known about whether universities should contribute to entrepreneurship and, if so, how (Davey et al., 2016).

Stam (2015) suggests that the focus of entrepreneurial ecosystems is on the individual entrepreneur rather than on the enterprise. Only limited attention has been paid to the

Corresponding author:

Katja Lahikainen, School of Engineering Science, Lappeenranta University of Technology, PO Box 20, FI-53851 Lappeenranta, Finland.

Email: katja.lahikainen@lut.fi

entrepreneurial individuals that form the centre of the ecosystem (Stam, 2015), as well as to the antecedents of the initial processes that lead to entrepreneurship (Brown and Mason, 2017). Additionally, the entrepreneurial ecosystem literature lacks information on what kind of formal and informal institutions and relations matter at various stages of ecosystem development (Alvedalen and Boschma, 2017).

In Finland, entrepreneurship promotion has been high on the Ministry of Education and Culture's agenda for a decade. However, the Ministry can promote entrepreneurship policies only through non-binding incentives and steering. Therefore, universities are not rewarded for the successful implementation of entrepreneurial actions, like they are for research and education. Furthermore, the Ministry has established different working groups and initiatives for preparing reports and recommendations, but Finnish universities enjoy strong autonomy in how they utilize such reports (Lahikainen et al., 2018).

This study focuses on academic individuals' engagement in entrepreneurial actions on the campus of two Finnish universities (one of which is a university of applied sciences) in Lappeenranta, Eastern Finland. The aim is to ascertain how individuals can identify their participatory roles in academic entrepreneurship processes in entrepreneurial university ecosystems. Studying individuals' perceptions, which have been overlooked by previous studies, is important, since entrepreneurial ecosystems are largely based on individuals engaging in entrepreneurial action and providing guidance to support emergent processes. In entrepreneurial university ecosystems in particular, academics can be seen as key individuals whose inventions serve as a seedbed for high-growth companies and start-ups. The research question we address is: how do participants in entrepreneurship processes engage with the emerging entrepreneurial university ecosystem?

This article contributes to the literature on entrepreneurial university ecosystems by illustrating a case that highlights ways in which academics engage or decouple in entrepreneurship processes and thereby in the emerging entrepreneurial ecosystem. We continue from the themes raised by Pinheiro et al. (2015) by showing that, even if there is a tendency to decouple societal engagement from universities' core activities (teaching and research) – for example, due to lack of binding incentives – academics are strongly motivated to provide a meaningful contribution to society. Second, the study provides new insights into the importance of the cognitive and normative influences that guide individual action in entrepreneurial activities (rather than university regulations, as discussed by Abreu et al., 2016). The study shows that the engagement or decoupling of individuals in entrepreneurship depends on two factors: first, how individuals perceive their roles in the entrepreneurship processes and, second, whether they interpret

institutional demands as complementary or counterproductive to their academic work.

We use institutional theory (Scott, 2014) as a theoretical background for the study in order to offer a framework within which to investigate both interactions in an institutional context and individual behaviour. The study is based on an institutional logics approach and on the micro-level cognitive-cultural elements of institutional theory (Thornton and Ocasio, 2008).

In the university context, a broad description of entrepreneurship is commonly used, which includes the entrepreneurial mindset and a skill set for entrepreneurs, resource providers, suppliers, customers and policymakers, in addition to starting up new businesses (Greene et al., 2010). This study applies a narrower description of entrepreneurship that echoes the concept of academic entrepreneurship, which in turn refers to the commercialized outcomes of academic research (Grimaldi et al., 2011). Consequently, the results of this study reflect the perceptions of academics regarding academic entrepreneurship. Therefore, other aspects of entrepreneurship (such as entrepreneurial teaching and learning and student entrepreneurship) are outside the scope of this study.

The rest of the article is organized as follows. First, we introduce the theoretical framework. Second, we present the research design. Third, we describe the findings of the study. Finally, we conclude by discussing the findings and limitations of the study.

Theoretical framework

The literature on entrepreneurial ecosystems agrees that the ecosystems build on combinations of cultural, financial, human, institutional and political factors within a region, aiming at supporting the development and growth of start-ups and encouraging nascent entrepreneurs and other actors to start, fund and assist high-risk ventures (Spigel, 2017). Key success factors when establishing a sustainable entrepreneurial university ecosystem include, for example, a strategic view by the management, long-term commitment on all levels, sponsors and collaborators within and outside the university, an appropriate organizational infrastructure and substantial financial resources (Rice et al., 2014). Figure 1 (adapted from Miller and Acs, 2017) illustrates the main elements of the entrepreneurial university ecosystem, showing its connectedness to regional stakeholders. In the figure, the university ecosystem is presented within the dotted circle, indicating the openness of the entrepreneurial university ecosystem.

An entrepreneurial university

The entrepreneurial university mission is built on the academic tasks of research and education, with entrepreneurship having been introduced as a third element during the

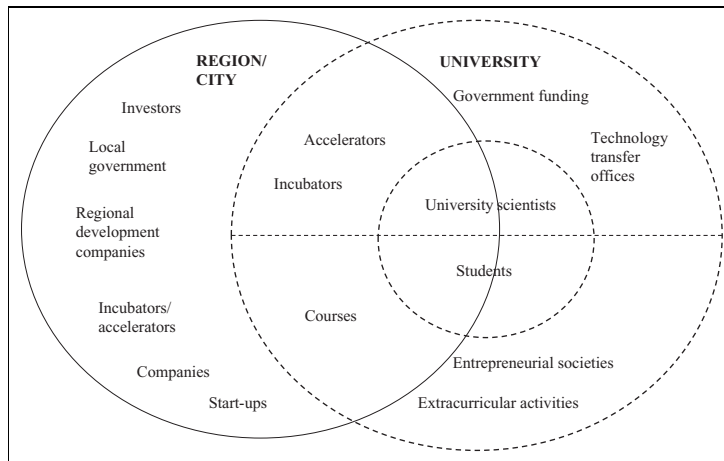


Figure 1. The main elements of the entrepreneurial university ecosystem, showing its connectedness to regional stakeholders. Source: Adapted from Miller and Acs (2017).

last two decades (Clark, 1998; Goldstein, 2010; Kirby, 2006; Wissema, 2009). The development of entrepreneurial universities has accelerated along with universities adopting new responsibilities for knowledge transfer and technological innovation (Bramwell and Wolfe, 2008; Martinelli et al., 2008). This is due to both the internal development of universities and external influences such as the increased need for new knowledge in regions (Etzkowitz, 2003; Etzkowitz et al., 2000; Goldstein, 2010). The entrepreneurial university is said to provide an answer to increasing global academic competition and the need to support economic growth by knowledge transfer (Wissema, 2009).

An entrepreneurial university can be defined as a university that finds new solutions to address the pressures and challenges that stem from an uncertain and unpredictable environment (Hannon, 2013). By addressing those pressures and challenges in an entrepreneurial manner, the university has a better chance of controlling its destiny and becoming a significant actor on its own terms (Clark, 1998). The development of entrepreneurial universities is conditioned by formal and informal external factors and by internal factors relating to resources and capabilities (Guerrero and Urbano, 2012). The external factors include, for example, the entrepreneurial organizational and governance structure, new teaching methods, rewards and incentives, the formation of strategic alliances with external stakeholders, technology transfer offices and business incubators (Goldstein, 2010; Guerrero and Urbano, 2012).

The attitudes of academics and students towards entrepreneurship are identified as the most critical factors affecting the development of entrepreneurial universities

(Guerrero and Urbano, 2012). According to Kirby (2006: 600), the central preconditions for the entrepreneurial university are academics believing in their entrepreneurial potential and a supportive atmosphere within the institution. In university faculties, there is a strong commitment to the research and teaching missions, and it is therefore challenging for university administration and governance to implement top-down reforms and restructuring in ways that will lead to changes in the actual behaviour of faculty members (Goldstein, 2010). Additionally, designing uniform entrepreneurial models might lead to the increased power of central administration (Clark, 1998), which academics can understand as an attempt to gain stronger control over their work and as increasing expectations for their performance (Pinheiro and Stensaker, 2014).

Entrepreneurship in an academic setting

In this study, we concentrate on the sources of academic entrepreneurship in a broad sense, including all kinds of spin-off creation, patenting, licensing and university–industry partnerships for commercializing research outcomes (Bronstein and Reihlen, 2014; Grimaldi et al., 2011). One way to categorize forms of academic entrepreneurship is by whether they are based on direct or indirect spin-off activities (with or without immaterial rights). Another is to categorize them by the type of business model (consulting, technology or product model) on which the enterprise is based (Pilegaard et al., 2010). From the individual point of view, academic entrepreneurs can be considered those who grasp internal and external opportunities with the aim of not only generating economic value for

themselves or their institution but also of creating societal value and impact (Mars and Rios-Aguilar, 2010). This approach characterizes entrepreneurship as not just a business-oriented activity but also a vehicle for furthering societal change and serving the greater good (see, e.g. Rae, 2011: 46).

Most academics have traditionally seen their role as that of a teacher and researcher, not that of an entrepreneur (Etzkowitz, 2003). Academic culture and identity seem to conflict with entrepreneurship and entrepreneurial values at many levels in the university context (Kolhinen, 2015; Ylijoki, 2003, 2014). In particular, the gap between the priorities set by the university's management and administration and the faculties' actual behaviour can be broad (Goldstein, 2010). However, Clark (1998) notes that including entrepreneurial activities in the context of a university does not necessarily conflict with the traditional academic missions. It can be seen more as a continuum and expansion of values.

However, fostering academic entrepreneurship requires acknowledging and aligning entrepreneurial and academic values (Kolhinen, 2015; Pittaway and Hannon, 2008). In particular, involving multiple university actors in venture creation (e.g. through entrepreneurship centres, laboratories and action-based education) enhances the entrepreneurial and academic roles of university scientists (Lundqvist and Williams Middleton, 2013). In order to respond to the growing expectations for fostering entrepreneurship, universities must face new challenges. They need to align the competing institutional logics and find a balance between research, education and entrepreneurship.

The institutional context

According to Scott (2014), institutions are comprised of three pillars: (1) the regulative pillar (e.g. rules and incentives); (2) the normative pillar (e.g. values and norms); and (3) the cognitive pillar (e.g. beliefs and taken-for-granted elements). Taking its simplest definition, institutional logic is the way a particular social world works. The core assumption of institutional logics is that they embed the interests, identities, values and assumptions of individuals and organizations (Thornton and Ocasio, 2008).

The creation of legitimated formal rules and entities can lead to increased commitment or heightened expectations by internal participants and external stakeholders. It can also lead to a greater chance of failure if the activity is not mature enough or not integrated into the practical activities of the institution. For this reason, institutionalization may lead to higher potential for an activity to survive but may damage its original efficiency (Pittaway and Hannon, 2008). In order to resolve the conflict between ceremonial rules and efficiency, organizations can decouple official structures and activities (Meyer and Rowan, 1977): this the appearance of being an entrepreneurial university might be

maintained, while at the same time the university's core tasks of teaching and research are protected by decoupling third mission activities (Pinheiro et al., 2015), and in practice the most appropriate or efficient ways of working are allowed (Foss and Gibson, 2015). Even if the entrepreneurial practices are accepted, decoupling may occur in two distinct ways. First, intentional decoupling can take place if the participants have a low acceptance level and a passive approach to implementation, which leads to the ceremonial adoption of the practice. This would mean that the organization would label itself *entrepreneurial* without its members changing their behaviour. Second, unintentional decoupling can occur when participants have a high level of acceptance but are less involved in the process and less conscious of it. Thus some existing practices may be unintentionally retained, preventing entrepreneurial actions from being fully integrated in the day-to-day work (Gondo and Amis, 2013).

From the cultural-cognitive perspective, change and the required action of the organizational members require that organizational members need to internalize and value the desired action, and change drivers need to be culturally supported (Palthe, 2014). Both normative factors and, in particular, cognitive factors have a stronger impact on the entrepreneurial activities of academics than university regulations. Individuals who are more inclined to become involved in entrepreneurial actions can act as 'change agents' in framing new institutional structures in their organization by sustaining a collective identity and by bringing together the interests of different groups (Pacheco et al., 2010).

Earlier studies have shown that universities which emphasize entrepreneurship in their strategic mission foster researchers' intentions to engage in spin-off creation and intellectual property rights, but not university–industry collaboration in general (Huyghe and Knockaert, 2015). This implies that, by tradition, university–industry collaboration is based on personal relationships between industrial companies and individual departments or professors, and therefore was already an institutionalized practice before it was designated as universities' third mission (Huyghe and Knockaert, 2015).

Entrepreneurial ecosystems emphasize the interaction between individuals and their institutional contexts, which results in entrepreneurial action that is based on the attitudes, ability and aspirations of individuals (Ács et al., 2014). This study further investigates the challenges of developing an entrepreneurial university ecosystem by studying academics' perceptions of fostering entrepreneurship in universities.

Research design

To explore academics' perceptions of academic entrepreneurship, we used a qualitative, single-case research design

which enabled us to get access to in-depth and information-rich data (Patton, 2002) and to understand how individuals' perspectives are a response to societal and institutional demands in a socially constructed context (Patton, 2002; Stake, 1995).

In this article, we present the findings from the case analysis of the emerging entrepreneurial ecosystem of a university campus that is located in south-east Finland and is formed of Lappeenranta University of Technology (LUT) and Saimaa University of Applied Sciences (Saimaa UAS). LUT's latest strategy, launched in 2014, includes entrepreneurship in its mission, emphasizing the broad scope of entrepreneurial actions. Since LUT has long traditions of collaborating with industry and has included entrepreneurship in its strategic mission, it can be considered an entrepreneurial university (Foss and Gibson, 2015). This can be seen as a concrete action towards changing the university's role in society, which was in fact noted in the Finnish Universities Act (Yliopistolaki, 558/2009) which introduced the third mission of societal interaction and impact. In actions related to fostering academic entrepreneurship, LUT and Saimaa UAS collaborate closely with Green Campus Innovations Ltd (GCI), which is partly owned by LUT, Saimaa UAS and two other regional stakeholders. GCI is a hybrid organization that offers seed funding, acceleration and incubation for the most promising research-based business ideas in the field of clean technology.

The role of Saimaa UAS is to provide practical applications for the inventions originated from LUT research. The campus has a leading role in the region in promoting entrepreneurship and establishing new knowledge-intensive start-ups. In addition to local companies and start-ups, the main regional stakeholders are the city of Lappeenranta, the Regional Council of South Karelia and the regional Centre for Economic Development, Transport and the Environment.

Conversational thematic interviews were the primary data source of this study. The interviews were of 20–60 min duration and were conducted between February and August 2016. We used a purposive sampling technique (Saunders et al., 2016) and we selected interviewees based on prior knowledge of the key people with an active role in the academic entrepreneurship processes. The data set is comprised of 15 in-depth interviews with people representing GCI, LUT, Saimaa UAS and the students' entrepreneurship society: specifically, vice rectors (2); administrative staff from research, development and innovation (R&D&I) (2); professors (2); associate professors (3); a research associate (1); senior lecturers (2); top management from GCI (2); and the Chairman of the Board from the students' entrepreneurship society (1).

The aim of the interviews was to shed light on those factors that foster entrepreneurship in an entrepreneurial university ecosystem. The interviewees were encouraged

to talk about their perceptions of entrepreneurial and commercial activities as a part of their work. All the interviews were recorded and transcribed. Confidentiality was guaranteed to all the interviewees, and hence the interview quotations here – which are free translations from Finnish – are anonymous.

Each interview followed its own path. However, the researcher covered three broad themes. First, regarding *networking and collaboration*, the interviewer asked the interviewee to name the most central actors in the ecosystem, to explain what kind of interaction and collaboration he or she had, to identify the most important means of collaboration and, finally, to give examples of successful and less successful outcomes of entrepreneurial actions. The second theme, *governance and leadership*, covered topics related to the strategic support of the region and the practical support of community leaders and civic officials in enhancing entrepreneurship in the region. Lastly, the interviewees were requested to provide information about *organizational barriers and support*.

We adopted an inductive approach and used the thematic analysis technique since it is flexible and allows for the identification of key themes for further exploration (Saunders et al., 2016). We used *initial coding* and *focused coding* in order to identify the emerging themes and constructs. The initial coding enabled the summarizing of data into conceptual categories that we derived from the research aims and from the loose theoretical assumptions. The focused coding enabled us to use the most significant categories for further analysis (Charmaz, 2006). For the data analysis, we used NVivo software.

The data analysis consisted of multiple stages (see Figure 2). The first stage, *initial coding*, involved categorization of the data into three broad categories comprising the main elements of institutional theory: the regulative, normative and cognitive pillars (Scott, 2014). After this rough categorization of the data, we carefully read all the quotations that we had coded into each category and made subcategories. The themes of the subcategories partly followed the themes belonging to each institutional pillar as identified by the literature (such as norms, ways of working, incentives). Also, new context-specific themes emerged (such as entrepreneurial teams, students, incubation, personal characteristics).

The subcategorization allowed us to obtain a more detailed picture of the phenomenon and we noticed that clear signs of conflicting interests and organizational resistance arose from the *cognitive factors* category and its subcategories. To be confident with the coding, we double-checked the quotations under each category and made some revisions.

Following this, we conducted focused coding and, based on the initial findings, we made four new categories for further analysis. These new categories comprised conflicting interests, and we labelled the *conflicting interests*

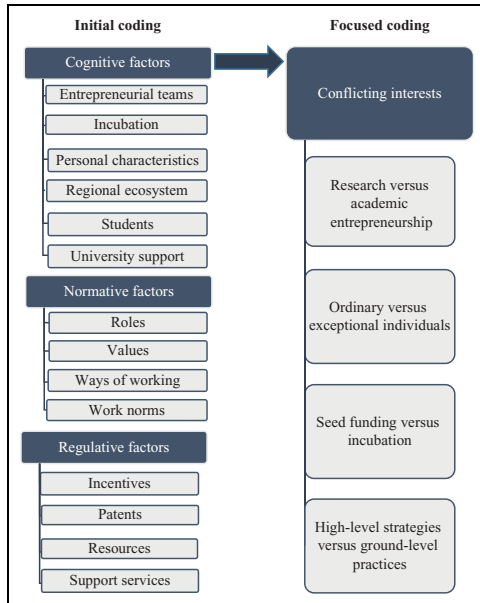


Figure 2. Data structure.

subcategories as follows: *research and academic entrepreneurship*; *ordinary and exceptional individuals*; *seed funding and incubation*; and *high-level strategies and ground-level practices*.

Figure 2 illustrates our data structure, including all the categories and subcategories from which we developed the dimensions for further analysis. We discuss the results of the study in detail in the following sections.

Findings

In this section, we present the outcomes of the data analysis. We structure our findings according to the conceptual dimensions that we constructed; that is to say, according to the categories that emerged based on the focused coding (Figure 2).

Research versus academic entrepreneurship

Besides the university's traditional tasks, entrepreneurial universities have included societal interaction in their mission (Etzkowitz, 2003) in a specific way. However, implementation of the third mission raises a set of contradictions. For example, it is considered that societal interaction is not a real mission of the university since its implementation is not linked to any governmental reward mechanisms, such as there are for research and education. The following excerpts from the interviews are typical:

It would be contradictory to go for them [third-task activities], since the Ministry of Education emphasizes ranked publications. To say that we don't need to write publications, but need to do patenting – that is barking up the wrong tree. (Vice Rector)

The first problem is that it is not the university's mission. (Professor in technology)

Now, the third task is sort of a task mentioned in ceremonial speeches, but universities won't get rewarded for that. (Vice Rector)

Also, university strategy seems to guide academic entrepreneurship actions to a limited extent. On the one hand, the strategy-level discourse seems to give permission for entrepreneurial actions but, on the other hand, there is a view that the interaction had evolved between researchers and industry partners well before the strategy was published. This is in line with the results of Huyghe and Knockaert (2015), who found that industry–science interaction was strongly determined by personal relationships between industry and particular professors. Therefore, this type of academic entrepreneurship was already an institutionalized practice prior to the strategic change that emphasized the university's third mission (Huyghe and Knockaert, 2015).

The interviewees recognized that entrepreneurship was encouraged in various ways – for example, a university offers laboratory premises and services with reduced prices to its staff members and supports part-time assignments in industry. However, it was considered that there were no incentives for implementing the third mission. Furthermore, within the university there are differences in individuals' perceptions of whether they represent technology or business disciplines. Individuals (even if only a small group of them) representing technological disciplines are regarded as entrepreneurial, but individuals representing business are regarded as having a role in researching entrepreneurship and not in participating in entrepreneurial actions directly. The following quotations serve as examples of the decoupling that is taking place:

Within the university, our staff is strongly divided in the sense that there is a small group of people who want to be involved in start-up creation or business development and then there is a large bunch of people who just want to study what is going on out there. (Research Associate in technology)

There were contradictory expectations. For example, we were expected to call firms and sell in the project. As researchers we can't do that; we should do something else instead... We tried to communicate that clearly. (Associate Professor in business)

We don't have any incentives for researchers to participate in these actions. When people realize that the funding is not targeted solely to research but it also requires commercialization actions they consider that it is not worth participating. (Associate Professor in business)

Researchers in the field of technology consider academic entrepreneurship activities more as a complementary part of their work than do researchers in business. Even if the entrepreneurial activities are also in the hands of a few individuals in technology, there is a commonly shared understanding that education, research and societal interaction are genuinely intertwined. Researchers in business are more reluctant to participate in entrepreneurship actions since those actions are considered as consultancy work which is not rewarded. As one interviewee put it:

I think that not participating in commercialization projects is a mental issue. I think that even if there were a big monetary reward, there wouldn't be that many willing to participate, or many capable of completing the required tasks. (Associate Professor in business)

The strategic goals of LUT include that of new business creation. That goal was considered ambitious, and the support mechanisms for start-up creation were considered inadequate. For example:

It [LUT's mission statement] just stated that start-ups are needed. (Professor in technology)

It is a long way to go before we reach the strategic goal. Something should be done; either framing the target less ambiguously or making things happen faster. (Associate Professor in business)

Additionally, the talk around start-ups was seen to guide actions too much towards the establishment of a start-up and to neglect other aspects, such as the licensing of inventions to the existing corporations, which is considered to be a more secure option in many cases in terms of new job creation and profitability.

To summarize, examining both the strategic-level targets and the individuals' perceptions of academic entrepreneurship, gaps at both structural and operational levels can be identified. First, universities as institutions should be rewarded by the government for implementing their third mission. Second, universities should develop internal reward mechanisms and support services for entrepreneurial actions.

Ordinary individuals versus exceptional individuals

The lack of potential entrepreneurs is considered to be the greatest obstacle for academic entrepreneurship. A distinction was made between 'ordinary' researchers and the 'exceptions':

The university is full of ordinary researchers and an ordinary researcher can't take the risk of establishing a company. However, there are a few persons like me who could be involved in business activities, but establishing a team among staff members within the university is impossible. (Research Associate in technology)

The 'ordinary' researchers are seen as those who polish the details and are not able to adjust to the timeframes that business requires, and as those who do not recognize the business potential of their research. Between the 'ordinary' researchers and the 'exceptions', there are hard-working individuals who typically have an industry background. These individuals have job creation and increasing societal welfare as their main motivational factors for participating in entrepreneurial actions. These are the people who provide entrepreneurial teams with the needed business expertise and act as a driving force, but who are not necessarily interested in entrepreneurship for themselves. For example:

It must be my background in the industry. Additionally it is my personal desire to create societal impact. I want to create new business and jobs. I see that at the university I have potential to do this. (Associate Professor in technology)

It was acknowledged that among the staff members there was a lack of potential entrepreneurs, but students were considered to be more capable of becoming entrepreneurs. Students were considered competent in terms of knowledge, but lacking in the experience needed in business, specifically in high-tech industry fields. The following quotation describes the common view of students as entrepreneurs in university-based start-ups:

For sure, the theoretical background gained through education is adequate, but what they are often lacking is the practical experience and vision of the real business... We are also talking about technology-intensive business here; you need to have great risk-taking ability in order to enter the markets and that is hard to gain. (Senior Lecturer in business)

Moreover, Saimaa UAS students were regarded as more likely to become entrepreneurs than LUT students. In addition, there was a commonly shared opinion that the students and practices of Saimaa UAS were more flexible with regard to combining studies with working on academic entrepreneurship projects:

It seems structurally easier to utilize students from Saimaa UAS in entrepreneurship projects than LUT students. In order to utilize LUT students, we would need a specific course which could be applied in the project work, but these are complex cases and implementing them as coursework would be difficult. (Associate Professor in business)

The student-led entrepreneurial society, established some years ago, was greeted with pleasure, but the expectations were for something other than practical collaboration. The society was seen rather as a social club than as an organization aiming at real entrepreneurship. As one interviewee put it:

We would have room, and it would be good if student entrepreneurship would be visible, but they are in their own location there. In addition, in real terms, they don't look for new openings with us. (Representative of R&D&I)

To conclude, the general opinion was that students worked on their own ideas, which were mainly applications that could be easily commercialized, whereas academic entrepreneurship, based on scientific research, was more demanding. This suggests that students and academic scientists are not truly working together as equal participants in the ecosystem. Stronger involvement of students could be achieved by providing commercialization cases for them as part of their studies, but curricula do not seem to be flexible enough, especially at LUT. However, those researchers who had worked with the students from the both institutions were very satisfied with their work.

Seed funding versus incubation

There are two main paths for new venture creation. First, in the idea screening or pre-incubation phase, research teams can apply for governmental funding that is targeted at researching commercialization projects. Second, when the start-up is already established or is about to be established, seed funding is offered by GCI. Even though there are these governmental and university-based support mechanisms, however, researchers have contradictory expectations for different reasons. First, the seed funding provided by GCI is available only for a few carefully selected teams, and many promising ideas do not receive funding or support. Second, research teams would like to get support for such matters as team formation and scanning potential investors and expect more of these kinds of service from GCI. It is stated that, in addition to seed investments, the activities of GCI also include incubation and acceleration: in practice, however, the acceleration and incubation activities are based on ad hoc actions, and the main goal of the company is to offer venture capital for university-based start-ups:

In real terms, we are an investment company which makes investments based on the same criteria as any other investment company. We are more interested in the outcomes of an incubation process than in incubation as such... We are starting the incubation process, which has been more or less ad hoc so far – solely due to a lack of resources. (Senior manager, GCI)

The interviewees, especially the professors and researchers, shared the general opinion that GCI's operations were overvalued. The following quotation conveys the prevalent thinking:

We have the opinion that the operational logic of GCI is wrong. So far, it appears to us as just any venture capitalist, which operates by the same logic as any other venture capitalist, except for the fact that it doesn't have money. It could be

thought that the most important task of the company was to form great teams and look for the funding elsewhere. (Professor in technology)

In general, governmental funding is considered very useful since it directs researchers to think about the commercial potential of their research. However, the funding provided has its drawbacks. First, researchers tend to use it as supplementary research funding and do not seriously consider establishing a business. Second, the rules for the funding are restrictive since they do not allow the establishment of a business but do allow the development of different paths for academic entrepreneurship, which leaves the business development unfinished. The following quotation communicates a commonly shared opinion:

This funding is good when teams have real intentions to establish a company – when they are motivated. Additionally, if a team includes a person with business experience it has a good chance to be successful. Now we tend to apply for the funding or we have ongoing projects that just serve as additional funding for conducting research. (Research Associate in technology)

The expectations for greater support than GCI can currently offer cause unrealistic expectations and disappointment among the researchers interested in academic entrepreneurship. There is a clear need for support in team formation and incubation, but the services do not seem to be adequate, or at least they are not recognized, even if they have a high priority in the university's action plan for entrepreneurship.

High-level strategies versus ground-level practices

There is little collaboration in academic entrepreneurship and new company creation between universities and other regional stakeholders. The existing relationship was characterized as involving meetings and drinking coffee together rather than real reciprocal collaboration. It was thought that, while there were several actors in the field, they did their own work without knowing much about the work of others. For example:

In the region there are too many actors and each of them works separately and it results in collaboration that doesn't always work... We have taken the development of entrepreneurship into our own hands here at the campus, just because the distance from regional actors is too far in terms of different ways of working. (Vice Rector)

The investment company provides pre-seed and equity investments for start-up companies and corporate spin-offs that are based on LUT research. It has a strong focus on cleantech and concentrates on companies that can become world leaders in their field:

Our mission is our university's mission, which means that our message to the world is that we are small, focused and international. (Senior manager, GCI)

In general, the entrepreneurial culture in the region was regarded as having stagnated, and collaboration with regional companies was not as active as it could be. LUT mainly collaborates with larger corporations, which are not necessarily located in the region:

Our university tends to collaborate with big companies since it has demanding long-term research projects and SMEs don't have enough resources to join these projects. (Representative of R&D&I)

LUT's strategy and action plan for entrepreneurship encourages cooperation and mobility between the university and the surrounding community. Additionally, the regional strategy acknowledges the potential of universities in business development and in new business creation. The regional strategy encourages non-conventional interaction between entrepreneurs and experts from different fields in order to find new ways of collaboration. However, according to the interviewees, strong strategic support is not being translated into concrete actions in academic entrepreneurship:

The investment company picks the very best and invests in a few individual companies, whereas university students or staff establish many more companies, but they don't go through incubators or accelerators. Graduates just establish companies and that's it. It doesn't require any specific effort. (Vice Rector)

We just need to do something else other than generating projects that result in reports. That is a waste of funding. (Vice Rector)

It is much easier if we can work with existing companies with sufficient resources. Together with companies with which we have existing connections, we can create welfare in Finland. (Professor in technology)

These quotations reflect the views of many interviewees. Collaboration with the regional stakeholders was considered difficult or unreasonable. Instead, university–industry collaboration and new business creation tended to be focused on national or international markets.

Common ground

LUT has long and successful traditions in university–industry collaboration. Discourse on entrepreneurship has increased expectations for academic entrepreneurship, especially for start-up creation. The quotation below describes the traditional way of working:

The existing path for patenting and licensing is functioning well. It is the traditional way, and we haven't made much noise

about this and this is not shown in statistics. They are not the university's patents – the ownership belongs to the companies. (Vice Rector)

There is plenty of hidden potential beyond the traditional mode of university–industry collaboration. The existing mechanisms for identifying entrepreneurial potential and giving individuals the right assistance need to be strengthened in order to make the support mechanisms visible:

Yes, we have received support from LUT and Saimaa UAS; for example, we received support in creating the business plan. This support has been very valuable and this is exactly what is needed. (Senior Lecturer)

It looks as if clearer roles are needed by GCI, incubation services and researchers representing technology and business:

It worked well with the technology teams with which we collaborated. They were eager to learn the commercial part and we achieved fruitful collaboration by combining technology and business in such a way that they were both pushed in opposite directions: technology towards business and business towards technology. Then we found the right interfaces. (Professor in business)

Moreover, it needs to be acknowledged that the people who aim to conduct top research are not the same as those who run academic entrepreneurship projects. One interviewee put it as follows:

It cannot be required that someone who performs academic entrepreneurship actions also conducts top research. Of course there are exceptions, but it is not necessarily optimal to expect everyone to do everything. (Associate Professor in technology)

Lastly, regional collaboration could be strengthened by developing experimental platforms and directing public investments towards the testing of new technological solutions. This potential is also stated in the regional strategy and was mentioned by interviewees in this study, and it is supported by the fact there are already some good practices and examples that could be enhanced.

Discussion and conclusions

The purpose of the study is to add to the literature on entrepreneurial university ecosystems by highlighting the ways in which individuals engage or decouple in entrepreneurship processes. The study extends our understanding of entrepreneurial university ecosystems by providing an in-depth analysis of individuals' perceptions in response to

societal and institutional demands that entrepreneurship should be fostered, especially academic entrepreneurship.

The results confirm that establishing a successful entrepreneurial university ecosystem requires collaboration and contribution from all stakeholders within and outside university (Rice et al., 2014). This case shows that, even if the promotion of entrepreneurship is given priority in regional strategies and is strongly supported by university management as a top-down initiative, university staff tend to interpret the incentive system as counterproductive, and there is both intentional and unintentional decoupling if staff members are not engaged in entrepreneurship processes and if the strategic goals and support mechanisms are not aligned. Additionally, intentional or unintentional decoupling may occur if individuals have contradictory expectations about each other's roles and if they consider that entrepreneurial activities do not complement their academic work.

Furthermore, in this case, concrete collaboration with external stakeholders is very limited, and therefore institutionalized practices are not visible. We argue that this is the result of unintentional decoupling, which means that some elements of the organizational culture may be unintentionally retained, preventing new practices from being fully integrated in day-to-day work (Gondo and Amis, 2013). Traditionally, LUT has collaborated closely with large corporations and faculty researchers have established tight dyadic relationships with their industry partners. This collaboration has been very successful, and therefore there has not been any immediate need to find new regional partners, even if there is high-level strategic support for that endeavour. In addition, there is intentional coupling, meaning that there is a lack of belief that the suggested practices will improve the productive value of one's work coupled with a passive approach to participation (Gondo and Amis, 2013). In practice, as a result, the new practices with regional stakeholders are implemented only ceremonially.

The third mission of the university did not have cognitive legitimacy among the individuals interviewed, but education and research were regarded as the highly institutionalized logics of the institution. These more institutionalized functions tend to be maintained and are more resistant to change (Zucker, 1991) since more rewards are associated with research and education than are associated with entrepreneurial actions. For example, the individuals representing business disciplines saw their role mainly as that of researcher. For this reason, there is unintentional decoupling, which manifests as a high level of acceptance of but also as passive participation in academic entrepreneurship processes. Engagement in academic entrepreneurship is stronger among researchers in technology since they tend to consider that research, education and academic entrepreneurship are genuinely intertwined.

However, even the researchers in technology who considered themselves 'exceptional' were interested in academic entrepreneurship only to a limited extent. These

people are highly motivated to achieve societal impact, but they feel inadequately equipped when faced with institutional demands to foster academic entrepreneurship. They expect the university or regional support services to take part of the burden of entrepreneurship from them. Additionally, they expect more support from their peers, like gaining business knowledge from the business school, so that the pressure for entrepreneurship would not be on the shoulders of just a few individuals. They want to be involved in academic entrepreneurship, but they expect that someone will lead the process and find the right resources and required competencies.

For governmental decision-makers, the results imply that universities' third mission activities should be acknowledged and rewarded. The regional stakeholders and university management need to acknowledge that, in order to create a successful and sustainable entrepreneurial university ecosystem, networking and peer-support mechanisms need to be created in addition to financial support.

Naturally, our study has its limitations. The ecosystem consists of a group of interdependent actors (Cohen, 2006; Stam, 2015), and the conclusions we have drawn from the analyses are based on interviews we conducted with people representing higher education institutions in the fields of technology and business, leaving the perceptions of other regional actors and students beyond the scope of the study. Additionally, actions related to entrepreneurial education were not included. However, the findings indicate that students have more potential than is currently utilized. Therefore, future research could investigate how students can be involved in the ecosystem's processes as equal members with researchers through teaching and extracurricular activities. Another avenue for future research is an in-depth analysis of the factors that make certain groups of individuals consider themselves to be exceptional in the academic entrepreneurship process; what are the underlying reasons for this judgement and from what factors do the differences stem?


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ORCID iD

Katja Lahikainen  <https://orcid.org/0000-0003-1712-3253>

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Publication III

Lahikainen, K.

**Understanding the emergence of the university-based entrepreneurial ecosystem:
Comparing the university and company actors' perspectives**

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6. UNDERSTANDING THE EMERGENCE OF THE UNIVERSITY-BASED ENTREPRENEURIAL ECOSYSTEM: COMPARING THE UNIVERSITY AND COMPANY ACTORS' PERSPECTIVES

Katja Lahikainen

INTRODUCTION

Entrepreneurial ecosystems promote entrepreneurship within specific regional boundaries. They consist of a set of interdependent actors that aim for new value creation, the creation of spin-offs and start-ups as well as new jobs through entrepreneurial activities (Spigel, 2017; Stam, 2015). The distinctive feature of the entrepreneurial ecosystems is that they enable entrepreneurs to identify market opportunities and offer local resources, support and financing to grow new high-growth ventures (Spigel and Harrison, 2018).

Recently, universities have been identified as important contributors in entrepreneurial ecosystems (Belitski and Heron, 2017; Isenberg, 2010; Stam, 2015). Universities can provide a large variety of resources to entrepreneurial ecosystems: new technologies that create entrepreneurial opportunities (Lawton Smith et al., 2014); human capital (teaching activities), knowledge capital (technology and research) and entrepreneurship capital (creation of spin-offs and entrepreneurial mindset) (Audretsch, 2014; Guerrero et al., 2016; Huang-Saad et al., 2018). Additionally, universities may play an important role in creating and connecting entrepreneurs in their networks, thereby enabling entrepreneurs to acquire resources, knowledge and support from the actors of the entrepreneurial ecosystem (Spigel and Harrison, 2018). University-based entrepreneurship ecosystems can be researched as sub-systems of larger regional or local entrepreneurial ecosystems (Cavallo et al., 2018; Fuster et al., 2019) or as entrepreneurial ecosystems on their own (Greene et al., 2010; Miller and Acs, 2017). This study focuses on investigating a university-based entrepreneurial ecosystem on its own. This study defines the university-based entrepreneurial ecosystem (U-BEE) in accordance with Hayter (2016) as *the strategic and collective actions of various organizational components in order to maximize both the entrepreneurial and innovative contributions of universities*.

Research on U-BEE is still in a nascent stage and tends to focus on a narrow view on entrepreneurship that is limited to studies on new venture creation (Bishchoff et al., 2018). The current research has focused on investigating organizational structures, curricular and extra-curricular study programmes and support services, like technology transfer offices (TTOs), from the university point of view (Belitski and Heron, 2017; Greene et al., 2010; Hayter, 2016). Previous studies have acknowledged the importance of non-academic contacts of academics, diverse governance, openness and decentralization of activities as factors that enhance university-based entrepreneurship (Hayter, 2016; Miller and Acs, 2017). Spigel and Harrison (2018) posit that university knowledge spillovers are important in entrepreneurial ecosystems, yet still less important than the universities' role as producers of skilled entrepreneurs and workers. This study addresses this statement by investigating university and company actors' perspectives on the different roles of the university in promoting entrepreneurship in the region. The objective of this study is to provide new insights on the immature theory of university-based ecosystems. The specific aim of the study is to compare the different perspectives of the university and company actors towards the university as a producer of new knowledge and start-ups and as a producer of skilled entrepreneurs and workforce. The research questions are: How do university and company actors perceive the university's role as a catalyst for entrepreneurship? Which factors constrain and reinforce the interaction between the companies and universities in the university-based entrepreneurial ecosystem? This study brings out the factors that enhance and hinder the emergence of U-BEE. The study presents the findings of an inductive case analysis of the university-based entrepreneurial ecosystem that is formed around a Finnish university campus.

This chapter is structured as follows: After this brief introduction, the literature on entrepreneurial ecosystems is reviewed. The following section presents the research method, including a short description of the case, as well as provides detailed information on the data collection and data analysis process. The findings of the study are then presented, focusing on four themes that emerged during the data analysis process. The chapter is concluded by discussing the main conclusions and implications of the study.

UNIVERSITY-BASED ENTREPRENEURSHIP ECOSYSTEMS (U-BEE)

In entrepreneurial ecosystems, entrepreneurs form the core of the ecosystem (Stam, 2015). The entrepreneurial ecosystems consist of social, material and cultural attributes. The success of entrepreneurial ecosystems is based on the interaction of these attributes that provide benefits and resources to entrepreneurs (Spigel, 2017). In regional entrepreneurial ecosystems, universities can be considered as one of the key material attributes (Isenberg, 2010; Spigel, 2017). The main social attributes include networks, investment capital, mentors and dealmakers, and worker talent. The cultural attributes consist of attitudes and histories of entrepreneurship (Spigel, 2017).

In a similar vein, UBEEs consist of similar attributes as entrepreneurial ecosystems in general. According to Brush (2014), the key dimensions of U-BEE are stakeholders, resources, infrastructure and culture. The stakeholders include internal and external stakeholders that have different needs, connections and motivations. Resources include for example, intellectual knowledge and research capabilities, physical facilities, and monetary and human resources. The infrastructure includes elements related to connectivity, for example technological platforms as well as formal and informal networks. Culture includes the symbolic aspect, norms, values and traditions (Brush, 2014). A distinctive feature of U-BEE is that entrepreneurship activities revolve around curricular, co-curricular and research activities and that they can be implemented by university staff, students or specific organizational structures of universities, such as TTOs or incubators (Greene et al., 2010; Brush, 2014).

U-BEE can emerge as a proactive or reactive response to the internal or external needs of a university (Lahikainen et al., 2018). In a proactive development, the university creates for example new educational or economic initiatives, whereas in a reactive development the university may address the unfulfilled needs of students or local entrepreneurs (Rice et al., 2014). The academics tend to collaborate with their like-minded social networks. In order to increase market-oriented motivations, values and practices, academics need to bridge the gap between the traditional academic networks and more entrepreneurial market-oriented entrepreneurial networks (Hayter, 2016). The engagement of faculty members and students with the outside world is crucial for developing U-BEE, since U-BEE can be attractive for the local companies because of the academic freedom that its students and faculty members enjoy (Miller and Acs,

2017). However, the development of U-BEE is not an endeavour of a single active and engaged individual; instead, it requires a team of people and the involvement of all stakeholders to be successful (Rice et al., 2014). Additionally, some of the faculty would rather focus on research and teaching that are the traditional tasks of universities (Lahikainen et al., 2018) than participate in entrepreneurial activity. This means that universities need to complement the faculty staff with staff members who excel in both traditional tasks and entrepreneurship (Rice et al., 2014).

The entrepreneurs and company representatives are the most frequently involved external stakeholder groups in U-BEE. Moreover, the collaborative partners tend to be small and medium-sized companies. Collaboration with large companies is favoured in case SMEs are underrepresented in the region (Bishchoff et al., 2018). University spin-offs can have an important role in U-BEE by acting as a knowledge hub that transfers the knowledge and connects U-BEE to wider business ecosystems. In order to reinforce these interactions, the universities should develop a proactive strategy to support university-based spin-offs, for example, through the intermediate functions like TTO and university-focused venture capital (UVC) (Fuster et al., 2019).

Empirical research highlights the need for a coordinated stakeholder management approach to strengthen the university-based entrepreneurial ecosystem through strong and focused stakeholder networks and collaboration (Bischoff et al., 2018). The universities have a potentially important role to play in the promotion of regional entrepreneurship, but they face challenges in societal interaction, especially in the commercialization of research outcomes (Lahikainen et al., 2018), and not all faculty want to be entrepreneurs (Huang-Saad et al., 2018). Additionally, the identified challenges usually relate to the orientation of universities and the transactions involved in for example conflicts over IPRs and dealing with university administration. Trustful long-term relationships can lower these barriers, whereas increased scrutiny and formalized relationships can increase the transaction-related barriers (Bruneel et al., 2010). Universities can have a strong influence on the specialization of regions. The successful re-orientation of industry depends on different factors, for example, organizational and incentive structures of universities as well as the universities' capacity to establish external links with their regional stakeholders (Braunerhjelm, 2008).

METHOD

This paper presents the findings from the case analysis of the U-BEE that is formed around Lappeenranta University of Technology (LUT). LUT, established in 1969, is located outside the capital region in southeast Finland. The region is by tradition dominated by large industry, but due to the industrial restructuring in recent years, the company base has become more diverse. Even so, the region is still lacking in start-ups and SMEs.

Since its establishment, LUT has had extensive collaboration with industrial partners. LUT is strongly focused on seeking high-tech solutions that combine technology and business in the field of cleantech. In 2015, *Times Higher Education* World University Rankings awarded LUT for business interaction. LUT's latest strategy, launched in 2014, includes entrepreneurship in its mission, stating that LUT will be the first Finnish entrepreneurial university and emphasizing the broad scope of entrepreneurial actions. In actions related to new business creation, LUT collaborates closely with Saimaa University of Applied Sciences (Saimaa UAS), located in the same campus area. The role of Saimaa UAS is to provide, amongst others, practical applications for the inventions originated from LUT research. The campus formed by the LUT and Saimaa UAS has centralized support services for research and innovation services, including a TTO and an investment company. The campus has a leading role in the region in promoting entrepreneurship and establishing new knowledge-intensive start-up companies.

This study is based on an exploratory qualitative research approach with the aim of developing a more comprehensive and nuanced understanding of the university campus as an entrepreneurial ecosystem, and on the factors that constrain and reinforce the interaction between the university and local companies within the university-based entrepreneurial ecosystem.

Data collection

In order to get a more comprehensive and nuanced understanding of the phenomenon that is the emergence of U-BEE, conversational thematic interviews were conducted. The interviews had a duration of 20–60 minutes each and they were conducted between February and August 2016. The purposive sampling technique was used (Saunders et al., 2016) and the interviewees were selected based on the previous knowledge of the persons who are active members in the U-BEE. The dataset comprises 22 in-depth interviews consisting of ten interviews made among

company actors and 12 interviews of academic and administrative staff members of LUT and Saimaa UAS. The titles and organizations of the interviewees are described in Table 6.1. All six university-based spin-offs and start-ups are high-tech growth companies whose expertise is based on the university research. The informants from the companies are either managing directors of the companies or experts who regularly collaborate with the university. The selected informants from LUT are researchers who have been active in research commercialization projects of the university. The informants from Saimaa UAS have been actively involved in the commercialization projects that are based on university research. Administrative staff from both higher education institutions (HEIs), who are involved in innovation and commercialization actions, were also selected for the interviews.

< INSERT TABLE 6.1 TITLES AND ORGANIZATIONS OF THE INTERVIEWEES ABOUT HERE >

The aim of the interviews was to shed light on and recognize the factors that foster or hinder entrepreneurship in U-BEE. The university interviewees were encouraged to talk about their perceptions on the entrepreneurial and commercial activities as a part of their work. Similarly, the company representatives were asked to describe the ways of interaction with the university, emphasizing the university's role in fostering entrepreneurship in the region. All the interviews were recorded and transcribed. Confidentiality was guaranteed to all the interviewees, and hence the interview quotations here – which are free translations from Finnish – are anonymous. Each interview followed its own path. However, the interviews covered four main themes, namely networking and collaboration, governance and leadership, and barriers and support. First, regarding networking and collaboration, the interviewees were asked to name the most central actors in the ecosystem, describe the kind of interaction and collaboration they had, name the most important means of collaboration and, finally, give examples of the successful and less successful outcomes of entrepreneurial actions. The second theme, governance and leadership, covered topics related to the strategic support of the university to enhance entrepreneurship in the region. Lastly, the interviewees were requested to provide information about organizational barriers and support.

Data analysis

The data analysis followed the inductive thematic data analysis method introduced by Gioia et. al (2013). The analysis method was chosen because it is suitable especially for elaborating new concepts and ideas (Gioia et al., 2013). The data analysis followed the approach of composing 1st order and 2nd order analysis – the approach that enables making the links between data and concepts visible (Gioia et al., 2013).

The analysis was started by using NVivo software. Very thorough coding was made of all the aspects (phrases and sentences) that seemed relevant concerning the research questions. After a closer look of the codes, 75 codes were selected for further study and exported to an Excel file. In the Excel file, each code was marked in a way that all the excerpts that belonged to different codes could be traced back to their original sources.

Furthermore, the codes were organized in the Excel file by grouping and deleting the codes and excerpts that began to seem irrelevant in terms of the research questions of this study. The grouping was continued by looking for similarities and differences among the codes. This resulted in 20 codes for describing company perspectives and 17 codes describing the perspectives of the HEIs. As suggested by Gioia et al. (2013), the informant-centric wording was used when naming the codes. As a result, these categories were given phrasal descriptions that became the 1st order concepts.

At the second level of analysis, similarities and differences were looked for among the 1st order concepts. Within this, group comparisons were made among company and university informants, as well as inter-group comparisons between the company and university informants. Altogether four 2nd order themes were created by using the research-centric terminology in naming the themes.

At the third level of analysis, the emergent 2nd order themes were further distilled into three aggregate dimensions that together form the preliminary data structure of this research (Figure 6.1).

During the data analysis process, already existing theoretical frameworks were sought to be ignored in order to avoid a potential guiding effect of the existing theories in data analysis (Gioia et al., 2013). However, the data analysis process was an iterative process that consisted of

moving among data, emerging patterns and the literature until the final dataset settled in its final structure (Eisenhardt, 1989).

<INSERT FIGURE 6.1 DATA STRUCTURE ABOUT HERE>

FINDINGS

This section describes the findings of the data analysis. The findings are structured according to the themes that emerged based on the second level coding. The constructed 2nd order themes are: 1) *Scientific excellence and focusing*; 2) *Strong dyadic relationships*; 3) *Formal structures as hindering factor*; and 4) *Outsourcing entrepreneurship* (see Figure 6.1). The numbers in brackets after each quotation in Tables 6.2–6.9 refer to the number of each informant as indicated in Table 6.1.

Scientific excellence and focusing

From the company and university points of view, the most critical and important task of the university is to educate the experts to meet the needs of the industry. In research and education, successful collaboration is based on scientific excellence and clear focus areas. Both company and university actors emphasized these success factors. Clear focus areas and research quality are the key preconditions for the companies to get the best possible workforce. The university graduates act as important intermediaries in knowledge transfer from the university to industry. Tables 2 and 3 present the 1st order concepts and the selected representative data on scientific excellence and focusing from the company actor (Table 6.2) and university actor (Table 3) points of view.

< INSERT TABLE 6.2. SCIENTIFIC EXCELLENCE AND FOCUSING – COMPANIES ABOUT HERE>

Company actors perceive that the most important task of the university is to educate the experts to meet the demands of the industry. In terms of research collaboration, the university is

expected to be a problem solver of very concrete challenges of the companies – the kinds of problems that offer intellectual challenges for the professors and their students. Research as well as education must be based on the world-class knowledge that is competitive on global markets. The university must provide top knowledge that can be combined with the top expertise that companies have. The university has managed to make its focus areas known, since the companies have recognized them. They have also concentrated the collaborative actions and built the teams around those areas.

<INSERT TABLE 6.3. SCIENTIFIC EXCELLENCE AND FOCUSING –
UNIVERSITY ABOUT HERE>

Correspondingly, university actors emphasized combining practical relevance and scientific excellence in all their actions. This applies especially to the School of Energy Technology at LUT that has practical relevance within scientific rigour as a guiding rule. The school is very focused in its actions. The research groups are formed based on the selected focus areas, and team members are selected based on their academic competences as well as their abilities to collaborate with other team members and industry. Like their industrial counterparts, the university actors emphasized the students as the key actors to transfer the research knowledge to the markets. One of the degree programmes of the School of Technology was even established to serve the existing companies, and with the aim of creating new companies in the region. One of the founding members of the degree programme mentioned that they had considered stopping the programme a number of times during its existence, since the collaboration with the industry was very limited at certain points, and they concentrated solely on scientific work without practical relevance.

Strong dyadic relationships

The collaborative actions between the companies and university are based on tight personal relationships between the company actors and senior professors or researchers. The company actors emphasize tight relationships with professors and experts in their field. However, at the same time they acknowledge that wider networking would bring benefits both to companies and

the university. The university actors highlight the collaboration with large companies and seek more collaboration with SMEs and interdisciplinary collaboration among their colleagues. The emerged concepts and representative data are presented in Tables 6.4 and 6.5.

<INSERT TABLE 6.4. STRONG DYADIC RELATIONSHIPS – COMPANIES ABOUT HERE>

< INSERT TABLE 6.5. STRONG DYADIC RELATIONSHIPS – UNIVERSITY ABOUT HERE>

The company actors have established tight dyadic relationships with the professors or senior experts in their field. They highlighted the symbiosis that was created by people – not by any intentional process - based on strong personal relationship. The symbiosis had blurred organizational boundaries, with staff members working simultaneously for the benefit of the university and company with or without an official employment contract.

Despite the benefits of having close dyadic relationships, the company actors acknowledge that wider networking would be beneficial for the university and companies as well as the surrounding region. Collaboration is easy and smooth for the company actors, who have managed to form close personal contacts with the university experts. According to the informants, the university has traditionally concentrated on large companies. However, it was noted that during recent years the university has become a more active actor in the region and approached SMEs in a more active and regular manner. However, the university was still expected to be more active and easily approachable for the SMEs that do not have personal contacts with the university professors and researchers.

The university actors acknowledge that they prefer to collaborate with large companies due to the persevering nature of the university research. Large companies have more capacity to invest and commit their time for the university projects compared to SMEs. Additionally, university actors feel that business and technology experts work in their own silos within the university. More collaboration would be needed, especially in the projects that aim to develop new business from the research outcomes.

Formal structures as hindering factor

Despite the fact that the case university is rather small and considered to be agile, the bureaucracy typical for universities cannot be avoided. Bureaucracy increases the participation costs of projects, which particularly hinders SMEs' participation in the university projects. Additionally, finalizing formal agreements even in smaller projects can be time-consuming and complicated. Company and university perspectives on administrative challenges are described in Tables 6.6 and 6.7.

<INSERT TABLE 6.6. FORMAL STRUCTURES AS HINDERING FACTOR – COMPANIES ABOUT HERE>

Participating in the projects initiated by the university is challenging, especially for the SMEs which are seldom able to contribute to the projects financially. Instead, they tend to contribute in kind by working for the project without asking for compensation. However, SMEs have a willingness to participate in project work, since it provides them with an avenue for new research knowledge and the possibility for networking.

Almost all interviewees emphasized that the problems related to bureaucracy stem from the centralized university administration structures. The professors are the ones who act as buffers and intermediaries between the administration and companies. The interviewees stated that bureaucracy mainly manifests in delays in schedules. While large companies are less vulnerable, delays in university outputs can have a severe impact on the business operations of newly established start-ups.

< INSERT TABLE 6.7. FORMAL STRUCTURES AS HINDERING FACTOR – UNIVERSITY ABOUT HERE>

Similarly, university actors also recognize the problem areas of bureaucracy and high costs of university services. They know that SMEs are unable to participate in bigger projects that require their own funding. Additionally, they acknowledge that the university should change the pricing policy and lighten the administrative burden especially when SMEs are involved. Lighter

administrative processes would enable the university itself to participate in smaller assignments initiated by the companies and vice versa, which in turn would give SMEs better possibilities to participate in university projects.

Outsourcing entrepreneurship

The university's role as a locus of new spin-offs and start-ups is seen as a challenging one. Company actors emphasized that commercialization of research outcomes is difficult due to their very technical nature and low readiness level for the markets. Additionally, company actors share the view that professors and researchers lack the passion that is needed for new business creation. In a similar vein, university actors recognized that they lack the needed business expertise. Moreover, the commonly shared concern is that there are not enough potential entrepreneurs, neither at the university nor in the surrounding region. Concepts and selected representative data related to these challenges are highlighted in Tables 6.8 and 6.9.

<INSERT TABLE 6.8. OUTSOURCING ENTREPRENEURSHIP – COMPANIES ABOUT HERE>

In general, the company actors had doubts about the overarching goal that has been set on the university to foster regional entrepreneurship. In their opinion, it should not be solely the university's responsibility for several reasons. First, companies are not established by an external push. As one interviewee put it: *'things do not happen they are done.'* Professors seldom have the entrepreneurial passion and will to act. Second, university-based inventions are very technical and difficult to commercialize. In many cases, a more sensible solution would be to offer the invention to the existing companies rather than trying to commercialize them within the university. Third, the university could have a more entrepreneurial culture. There are many concrete ways to foster entrepreneurship, for example including entrepreneurship in curricula as much as possible in the most concrete manner. Lastly, entrepreneurship is also about changing attitudes, and that does not happen only through university teaching but also through upbringing at home and through informal activities.

< INSERT TABLE 6.9. OUTSOURCING ENTREPRENEURSHIP – UNIVERSITY ABOUT HERE >

The main concern of the university actors was finding potential entrepreneurs, especially finding them among the students. Since the researchers lack the passion and needed competences for starting up a business, they would like to outsource the commercialization activities and concentrate on the research. The professors are looking for mechanisms that would help in finding the potential entrepreneurs. They also acknowledge that even if students are eager and have the right attitude in commercialization projects, they lack the deeper understanding of the specific business area and the different application areas of the technology in question.

CONCLUSIONS

The objective of this study was to provide new insights on the emerging literature on U-BEE. Based on the thematic analysis, four themes were constructed and analysed in the findings section. These themes can be further distilled to three aggregate dimensions, which are material, social and cultural attributes (Spigel, 2017).

This study confirms the statement that, in the entrepreneurial ecosystem, university spillovers are less important than the university's role as a provider of entrepreneurs and qualified workforce (Spigel and Harrison, 2018). According to the findings, the most important task of the university from the company and university actors' perspective is to educate the experts to meet the demands of the industry. However, this case shows that education of the workforce is expected to be based on scientific excellence that is competitive on global markets, meaning that strong material attributes form the firm ground for the emergence of U-BEE. The transfer of technology and human talent is supported by flexible ways of working, for example by blurring organizational boundaries, as well as by increasing double contracting and internships between the university and companies.

Social interaction between the companies and the university takes place mainly through strong dyadic relationships between the senior academics and company representatives. This case proves that the university's tendency to scrutinize and formalize the relationships increases transaction-related challenges (Bruneel et al., 2010). These transaction-related challenges can

become severe problems for SMEs in case they are treated with the same manner as larger companies. The company actors are of the opinion that university administration creates additional bureaucracy, which can be avoided by having trustful dyadic relations with the senior academics in the faculties. This finding contradicts the earlier study, suggesting that a coordinated stakeholder management approach is needed to strengthen the U-BEE (Bischoff et al., 2018).

As the importance of scientific excellence and educating a high-quality workforce is unquestionable, the university's role as a promoter of regional entrepreneurship is more debatable. The basic elements of entrepreneurial culture – the attitudes and histories of entrepreneurship (Brush, 2014; Spigel, 2017) – seem to be in place. However, both company and university actors have concerns regarding the university as a locus of new start-ups and spin-offs, and they tend to share the view that new venture creation should be outsourced from the university. The reasoning behind this opinion is twofold. First, university-based inventions and their applications were seen as being excessively technology-focused and difficult to commercialize, and they would be better utilized if they were offered to existing companies in the first place instead of having the university try to commercialize them. Secondly, it was emphasized that new business creation requires genuine commitment and passion from the potential entrepreneurs. Academics often lack the needed will to become entrepreneurs (Huang-Saad et al., 2018), meaning that potential entrepreneurs need to be found outside the university. Similarly, the university actors also have their reserved attitude towards the university's role as a catalyst for start-ups and spin-offs. They believe that the most efficient interaction mode is joint projects with existing companies, in which the resulting IPR is to be transferred to the companies. The professors see that they lack the needed expertise for commercialization actions and that the mechanisms by which for example students could be involved in the commercialization projects do not exist. The professors consider the creation of start-ups to be important, but the fuzz around start-ups might downsize the importance of knowledge transfer through research and education in the form of IPRs and a high-quality workforce.

In sum, this case confirms that a close and trustful relationship with non-academic contacts (Hayter, 2016; Miller and Acs, 2017) are important factors that reinforce the interaction in U-BEE. However, the close dyadic relationships hinder the further networking within the university and among companies, especially among SMEs that are not active members in U-BEE. This

reinforces the interaction vertically but hinders horizontal networking across different disciplines and different fields of industry. This case confirms that the selection of a clear focus area enhances the university's role in the re-orientation of the commercial sector in regions (Braunerhjelm, 2008). However, focusing enhances the special industrial cluster to be developed but neglects the entrepreneurs in other sectors and hinders them to acquire resources and support from the university (Spigel and Harrison, 2018).

Finally, it should be noted that this study has some limitations. First, the company and university actors that were selected for the interviews are all active members in the emerging U-BEE. This fact may result in biased research results. Second, the U-BEE of this study is located in southeast Finland with specific regional characteristics. Additionally, the U-BEE analysed in this study has a strong technological focus specializing in cleantech. For this reason, the results of the study might not reflect the reality in U-BEES in other contexts. To address these gaps, future research could investigate the perceptions of non-active members of U-BEE and select different types of U-BEES in different regions for further investigation. Moreover, as the education of the entrepreneurs and high-quality workforce seem to be the most important task of the university in U-BEE, future research could focus on investigating how students are engaged in U-BEE as active and engaged members through teaching and research.

IMPLICATIONS

This study brings new insights to the immature theory of U-BEE by bringing out the factors that constrain and reinforce the emergence of U-BEE. The current literature on U-BEE has focused on investigating organizational structures and support services like TTOs (Belitski and Heron, 2017; Greene et al., 2010). This study goes beyond investigating organizations and curricular and extra-curricular study programmes, but it gives voice to individuals: faculty, entrepreneurs and other company actors. The study highlights that entrepreneurship promotion in U-BEE is not only about technology transfer and the creation of high-growth companies. The findings of this study pinpoint the importance of entrepreneurial culture and social relations, which do not receive enough attention in current empirical models and theories that emphasize formal structures and support mechanisms. Additionally, the current theories tend to neglect the students as important intermediaries and stakeholders in U-BEE.

For the practitioners, policymakers and higher education management, this study provides evidence about the importance of considering U-BEE as a wider phenomenon than technology transfer and new business creation. Expectations for the universities in creating new businesses should not be set too high; rather, they should strengthen their role as educators of entrepreneurs and workforce, as well as providers of scientific solutions to practical problems that stem from the needs of industry. This can be done by increasing awareness of entrepreneurship education among teachers, involving students in research commercialization projects and company assignments in a more systematic manner, and by minimizing the bureaucracy when collaborating with SMEs. Additionally, double contracting and internships of academics in the industry could be further enhanced.

Universities tend to centralize innovation and entrepreneurship-related functions. These centralized functions might have their role, but they cannot replace the dyadic relationships between companies and faculty. As the interaction in the entrepreneurial ecosystem is mainly based on informal social relationships between the faculty members and company actors, universities should avoid centralizing all entrepreneurship-related functions. Instead, they should decentralize them and their coordination. Certain senior academics enjoy a strong position among their company partners, and they have created trustful relationships with each other. Therefore, the companies prefer to collaborate with their academic counterparts directly rather than involving administrative structures in collaboration.

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Figure 6.1. Data Structure

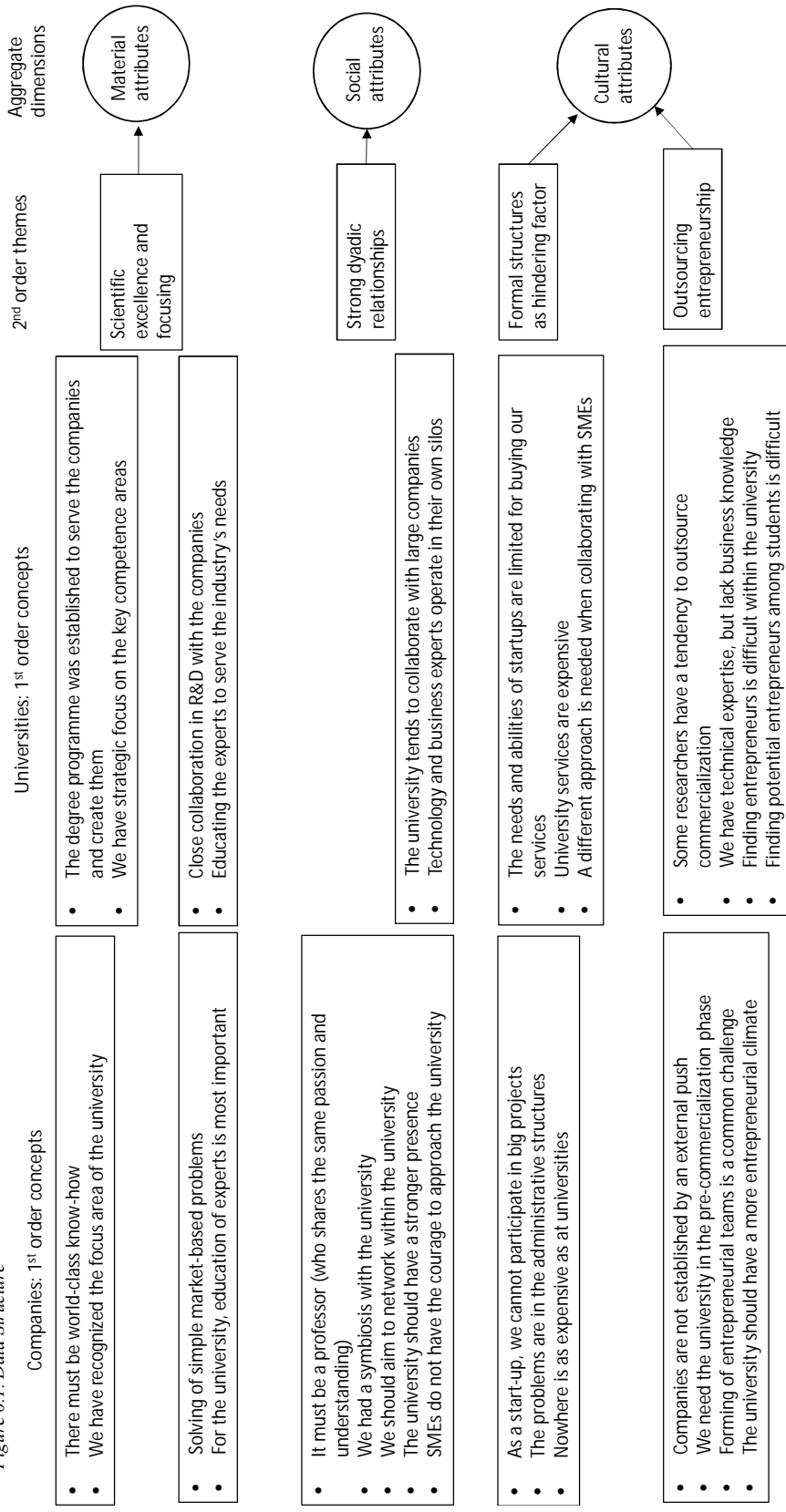


Table 6.1. Titles and organizations of the interviewees

Firm			University		
#	Title	Firm type and size	#	Title	University type
1	Managing director	University spin-off, <i>small</i>	11	Associate professor, technology	University
2	R&D director	Process industry, <i>large</i>	12	Research associate, technology	University
3	Chief technical officer	University-based startup, <i>medium</i>	13	Senior lecturer, business	UAS
4	Managing director	Software industry, <i>medium</i>	14	Professor, technology	University
5	Managing director	Software industry, <i>medium</i>	15	Associate professor, business	University
6	Managing director	University-based startup, <i>small</i>	16	Professor, technology	University
7	Managing director	University spin-off, <i>micro</i>	17	Senior lecturer, technology	UAS
8	Managing director	University spin-off, <i>micro</i>	18	Professor, technology	University
9	Managing director	University-based startup, <i>medium</i>	19	Research director	UAS
10	Managing director	Engineering, <i>medium</i>	20	Manager, Innovation Services	University
			21	Vice-rector	University
			22	Vice-rector	UAS

Used measures of firm sizes: large > 250 employees, medium < 250 employees, small < 50 employees, and micro < 10 employees.

Table 6.2. Scientific excellence and focusing – companies

1 st order concepts and the selected representative data
<p>There must be world-class know-how</p> <p>One great case led to the creation of a new company that was also funded by the university's investment company. Another notable example is that the problems of companies can be solved by top expertise. (4)</p> <p>The university has top knowledge. We have top knowledge. We have built a team around these top experts. When these people start to work it leads to success. However, it is hard work. (6)</p> <p>We have recognized the focus area of the university</p> <p>We have recognized it as a focus area of LUT and we want to focus our efforts in this field. (2)</p> <p>Solving of simple market-based problems</p> <p>...simpler, clearer, market-based research for companies. No pipe dreams. (7)</p> <p>For the university, education of experts is most important</p> <p>A critical factor is how successful university is in recruiting? Had the research assistant who wrote the master's thesis not succeeded in getting good results, or had the collaboration otherwise failed, this company might not have been established. This is a notable thing. (7)</p> <p>Nowhere can I find experts in this specific field as well-educated as those taught by Prof. N.N. Even our customers notice how they differ from the others. (9)</p>

Table 6.3. *Scientific excellence and focusing – university*

1st order concepts and the selected representative data
<p>The degree programme was established to serve the companies and create them When we established this degree programme, we defined in our strategy that, because we lacked industrial customers, our mission would be to try to promote the establishment of new companies in the region that would later employ us, as well as serve the existing companies. (16)</p>
<p>We have strategic focus on the key competence areas We have the ability and a sufficiently large research group. This inevitably leads to the accumulation of knowledge and focusing. We do not try to do everything, but we concentrate on the areas that are defined in our strategy. (16)</p>
<p>We have targets and we select the persons who implement them based on their competences. They must be scientifically qualified, as well as otherwise right-minded in order to fit in. (14)</p>
<p>Close collaboration in R&D with the companies The university-based inventions are often still raw and not ready to be delivered to the end-user. Often the end-users are SMEs, with whom we begin the R&D project. (20)</p>
<p>We conduct research cooperation in the product development interphase. Then the knowledge is transferred by the persons and the IPRs. (14)</p>
<p>Educating the experts to serve the industry's needs We produce the greatest impact by educating engineers and doctors to serve the Finnish industry. These persons are the ones who transfer the research knowledge to the markets. (14)</p>
<p>Five or six doctors went to work there [a company] during one day. However, some of these doctors were still employed by the university. (16)</p>

Table 6.4. Strong dyadic relationships – companies

1st order concepts and the selected representative data
<p style="text-align: center;">It must be a professor (who shares the same passion and understanding)</p> <p>It must be the professor who shares the same passion, will and understanding. They know whether they have a PhD student who has the right attitude and background for us... I do not like very much what they offer [university administration], but I do like what the professors do. (9)</p> <p>For me it is easy, since I know everyone personally. I contend that every company should aim for developing a relationship with the professor or senior researcher. (9)</p> <p style="padding-left: 40px;">In practice, we are in direct contact with the professors, always. (3)</p> <p style="text-align: center;">We had a symbiosis with the university</p> <p>We had a symbiosis with the university. It was personal relationships, not any process, that created it.</p> <p style="padding-left: 40px;">We wrote many theses and conducted recruitments. (5)</p> <p>We had the kind of research collaboration where I sometimes did not know whether it was the university's meeting or our company's meeting. It worked. We conducted research and so forth. (5)</p> <p>He [PhD student] worked half the time for us and the other half as a research assistant. The university was very flexible. Double contracting was very beneficial for the university and for us. (7)</p> <p style="text-align: center;">We should aim to network within the university</p> <p>We should aim to network further within the university, not just within our own team. (6)</p> <p style="text-align: center;">The university should have a stronger presence</p> <p>The university should be a stronger and more visible actor in Lappeenranta. (4)</p> <p>LUT overlooks this place a bit. It looks further to the world and to other regions in Finland – especially at the capital region. Large companies and so forth. (8)</p> <p style="text-align: center;">SMEs do not have the courage to approach the university</p> <p>The problem is how SMEs could better utilize the university – they do not even have the courage to go there. (10)</p>

Table 6.5. Strong dyadic relationships – university

1st order concepts and the selected representative data
<p style="text-align: center;">The university tends to collaborate with large companies</p> <p>The university tends to collaborate with large companies because of the persevering nature of our work. (20)</p> <p>The companies in the region are anaemic in welcoming our expertise, with only few expectations. (16)</p> <p style="text-align: center;">Technology and business experts operate in their own silos</p> <p>The technology experts are somewhat alone, and the business experts are absent. (16)</p> <p>To a large extent, everyone here tends to concentrate on their own expertise area. However, when developing business ideas you should have broader expertise. (15)</p>

Table 6.6. Formal structures as hindering factor – companies

1st order concepts and the selected representative data
<p>As a start-up, we cannot participate in big projects We are asked [by the university] to participate in projects in which we should provide a notable amount of our own funding. We cannot do that – or we could, if we were sure that we would get it back. For this reason, we mainly participate in projects by offering work contribution. We have a very limited role – we just want to be able to follow what is happening. (8)</p> <p>The problems are in the administrative structures Our needs are usually of the kind that cannot be solved by any bureaucracy. If we cannot get help when we need it, we get it from somewhere else. We usually cannot wait for a week. (3) With the professors, I have not had the slightest problem – not even one. Instead, I have had problems with the administration and laboratory services of the university. (6) The administration cannot help us, not at all. It does not work if the university establishes some kind of bigger support structures. (9)</p> <p>Nowhere is as expensive as at universities A specific feature of the university is that if you have an assignment to be completed, nowhere is as expensive. (10)</p>

Table 6.7. Formal structures as hindering factor – companies

1st order concepts and the selected representative data
<p>The needs and abilities of start-ups are limited for buying our services It is sad that we have a bright future behind us with these spin-offs. They now have a very limited ability and needs to buy expertise from us. (16)</p> <p>University services are expensive ...and the biggest catastrophe is our pricing policy for SMEs. (12) We have tried something, some small cases, but it has been problematic that they are small with a short duration and without large sums of money. It is very problematic for us to be on board, because even a small amount of work will be very expensive to commission. (15)</p> <p>A different approach is needed when collaborating with SMEs In some companies, requirements are higher and timetables are faster. These cases are problematic, since researchers are not used to respond by 2 p.m., for example. (19) Our approach of being tough does not work with SMEs. (12)</p>

Table 6.8. Outsourcing entrepreneurship – companies

1st order concepts and the selected representative data
<p>Companies are not established by an external push</p> <p>Most importantly there must be someone who really has the will, heart and soul. Not a single company is established by an external push. In general, professors with great ideas do not establish them. It requires you to put yourself out there and start acting. (9)</p>
<p>We need the university in the pre-commercialization phase</p> <p>Start-ups are a hot topic at the national and ministerial levels. However, many inventions would have created new businesses and new jobs in existing companies had they been offered to them. However, I understand the researcher who thinks that the idea could become a new business and a start-up could be established. (5)</p> <p>In all honesty, many of the inventions are technically okay, but when they need to be put into commercial use, they cannot be applied since it would be too expensive, or they have features that cannot be applied (3)</p>
<p>Forming of entrepreneurial teams is a common challenge</p> <p>Finding the right people for the start-ups is the challenge. It just needs to be acknowledged that a new type of knowledge is needed to secure the growth, but how to find the needed experts when the ready-made concept does not exist? (2)</p>
<p>The university should have a more entrepreneurial climate</p> <p>The university should add more entrepreneurship to their curricula. They should have it in almost every course. Of course, not every student will become an entrepreneur, but there could be more of those who will. (10)</p> <p>I would see that there should be a more entrepreneurial climate, especially from the point of view that students, especially the ones who continue their academic careers, would have higher intentions to commercialize the top-quality research. (4)</p>

Table 6.9. Outsourcing entrepreneurship – university

1st order concepts and the selected representative data
<p>Some researchers have a tendency to outsource commercialization</p> <p>Researchers expect that more things should be done for their behalf. From the opposite perspective, the researchers should take more responsibility for themselves. Evidently, we need to have clearer roles. (20)</p> <p>Eventually, it is about people. Reports won't commercialize by themselves. We should speak in an active, not passive, form. (21)</p>
<p>We have technical expertise, but lack business knowledge</p> <p>I cannot do the marketing. My students and I invent all kinds of things, but it is not that extraordinary that someone would come and take it from us. We should be able to sell our inventions by ourselves. There is no clear path on how to do it. (16)</p>
<p>Finding entrepreneurs is difficult within the university</p> <p>We could not find entrepreneurs within the university, though we did find strong technological knowledge. (12)</p> <p>The research teams have good technical preparedness, but we cannot always find business experts. (20)</p>
<p>Finding potential entrepreneurs among students is difficult</p> <p>During the old days, when we had all kinds of collaboration and especially exercises, I could go and ask whether there was someone who stands out. Now I feel that no one stands out. Students are just faces who come and go. (18)</p> <p>They were ordinary degree students. They wrote their master's thesis. They had a very good attitude and still have it. We were very pleased that we found these two people. (18)</p>

Publication IV

Lahikainen, K., Pihkala, T., and Ruskovaara, E.

High hopes: Regional policy expectations for the entrepreneurial university

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Chapter 15

High Hopes: Regional Policy Expectations for the Entrepreneurial University

Katja Lahikainen

 <https://orcid.org/0000-0003-1712-3253>

LUT University, Finland

Timo Pihkala

 <https://orcid.org/0000-0003-0320-2217>

LUT University, Finland

Elena Ruskovaara

LUT University, Finland

ABSTRACT

The regional impact of entrepreneurial universities is a well-researched topic, but less attention is paid to the expectations of the regional policy institutes toward the university. This chapter investigates the regional policy expectations toward the university and what the influence of the university to these expectations is. This study is based on a technological university case in a peripheral region in Finland. The results of the study show that the existence of a single university leads easily to a university-dominant policy and thus to a regional policy lock-in. Consequently, the implementation of the regional policies can be in the hands of the university, leaving other regional stakeholders with a minor role. In order to fully utilize the potential of the university to address the specific regional challenges, the university should not only be seen as a locus of new spin-offs and start-ups, but rather as a producer of qualified graduates and future entrepreneurs.

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BACKGROUND

Across the globe, universities have a significant economic impact on regions. Earlier research shows that a 10% increase in the number of universities in a region is expected to lead to about 0.4% higher GDP per capita in that region (Valero & Van Reenen, 2019). Universities' influence on regional economic development is fostered by linear knowledge transfer mechanisms, human capital and innovations (Valero & Van Reenen, 2019), as well as a combination of teaching and research activities of universities with entrepreneurship support and programs among faculty and students (Bramwell & Wolfe, 2008; Lawton Smith & Bagchi-Sen, 2012). However, the benefits of technology transfer activities of universities not only depend on the features of universities, but also on regional networking activities (Lawton Smith & Bagchi-Sen, 2012) and other institutional and structural aspects in which universities are located (Uyarra, 2010).

This study takes a special focus on a technological university case in a peripheral region and analyzes the regional policy perspective to understand the regional expectations toward the university. Earlier literature has emphasized the role and impact of the university on the regions (Audretsch, Hülsbeck, & Lehmann, 2012; Bramwell & Wolfe, 2008; Guerrero, Urbano, & Fayolle, 2016) and brought up evidence of operations and mechanisms through which universities can benefit their immediate surroundings (Guerrero, Urbano, Fayolle, Klofsten, & Mian, 2016; Lawton Smith & Bagchi-Sen, 2012).

However, little attention has been paid to the other side of the continuum, i.e., the expectations that the region is setting for the university. In this perspective, earlier studies have stressed that the characteristics of the region have an effect on the expectations and impact of the university (Bergmann, Hundt & Stenberg, 2016; Schaeffer & Matt, 2016). In other words, the interaction between the region and the university within metropolitan areas is likely to be different from that of peripheral regions. In peripheral regions, the role of the university is likely to be drastically larger, since the university can become a hub organization in regional entrepreneurial ecosystems (Shaeffer & Matt, 2016) and peripheral regions tend to be more dependent on the income and innovation of universities (Huggins & Johnston, 2009).

In this chapter, we continue from the themes raised by Brown (2016). He proposed that the entrepreneurial spillovers from universities may be exaggerated, especially in some peripheral regions. In that sense, the regional expectations may be unrealistic in terms of the universities' direct impact on the regional economy, or not enough attention is paid to specificities of local entrepreneurial ecosystems when designing regional innovation policy instruments (Brown, Gregson, & Mason, 2016). On the other hand, the regional policies may exaggerate the regions' absorptive capacity to assume the scientific and technological innovations in the local business processes. Brown (2016) also points out that in peripheral regions the university may be in a position where it can have a strong impact on the regional policy expectations toward the university. In such cases, universities' dominant role through 'institutional capture' can result in a 'policy lock-in' in regions. While there may be several signs of institutional capture in the regional policy, it is also evident that the regional policy seeks to address specific development needs through the help of a technological university. This research aims to find out the expectations of the regional policy institutions toward the university in addressing the regional challenges, and what the influence of the university itself to the formation of these expectations is. This paper contributes by showing that the policy lock-in is preferable situation for most of the policy decision-makers in the region. Furthermore, it seems that the university focus guides the organizations to invest the regional and local resources to the same direction. In that sense, the policy lock-in may be an important way to reach economies of scale in the regional development. However, the similarity of the policy documents and unanimity of decision makers may be a source for collective blindness in the region.

This chapter starts with a brief literature review on the regional roles of universities. Next, it introduces the case of the South Karelia region in Finland. Following that, the expectations of the local and regional policy institutes are presented. Finally, the chapter suggests solutions, recommendations and future research directions, as well as draws some conclusions.

REGIONAL ROLES OF UNIVERSITIES

While practically all universities affect their immediate context, entrepreneurial universities are special cases in this respect, as they aim for regional impacts. Entrepreneurial universities have included economic and social development in their mission beyond their traditional tasks of research and teaching (Etzkowitz, 2003). The development of entrepreneurial universities has accelerated along with universities adopting new responsibilities of knowledge transfer and technological innovation (Bramwell & Wolfe, 2008). This is due to the internal development of universities and external influences, such as the increased need for new knowledge in regions (Etzkowitz, 2003; Etzkowitz, Webster, Gebhardt, & Terra, 2000; Goldstein, 2010; Lahikainen, Pihkala, & Ruskovaara, 2018). In academic research, the narrow view on entrepreneurial universities focusing on the commercialization of research through patenting, licensing and spinoffs is dominant (Mascarenhas, Marques, Rei, Anderson, & Santos, 2017; Tripl, Sinozic, & Lawton Smith, 2015). However, the contributions of entrepreneurial universities have been found to be much wider. In addition to research commercialization activities, the entrepreneurial universities provide regional entrepreneurial and innovation ecosystems with human capital, knowledge capital and entrepreneurship capital (Audretsch, 2014; Guerrero et al., 2016b).

Following the broader definition, entrepreneurial universities have adopted entrepreneurial management styles; they act entrepreneurially with their students and staff and interact with their outside environment in an entrepreneurial manner (Guerrero et al., 2016a). Moreover, an entrepreneurial university provides entrepreneurship capital that consists of leadership for creating entrepreneurial thinking, actions and institutions (Audretsch, 2014). In sum, the entrepreneurial university can be defined as a university that aims for better sustainability for itself by creating, disseminating and applying knowledge for economic and social development (Schmitz, Urbano, Dandolini, de Souza, & Guerrero, 2017).

Furthermore, universities may play an important role in creating and connecting entrepreneurs in their networks and thereby enabling entrepreneurs to acquire resources, knowledge and support from their regional stakeholders (Spigel & Harrison, 2018). In the regional policies, universities may be expected to carry out these facilitating roles and thereby promote regional entrepreneurship. However, as in the case of Sussex University in the UK (Martinelli, Meyer, & von Tunzelmann, 2008), the regional impact of universities can be lower than the regional stakeholders wish. For example, a significant number of a university's actual collaborative partners might be located outside the region, or the forms of collaboration do not meet with the expectations of local businesses. Additionally, different modes of technology transfer are favored in different disciplines, e.g., certain disciplines tend to focus on collaborative research and consultancy, and others on the creation of new IPs and start-ups (Martinelli et al., 2008).

Universities have multiple regional roles, and the different roles consist of different actions and mechanisms through which they occur. National and regional innovation and research policies tend to explicitly or implicitly reflect one or a combination of several of these roles and the interaction mechanisms associated with them. The diversity of the roles and expectations related to these roles gives rise to potential contradictions or conflicts of policy rationales and objectives (Uyarra, 2010). Despite this

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complex setting, policy-makers tend to consider universities as highly flexible, integrated and strategic actors, which in turn puts pressure on universities to respond to multiple policy expectations (Uyarra, 2010). Moreover, regional policies tend to focus on science and technology neglecting the needs of local companies (Huggins & Kitagawa, 2012). For example, if universities are assumed to provide the local companies with high-quality research to enhance their innovation capabilities, but it is forgotten that knowledge transfer is not a linear process but a bi-directional and reciprocal one, there is a risk that universities become 'ivory towers' with little relevance to the local economy due to their lack of absorptive capacity (Brown, 2016; Uyarra, 2010). At the other end of the continuum, universities can be considered as 'engaged' universities where the focus is on universities adapting to the regional needs at multiple scales of engagement. For example, 'economic governance' includes activities such as designing and running programs to support entrepreneurship, innovation and business growth and engaging with local and regional policy-makers (Pugh, Hamilton, Jack, & Gibbons, 2016). However, the university's role in 'economic governance' can lead to strategic-level discussions and statements without clear commitment and concrete actions unless more flexible regional funding arrangements are provided (Uyarra, 2010) or strategic goals and academic incentives are aligned (Lahikainen et al., 2018a). If the various missions of universities are aligned and they are complementing rather than competing with each other, universities can act as network enablers and neutral intermediaries, provoking reflection and interaction between actors (Pugh et. al., 2016).

Lawton Smith and Bagchi-Sen (2012) propose that universities' becoming active regional agents depends on 1) the internal characteristics of the university, 2) how the university responds to exogenous shocks, 3) the nature of national and regional funding that stimulates universities' third-task activities, and 4) the attributes of the region. For the creation of regional impact by universities, there must be a match between the assets of a university and regional conditions. The national and regional policy measures that can promote entrepreneurial actions of universities include regulation of IPRs, support for establishing technology transfer offices (TTOs), science parks and incubators, as well as the promotion of academic spin-offs (Trippel et al., 2015). The regional conditions include e.g., local absorptive capacity, i.e., local firms that are capable of engaging with the university, and competitive infrastructure including science parks, incubators and venture capital, as well as innovative local firms and high-quality local labor markets (Lawton Smith & Bagchi-Sen, 2012).

A strong entrepreneurial culture is needed to enhance networking between the entrepreneurs (Spigel & Harrison, 2018). Especially, for the universities in peripheral regions networking and focusing on outreach activities are important (Guerrero, Urbano, Cunningham, & Organ, 2014). Case study from Latvia shows that universities' impact on sustainable regional development is higher in regions, where university networks are strong than in peripheral regions where universities have less impact on entrepreneurial activities (Erina, Shatreich, & Gaile-Sarkane 2017). Case study from Ireland and Spain suggest entrepreneurial activities and outreach with the surrounding region can be enforced by strong leadership across the university (Guerrero et al., 2014). In a similar vein, the study of Goldstein and Glaser (2012) on the universities participating in the governance of local and regional development highlight that leadership and interpersonal working relationships among leaders may play more important role than formal governance structures.

Universities located in large metropolitan areas form a self-reinforcing loop together with the surrounding economy. These areas with a high concentration of companies and industries create more demand for university products (education, contract research, trained labor and new technology, for example). Universities, in turn, respond with providing better products in close cooperation with local

companies (Lendel, 2010). The regional attributes are not that attractive in more peripheral regions. While the concept of an entrepreneurial university seems promising for these regions, entrepreneurial spillovers of universities might not meet these expectations due to a disconnect between universities and the surrounding regional entrepreneurial and innovation ecosystems in the creation of university-based spinoffs (Brown, 2016). Moreover, the expectations for universities to provide high-level entrepreneurship education may be unreasonable (Laukkanen, 2000). Especially in non-mature contexts, universities can end up as hub organizations in regional entrepreneurship ecosystems (Schaeffer & Matt, 2016). However, universities' leading role in the policy-making might lead to institutional capture that results in a university-dominant policy (Brown, 2016).

CASE: SOUTH KARELIA REGION IN FINLAND

Methodology and Data Sources

There is a broad range of case studies investigating the impact of universities in different regions, however studies from the policy perspective have received less attention (see e.g. Brown, 2016; Goldstein & Glaser, 2012). To examine this less frequently studied perspective and to cover the regional expectations toward the university, this research utilizes a qualitative case study methodology, focusing on the special case of South Karelia in Finland

The empirical data contains a set of 11 central local and regional strategy documents. As the objective of this study is to recognize the regional policy towards the university, the local and regional strategy documents form the most relevant data source. To triangulate the findings from the strategy documents and to assure the validity of the study (Yin, 2009) interviews among the local and regional policy decision-makers were conducted. The data collection was based on purposive sampling, more specifically on critical case sampling (Patton, 2015). Strategy documents and interviewees were selected based on the prior knowledge on the most relevant policy documents and actors. The data sets are can be considered to be representative, since they cover all the key documents and the key experts from the most central local and regional policy institutions.

The data analysis was conducted in two phases. The strategy documents were analyzed manually by searching all the references related to university and its functions. The strategy documents were analyzed with the content analysis method (Patton, 2015) The transcribed interviews were firstly coded by using the NVivo software to identify the expectations of the policy-makers Then, secondly, the strategy documents and the interview data was analyzed by using modified pattern matching (Yin 2009) to identify and categorize the expectations of local and regional policy actors toward the university.

The regional and local policy documents that are used in this study are described below.

The regional policy documents:

- **Regional Development Plan:** The regional development plan of South Karelia 2018–2021 acts as the main strategic roadmap for the entire region. It is coordinated and drafted by the Regional Council of South Karelia in cooperation with all relevant regional stakeholders, including municipalities, regional development agencies, educational institutes and governmental organizations, as well as numerous non-profit organizations operating in the region. The university is represented as an institution, as well as by separately named experts.

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- **Regional Innovation Strategy:** The strategy is led by the Regional Council of South Karelia and is based on the regional development plan. The aim of the plan is to gather the specific business development targets of the region. It also acts as a Research and Innovation Strategy for Smart Specialization (RIS3) in the region.
- **Regional Business Strategy:** The strategy is drafted in cooperation with the South Karelia Chamber of Commerce, Entrepreneurs of South Karelia (regional branch of the national interest and service organization for small and medium-sized enterprises) and LUT University. The aim of the strategy is to highlight the views of the local businesses in the future, development targets and challenges of the region.
- **Regional Performance Objectives:** The set of regional performance documents consists of 5 annual documents that cover the years 2014-2019. The documents are issued by the Centre for Economic Development, Transport and the Environment of Southeast Finland (ELY Centre). These strategy documents set the annual targets for the regional development areas that are related to industrial policy, employment, environmental protection and sustainable development.
- **The Entrepreneurship Education Strategy of Southeast Finland:** The strategy is a guiding document that presents concrete aims for students, teachers and educational organizations to meet by 2020. The strategy defines targets for all education levels from primary schools to higher education institutions and it was prepared in a group representing a wide variety of stakeholders from educational organizations, municipalities and regional development agencies.

The local policy documents:

- **Lappeenranta Strategy 2033:** The strategy covers the development targets of the city of Lappeenranta related to topics such as the well-being of the citizens, the prosperity and image of the city, digital processes, finance and financial and human resources.
- **The growth agreement between the city regions of Lappeenranta and Imatra:** The agreement covers the years 2016-2019 and it is drafted by the city mayors, the leader of the Regional Council, the rector of LUT, the rector of Saimaa University of Applied Sciences and the director of the Centre for Economic Development, Transport and the Environment of Southeast Finland. The theme chosen for this agreement is business solutions for carbon neutrality and circular economy.

All the strategy documents analyzed in this study are published in Finnish and the citations presented in the findings section are direct translations from Finnish to English.

The interview data consists of eight thematic interviews lasting between 20 and 60 minutes. The interviewees are central policy-makers in the region, such as the heads of regional development companies and development directors of the regional council and the city of Lappeenranta, as well as representatives of governmental organizations operating in the region (see Table 1). The interviews were conducted with one key informant per organization. The interviews of the policy decision-makers bring further insights into the contents, implementation and challenges of the policy. Furthermore, they highlight the relationship between the university and the regional policies.

Table 1. Interviews conducted

Organization	Title of the interviewee
Centre for Economic Development, Transport and the Environment of Southeast Finland (ELY Centre)	Head of Unit at Employment, Business and Industry
City of Lappeenranta	Development Director
Imatra Region Development Company Ltd	Managing Director
Regional Council of South Karelia	Director for Regional Development
South Karelia Entrepreneurs Association	Managing Director
Startup Mill (incubator owned by the cities of Lappeenranta and Imatra)	Innovation Manager
TEKES - Finnish Funding Agency for Technology and Innovation	Senior Advisor
Wirma – Development Company of the City of Lappeenranta	Senior Advisor

South Karelia Region

The South Karelia region is located in Southeast Finland. It consists of 9 municipalities and has around 129,000 inhabitants. One of the biggest forestry industry clusters in Europe is located in the region, and the renewal of the forestry industry is one of the key challenges in the region. Even if the accessibility of the region is good, the challenge is that it is not connected to the growth centers of Finland. Other challenges are related to demographic change and the supply and demand of the competent workforce, as well as the creation of new businesses and innovations (Regional Development Prospects in Autumn 2018).

LUT University (LUT) is the only university operating in the region, and it is located in the city of Lappeenranta, the region's capital city. LUT, a relatively young and small university that was established in 1969, has approximately 5,500 students and 1,000 faculty members. LUT is highly focused and emphasizes clean energy and water, circular economy, sustainable business and entrepreneurship in its strategic mission.

The Regional Council of South Karelia acts as a central governing body of the region and has a statutory responsibility for regional development and planning. The EU's regional objective program for South Karelia has partly been prepared in the Council, as it also implements and coordinates various projects. The Centre for Economic Development, Transport and the Environment (ELY Centre) of Southeast Finland is responsible for the regional implementation and development tasks of the central government.

EXPECTATIONS OF LOCAL AND REGIONAL POLICY-MAKERS FOR A UNIVERSITY

The analyzed policy documents show good awareness of the challenges in the region: the region needs to improve the productivity of work, gain more dynamism in the business sector, increase the education level of the population, increase the R&D intensity and increase the level of employment. The university is expected to address these regional challenges. Furthermore, the university itself actively engages in the formation of regional policies. The chapters below present the findings based on these two dimensions.

University to Solve Regional Challenges

Part of the expectations set in the policy documents are based on the regional challenges. The objectives are twofold. First, the university is expected to produce new innovations that will make Southeast Finland a leading region in the exploitation of new energy-efficient and environmentally friendly technologies and thereby attracting a qualified workforce and new businesses in the region. Second, the objectives related to university students staying in the area after graduation seems to be a way to increase the education level of the region and influence the demographic distribution of the population.

On the regional level, the regional development plan, regional strategy, regional innovation strategy and regional business strategy form a coherent whole. All the above-mentioned strategy documents expect the university to provide new technological innovations, especially in the field of cleantech and green energy, in cooperation with other stakeholders and provide high-quality education.

The regional development plan acknowledges the need to integrate university students in the region, as well as integrate education with local business. LUT is expected to take a strong role in strengthening the local knowledge base and offering high-quality education that attracts international interest, thus increasing the internationalization of the region. In the regional development plan, specific emphasis is put on the university's role in strengthening the knowledge base in the region and creating new knowledge-intensive companies. The strategy acknowledges that in a national comparison, the region's strengths are R&D intensity and productivity, with the educational level and industry dynamics (indicator of an industrial renewal) being on an average level, and unemployment being higher than the national average in Finland.

Furthermore, the regional development plan states that LUT University will strengthen the knowledge cluster, which consists of different learning environments, research labs, support services and research projects. The specific development targets in which HEIs are involved include 1) enhancing the collaboration between educational institutes in innovation and commercialization actions based on knowledge-intensive development work, 2) strategic partnerships of educational institutes and industry, 3) strengthening the R&D cluster through external funding, and 4) modelling of the regional service-path for knowledge-based growth enterprises in cooperation with educational institutes and development agencies.

The mission statement of the innovation strategy shares a similar viewpoint with the regional development plan. As follows, the innovation strategy states that LUT University forms the core of the innovation ecosystem in the region:

The innovative actions of South Karelia are based on a strong university campus, cooperation between different stakeholders and knowledge-intensive growth entrepreneurship.

Close cooperation between the different actors and a focus on internationalization in all its actions are described as specific features of the innovation ecosystem. Indicators that are followed include the number of patents, national funding on R&D and new business creation, the ratio of R&D expenditures in companies, the share of university graduates in the population, the number of development platforms and development of growth companies (turnover and jobs). The knowledge-intensive entrepreneurship is to be strengthened by combining acceleration and incubation closer together, thereby enhancing networking and the entrepreneurial culture. The knowledge-base and internationalization of South Karelia are to be further enhanced by increasing the collaboration between international students and local companies.

In the regional policy documents of the governmental ELY Centre of Southeast Finland, LUT University's focus areas of water purification, energy efficiency and renewable energies are acknowledged

under the heading ‘Promoting the growth of the leading business sectors, especially through pilot and demonstration activities.’ Apart from that, LUT University is not mentioned in the policy documents of the ELY Centre of Southeast Finland.

The Entrepreneurship Education Strategy of Southeast Finland has a strong focus on entrepreneurial teaching and students. HEIs are encouraged to support student entrepreneurship and the internationalization of students. Additionally, HEIs are encouraged to include entrepreneurship in their strategic mission, provide pedagogical support for teachers and enhance the networking of students’ entrepreneurial societies with the associations and networks of business life.

The Lappeenranta 2033 strategy document sees Lappeenranta as an attractive university city for companies. To a large extent, the strategy bases itself on the potential that university students can bring to the region to improve the biased demographic distribution of the population. Currently, the city and the surrounding region are not attractive enough for the students, since only 12% of the business students and 21% of the technical students stay in the region after their graduation. In the strategy, the collaboration between the students and companies is highlighted, and students are considered to bring a positive image to the city. The measures to improve the situation include conducting a partnership agreement with the student union, financial support for summer jobs and making company assignments more visible. Furthermore, according to the city strategy the university is expected to bring growth to the region. New jobs within the university are expected, and the university incubator is predicted to produce five new companies annually. The strategy sets expectations for new businesses in the area of water purification technology – one of the university’s focus areas. According to the strategy, the role of the university is to produce new start-ups and spin-offs in its expertise field, and the city’s role is to concentrate on serving the existing companies.

Furthermore, in a strategic agreement with the neighboring cities of Imatra and Lappeenranta that is entitled ‘From carbon neutrality and circular economy solutions to economic growth in cooperation with companies and research,’ the focus areas of LUT are selected as priorities that can lead to new businesses. The document identifies three spearhead development targets and concrete investment and financial plans for implementing them. LUT acts as one of the development platforms in research. Regarding the commercialization of research outcomes, the cities provide support in building the development platform and establishing piloting sites. The agreement mandates the application of EU and national funding to partly fund the strategic actions.

The interviews that were made among the local and regional policy-makers confirm that joint strategic targets and goals make the cooperation between the university and other regional stakeholders easy. This applies to both cooperation with the university administration and with the professors and researchers. However, some challenges are identified in terms of utilizing the full potential of students, especially international students, and the commercialization of research outcomes. The interviewees shared the opinion that the joint goal should be the creation of new jobs and growth for the companies in a way that would lead them to recruit more and more university students. It is expected that the students’ entrepreneurial society, i.e., a student-led organization aiming to foster an entrepreneurial mindset and the entrepreneurship of university students, would be an actor that root the entrepreneurial culture further in the region. However, at the same time, it is recognized that such an entrepreneurial society would mainly operate in English, on account of the active participation of international students in its activities. This may hinder finding a common interface with the local SMEs, which are not that used to operate in English. In that sense, the absorptive capacity of the regions is rather low. Additionally, the interviewees were of the opinion that the students’ entrepreneurial society could activate more students

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in research commercialization actions in addition to enhancing students' entrepreneurial intentions in general. Overall, it is thought that more volume and centralization in research commercialization actions are needed because the volumes of established companies are limited, hence not enough knowledge accumulates. Additionally, further networking and collaboration is needed in spreading the information on the university inventions to local companies.

Despite the aligned strategies, the implementation of the goals seems challenging. The challenges in the implementation phase relate to the lack of private and public funding, which also do not meet each other. It would be important to find more local companies that would have the capacity to commercialize innovations. The growth potential of the local companies seems very limited. Additionally, governmental programs and the EU funding targeted for the regions do not meet with the regional goals and needs.

University's Influence on Regional Policy

In most of the strategies, it seems evident that the region closely follows the university policy. The strategies emphasize technological viewpoints, and the steps needed for the region are expected to take place within the university.

The regional development plan states the following:

With the help of LUT University, it is possible to find solutions to major global problems. The region's environmental and energy expertise is based, in particular, on LUT's expertise and on networks, businesses, innovations and commercialized products that are formed around LUT. In its strategic areas of expertise, LUT seeks partnerships across Finland and globally. LUT produces more than half of Finland's energy-related research, so its networks and impacts naturally extend beyond South Karelia.

Furthermore, the regional innovation strategy applies the features of the trailblazer strategy that is the theme of the current university strategy. The selected key development areas are aligned with the university's expertise, which are clean energy and environment, new industrial applications and materials and intellectual services. LUT is defined as the heart of the region's innovation ecosystem, and it is expected to produce new spin-offs and start-ups and act as an R&D partner of the local SMEs and large companies.

Clean energy and environment are selected as focus areas of the innovation strategy. Target measures include testing and piloting solutions related to energy and clean environment. This testing and piloting environment is expected to gain international recognition and interest. Additionally, the strategy states that the university belongs to a consortium together with large companies, SMEs and regional development companies that develop new industrial applications and materials, as well as digital services.

The Entrepreneurship Education Strategy of Southeast Finland introduces self-reviewing instruments for teachers working at all education levels. The Measurement Tools for Entrepreneurship Education, prepared by LUT, are intended to help teachers and educators evaluate their entrepreneurship education related activities and develop their actions based on the feedback generated by the tools.

The university's influence in the strategic agreement between the cities of Imatra and Lappeenranta is significant. The whole agreement is based on the strategic focus areas of LUT. The three spearhead development targets are: 1) processing of waste and industrial residues; 2) development of an emission-free energy system; and 3) water purification technology. In addition to the spearhead development

targets, the agreement includes additional targets that are: 1) LUT becoming the first entrepreneurial university in Finland according to OECD standards; and 2) development of education and research that enhances internationalization, education export and entrepreneurship.

The university's engagement in the Lappeenranta 2033 strategy is not that visible, since the strategy calls upon the university to address the regional challenges, particularly the demographic ones. However, the strategy is in alignment with the university's mission, since it emphasizes the city of Lappeenranta as an eco-friendly city that enhances circular economy based on the university's expertise. Additionally, the concept of a 'Junior University' is included in the strategy. The Junior University is a cooperation model that introduces local primary and high school students to university education and enhances their interest in science, technology, engineering and mathematics (STEM).

According to the interviews, the university's influence on the region is indisputable. In practice, the future and vitality of the region is based on the existence of the university. Even greater expectations are placed on the university to produce new innovations and business. It is expected that the university will take on a leading role in the region in guiding its strategic focus and in innovation actions. The selection of strategic focus areas is seen as a step in this direction. There are hopes for entrepreneurship and new business creation to have even greater importance in the university's mission than it currently has. At the same time, it is acknowledged that the university's strategy is the most entrepreneurial among the strategies present in the region.

The university's important position in the region also poses challenges. The university is considered to be not only a regional actor, but also an actor with national and international influence. This fact can be contradictory with the pronounced regional role of the university, and in a similar vein with the region pushing to increase the university's regional role even further.

According to interviewees, the university's successful regional role depends, in addition to focused strategic choices, on the large number of professors and researchers who see the regional development not only through basic research but also through a broader scope in enhancing growth and creating new jobs in the region. Researchers in the field of energy technology are particularly recognized for their innovative and inclusive ways of working. Additionally, the presence and commitment of the university management to the region is important.

Discussion

The results of this study show that expectations of regional and local policy-makers for a university can be enormous and that the policy visions on the socio-economic development of the region can be based on the university's success to provide a high-quality workforce and create new spin-offs and start-ups. Furthermore, the university has become a hub organization in the regional entrepreneurship ecosystem (Schaeffer & Matt, 2016). In all the strategy documents the university is explicitly mentioned by name, but the naming of other stakeholders is somewhat lacking, even if cooperation and the regional innovation ecosystem is regularly emphasized.

In general, the regional strategies are vaguer, emphasizing the university's innovation potential rather than the local strategies. The local strategies are more concrete than the regional ones, defining the roles of different actors in a clearer fashion and including more concrete development targets. The Lappeenranta 2033 strategy differs from other strategies in the sense that it has put more emphasis on the potential of university students enhancing the vitality and attractiveness of the region than in the technology transfer.

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Especially at the regional level, the university is seen through a narrow perspective, meaning that the university is mainly seen as a provider of new technological knowledge that can be commercialized (Huggins & Kitagawa, 2012; Trippel et al., 2015), even if the strategies acknowledge the importance of students. As an exemption, the regional strategy on entrepreneurship education strategy that gives guidance to teachers in all levels of education, including the university. In some of the strategies, the development of entrepreneurial culture is mentioned. However, it is neither specifically singled out as the university's responsibility nor as the responsibility of any other stakeholder. This implies that stronger leadership could produce more efficient outcomes in entrepreneurial activities in the region (Goldstein & Glaser, 2012).

The university's strong influence on the contents of the regional strategy documents is evident. The context of this case study shares similar features with the study of Brown (2016) that pays attention to a potential regional policy lock-in. The university-dominant policy and regional policy lock-in seem to be true for the South Karelia region, and this situation has its pros and cons. The definite advantage is that having a strongly focused technological university present in the region makes the definition and implementation of the smart specialization strategy for the region plausible. On the other hand, concentrating on the few selected focus areas means that the region will be dependent on these selected focus areas that might be vulnerable to changes in laws and dominant technologies. In addition, developing the selected focus areas requires heavy investments and external funding. Furthermore, concentrating on a few focus areas might mean that not enough resources and attention is directed to the development and strengthening of other sectors that might support the industrial renewal of the region. In this sense, the region may suffer from collective blindness and thereby waste emerging opportunities in the region.

SOLUTIONS AND RECOMMENDATIONS

The paper has several solutions and recommendations to be followed in the cases of peripheral entrepreneurial universities. It seems clear that the role and impact of a single university may be exaggerated in the peripheral regions. This situation may lead to a regional policy lock-in, i.e., it may be challenging to form new policies supporting other measures than those related to the university. Furthermore, the impact of the university on the eventual regional performance may be exaggerated. This fact may lead to biased investments in the regional investment policy. Third, directing so much attention to the university may lead to less attention for the other actors in the regions, such as SMEs, other educational institutes, etc. This may result in unequal development of the actors in the entrepreneurial ecosystem, causing the absorptive capacity of the region to stay low.

The alignment of the strategic mission between the university and regional public policy institutions is a clear advantage that serves the future development of the region. However, in order to fully exploit the common goals, national strategies and funding instruments should be aligned as well. Additionally, more attention needs to be directed to the aspects of human capital (Guerrero et al., 2014), networking (Erina et al., 2017), as well as leadership and personal relationships (Goldstein & Glaser, 2012). The aspects of human capital matter, since entrepreneurs and the networking possibilities of universities may play an important role in creating and connecting entrepreneurs in their networks, thereby enabling entrepreneurs to acquire resources, knowledge and support from their regional stakeholders (Brown, 2016; Spigel & Harrison, 2018). For example, in order to utilize the international students – as emphasized in strategies – measures to increase the absorptive capacity of local SMEs need to be increased. Additionally,

the strategies related to the regional implementation and development tasks of the central government should have a broader view on universities' role in the region and thereby also align national funding instruments aiming for demonstration and piloting actions better with the regional needs.

In conclusion, the industrial renewal of the region could be further enhanced by moving the strategic focus from the university primarily as a producer of new start-ups and spin-offs toward a more holistic view that emphasizes the human capital development and social networking among all the stakeholders in a concrete manner - including the students and entrepreneurs. This is important, since annually around 20% of LUT's incoming students are international, and these international students, together with other university graduates, offer a huge but still underutilized potential for the region. The university, together with other regional actors, could have more influence on enhancing the absorptive capacity of the local companies so that they would be able to better benefit from the university students and graduates. As the region aims for internationalization and suffers from a decreasing and ageing population, the tighter engagement of students in the regional innovation and entrepreneurship ecosystem is essential.

FUTURE RESEARCH DIRECTIONS

Entrepreneurial universities have received much attention in academic literature. However, in many studies, entrepreneurial universities are investigated from a narrow perspective, with the studies concentrating on the aspects of technology commercialization (Mascarenhas et al., 2017). Following Brown (2016), we have suggested that the university may reach a dominant position in regional policy in peripheral regions, thus resulting in a regional policy lock-in. Further studies are needed to create an understanding of the lock-in and more in order to understand the ways that peripheral regions could avoid institutional capture while benefiting from the presence of the university. More information is needed to uncover the routes through which the interaction between universities and regions could operate in mutual benefit and synergy.

Furthermore, while attention is given to the regional impact on universities, less attention is given to how regions exploit the potential of universities (Trippel et al., 2015). These facts call for more research on entrepreneurial universities as members in regional entrepreneurial ecosystems. From a policy perspective, universities' contributions should be investigated through a larger spectrum than just seeing universities as institutions providing economic growth by the commercialization of research outcomes. For example, the engagement of students in the entrepreneurial actions of universities and thereby in the regional entrepreneurial ecosystem would provide an interesting research avenue, since entrepreneurs and a high-quality workforce form the basis for regions' competitiveness and help balance the biased demographic distribution, especially in peripheral regions.

CONCLUSION

The specific aim of this study was to investigate the expectations of the regional policy institutions toward the university and the influence of the university for the regional policies. The roles of entrepreneurial universities and universities' socio-economic impacts are extensively studied in the academic literature, but less attention is given to how the regions define the different roles and expectations for the university, as well as how the university itself influences these definitions and expectations. To address these ques-

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tions and investigate the phenomenon further, we selected a case region located in Southeast Finland that represents a peripheral region and is dominated by a single university that has a strong technological and entrepreneurial focus.

This study is consistent with the findings of Brown (2016) claiming that the existence of a single university in a peripheral region easily leads to a university-dominant policy and thus to a possible regional policy lock-in. Consequently, the implementation of the regional policies can also be in the hands of the university, leaving other regional stakeholders in a more supportive and inactive bystander role. This might lead to a strong technology focus in regional policy action (Huggins & Kitagawa, 2012) and cause weak absorptive capacity of local companies. This, in turn, might hinder industrial renewal and lead to high unemployment rates. In order to fully utilize the potential of the university to address the specific regional challenges, the university should not solely act as a locus of new spin-offs and start-ups. Rather, the university should pay attention to the mechanisms of integrating university graduates in the region as future employers and entrepreneurs and have stronger networks with the regional stakeholders (Guerrero et al., 2014; Erina et al., 2017).

The study has its limitations. First, it applies a single case study method; therefore, the results of the study reflect the specific peripheral region in a specific national context. In this case, the results reflect a region having a single, strongly focused and technological university, which enjoys the status of an autonomous institute governed by public law. Second, this chapter is based on the selected set of regional strategy documents and the interviews representing the main policy institutions in the region. Further data sets, such as interviews among larger stakeholder groups and more detailed analyses of other public documents and websites, could have enriched the study.

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Publication V

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Students' perceptions of the entrepreneurial culture in Finnish higher education institutions

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Students' Perceptions of the Entrepreneurial Culture in Finnish Higher Education Institutions

Katja Lahikainen – Junior Researcher, LUT University
Yliopistonkatu 34, 53850 Lappeenranta, Finland; mobile +358 400 570 603, email katja.lahikainen@lut.fi

Kati Peltonen – Research, Development & Innovation Director, Lahti University of Applied Sciences

Elena Ruskovaara – Associate Professor, LUT University

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Abstract

The purpose of this study is to add to the literature on entrepreneurial culture (EC) in higher education institutions (HEIs). This study investigates how HEI students perceive EC and which factors explain students' perception of EC. Drawing on organisational and entrepreneurial culture literature, we analyse students' perceptions of EC in a Finnish HEI context. The study is based on the survey with 2,460 responses from HEI students in Finland. The results of the study show that EC is gained steady ground in Finnish HEIs, and students find that entrepreneurship is valued on individual and institutional levels. Institutional level activities are those with the strongest impact on students' perceived EC. Further, our results highlight that teachers have a great influence on students' perception of EC. Accordingly, our theoretical contribution to the literature lies in identifying factors that influence HEI students' perceptions of EC. As students are the key stakeholders in HEIs, it is crucial to shed light on their perspective. This study offers also practical implications. Despite of the positive results, there is still room for more rigorous promotion of entrepreneurship, since students do not recognise all entrepreneurship related functions and support services available. Therefore, entrepreneurship promotion - also amongst teachers - is decisive.

Introduction

In the last few decades, the promotion of entrepreneurship education has been an important topic on European policy agendas (European Commission, 2013), and it has been addressed in various national strategy papers, worldwide (Turner and Mulholland, 2018). In Finland, the Ministry of Education and Culture established its Entrepreneurship Education Guidelines in 2009, for all levels of education, with a revised version of these being published in 2017 (Ministry of Culture and Education, 2017). According to the guidelines, Finnish higher education institutions (HEIs) have a substantial role in promoting entrepreneurship. The guidelines encourage HEIs to take four aspects of operations that affect the development of an entrepreneurial culture (EC) in HEIs into consideration: the level of strategy and leadership, learning environments, training for educators and teaching staff, and teaching that supports entrepreneurship. Furthermore, it seems that universities of applied sciences (UAS) are ahead of traditional research universities in promoting entrepreneurship and that there is considerable variation amongst HEIs in how entrepreneurship is promoted (Viljamaa and Moisio, 2015). Moreover, in Finland, student-led initiatives, exemplified by students' entrepreneurship societies, plays an important role in encouraging student entrepreneurship and entrepreneurial culture (Lahikainen, Pihkala and Ruskovaara, 2018; Parkkari and Kohtakangas, 2018). This article discusses EC in the Finnish HEI context, with a focus on student-perceived EC.

A literature review by Wong (2014) reveals that, in many cases, illustrations of EC and its various dimensions are approached from the national level or from the perspectives of business organisations. Given the corporatisation of the contemporary HEI sector and the fact that HEIs nowadays have a greater role in local, national, and international economic and cultural development (Chile and Black, 2015), HEIs are of interest as a platform for exploring how entrepreneurial culture is manifested and perceived in a particularly relevant domain, by students in particular. Students' perceptions of entrepreneurial culture have been researched with reference to the concept of entrepreneurial climate (e.g., Bergmann et al., 2018; Geissler, Jahn and Haefner, 2010). The concepts of organisational climate and organisational culture are sometimes used interchangeably, since they overlap with each other somewhat and are closely related (Geissler, Jahn and Haefner, 2010; Schneider, Ehrhart and Macey, 2013).

The former refers to shared perceptions and meanings attached to the relevant policies, practices, and procedures, whereas organisational culture involves shared assumptions, values, and beliefs (Schneider, Ehrhart and Macey, 2013). In contrast, our study applies the concept of entrepreneurial culture, since it takes into account the role of the individual as an agent and subject simultaneously, whereas research into organisational climate separates the individual from the social context (Geissler, Jahn and Haefner, 2010; Schneider, Ehrhart and Macey, 2013). Earlier research on HEIs' entrepreneurship climate shows that peer effects and previous affinity for entrepreneurship affect students' perceptions of that climate. The effect of compulsory entrepreneurship courses is stronger for those students without a prior affinity for entrepreneurship, but elective courses and peer students exert a stronger positive effect on those students' perceptions of the entrepreneurial climate (Bergmann et al., 2018). Finally, qualification programmes have the biggest impact on students' perceptions related to entrepreneurial climate, but they are the least important factor from faculty members' standpoint (Geissler, Jahn and Haefner, 2010).

Our work constitutes an attempt to add to knowledge of students' perceptions of EC in HEIs. These institutions play a significant role in promoting entrepreneurship in society by harnessing the potential of staff and students for scientific, technological, and social innovations (Afriyie and Boohene, 2014). To this end, HEIs strive to become entrepreneurial entities themselves as well as learning communities with opportunities that encourage student entrepreneurship (Mascarenhas et al., 2017). Accordingly, cultivating EC and related practices has risen to prominence in HEI strategies (Guerrero and Urbano, 2012; Lyytinen, 2014; Mascarenhas et al., 2017). Whilst researchers have responded by examining entrepreneurial universities, the focus has mostly been on organisational changes, management, and governance (Guerrero and Urbano, 2012; Lyytinen, 2017), alongside research on commercialisation and new business creation (Rothaermel et al., 2007). The student perspective on developing EC within HEIs has been neglected (Clauss, Moussa and Kesting, 2018). To address this gap, we analysed a large quantitative dataset on Finnish HEI students' perceptions to answer the following question: How do students perceive HEIs' entrepreneurial culture, and what factors in particular explain their perceptions of entrepreneurial culture? To answer this research question, we took a closer look at students' background characteristics and examined how a university with its various activities, fellow students, and teachers influence students' perceptions of EC.

Theoretical Framework

Entrepreneurial culture

Entrepreneurial culture is seen as one of the key building blocks for developing entrepreneurship within HEIs (Afriyie and Boohene, 2014; Clark, 1998). For instance, Clark (1998) states that the formation of EC at a university may start as a simple institutional idea related to change, later elaborating into a set of beliefs which – if it diffuses through the 'academic heartland' – grow into a university-wide culture strongly anchored in practices.

With its origins in organisational culture studies (e.g. Schein, 1985), the concept of entrepreneurial culture has been widely applied in organisation management and entrepreneurship literature for decades, and in the last 10 years this discussion has been extended to the university sector (Gibb, Haskins and Robertson, 2013; Wong, 2014). Acknowledging the diversity of perspectives on organisational culture, we adopted a contemporary view wherein culture is seen as a dynamic, historically connected, socially constructed, and long-term oriented construct (Wong, 2014). As the literature (e.g. Wong, 2014) suggests, entrepreneurial culture can be seen as a distinct sort of organisational culture. This is difficult to define, however, since entrepreneurial culture is like all other organisational culture in being a multidimensional construct comprising various dimensions and elements. Even the term 'entrepreneurial' on its own conveys various meanings (Wong, 2014). In the definitions utilised in prior studies (e.g. Davies, 2001; Ireland, Hitt and Simon, 2003; Wong, 2014), EC typically refers to such culture that promotes creativity, new ideas, the recognising of opportunities, and new value creation; alongside risk-taking, learning from one's failures, and a setting wherein continuous change is viewed positively (Wong, 2014).

According to Schein's (1988, 8) often cited definition, organisational culture is 'a pattern of basic assumptions, invented, discovered or developed by a given group, as it learns to cope with its problems of external adaptation and internal integration, that has work well enough to be considered valid and, therefore is to be taught to new members as the correct way to perceive, think, and feel in relation to those problems'. Schein (1988, 10–11) further explains that organisational culture can be understood as 'a set of taken for granted assumptions' that are manifested in three layers: the first layer involves visible and observable artefacts, organisational structures and processes; the second brings in espoused values, such as strategies, goals, ideals, norms, standards, and statements such as the expression of premises by leaders or the management; and the third layer, underlying

assumptions, is composed of unconscious values, beliefs, perceptions, thoughts, and feelings – implicit (and thus difficult-to-describe) assumptions that significantly guide organisation members' behaviour and thinking.

Entrepreneurial culture in universities draws together structural elements such as control systems and organisational and power structures, bundled with rituals and routines, stories, and symbols (Handscombe, 2003; Kothari and Handscombe, 2007). For example, stories at an entrepreneurial university may focus on campus millionaires, alumni enterprise heroes, and spin-out success stories, rather than emphasise the achievements of senior staff and the hiring of research professors. Similarly, the rituals and routines at such a university may focus more on entrepreneurial events and the celebration of innovation than on degree ceremonies and visits by governmental officials (Handscombe, 2003). However, as Wong (2014) suggests, entrepreneurial culture is not just a strategic goal pursued by the organisation but also a social setting in which employees and other stakeholders are socialised into an entrepreneurial way of thinking and doing. If an HEI seeks to become known as an entrepreneurial organisation, promotion of entrepreneurship has to be considered and embedded in all its actions and practices. Otherwise, the values displayed are not consistent with those espoused (Peltonen, 2014).

Stakeholders' roles in promoting entrepreneurship in HEIs

Perceptions of university entrepreneurship vary between actors and between contexts in which universities operate. For entrepreneurship to become integrated with a university's mission, it is of importance to acknowledge the dynamic relationships between the university, its staff, students, and industry and to be aware of what the respective stakeholders value (Davey, Hannon and Penaluna, 2016; Manning, 2018). Earlier studies show that both individual and organisational characteristics have impact on student entrepreneurship. For example, the individual characteristics of students have the biggest impact on students' entrepreneurial activities, but also organisational characteristics increase students' entrepreneurial learning and entrepreneurial intentions (Bergmann, Hundt and Sternberg, 2016). Moreover, Walter, Parboteeah, and Walter (2013) found that organisation level factors play an important but gender-specific role in students' entrepreneurial intentions. For example, their study revealed entrepreneurship education and collaboration with industry increases only male university students' entrepreneurial intentions. Additionally, regarding support structures, they could not find a significant relationship between entrepreneurship support programmes and students' entrepreneurial intentions.

Several studies have highlighted teachers' significance in promoting entrepreneurship within educational institutions (e.g. Hytti and O'Gorman, 2004; Matlay, 2011; Peltonen, 2015; Ruskovaara and Pihkala, 2013). Teachers are key players in facilitating and enabling students' entrepreneurial learning. They have an important role also in nurturing an entrepreneurial culture in universities, since they are relatively autonomous with respect to their colleagues while associating very closely with the students (Kothari and Handscombe, 2007). For the promotion of entrepreneurship in HEIs and to enhance entrepreneurial learning among students, it is vital that teachers act as entrepreneurial role models for them (Peltonen, 2014). However, this requires readiness and ability to challenge the traditional teaching practices. Hence, adopting entrepreneurial teaching practices also ties in with HEIs' resource management and strategic management (Peltonen, 2014; 2015). Another important aspect of entrepreneurial learning is to offer students external contacts with, for example, regional stakeholders and extend the education beyond the classroom (Lahikainen, Pihkala and Ruskovaara, 2018; Pittaway and Cope, 2007; Rasmussen and Sorheim, 2006).

Student-led entrepreneurial clubs and societies are informal, non-accredited entities that complement entrepreneurship education in HEIs by offering extracurricular activities for the students (Pittaway et al., 2011; Pittaway et al., 2015). The main goal of these groups is to attract students who are interested in learning about entrepreneurship and developing entrepreneurial skills for the purposes of starting their own business or developing an entrepreneurial mindset (Pittaway et al., 2011). For students, the student entrepreneurial societies are a vehicle for gaining entrepreneurial skills that are needed in preparing for the uncertain future of working life (Siivonen et al., 2018) and for starting a business, cultivating transferable skills, gaining practical experience; and finding personal enjoyment (Pittaway et al., 2011). Also, to encourage students toward start-up entrepreneurship, these groups bring peers together and nurture an entrepreneurial atmosphere by fostering a sense of community and belonging amongst the students (Parkkari, 2019).

Data and method

Data

This study is based on entrepreneurship and innovation studies at Finnish higher education institution. The data is owned, and it was gathered by Finnish Education Evaluation Centre by an online questionnaire in 2017. The survey link was sent to each HEIs' contact persons who forwarded the link to all their students. The data was part of a process of collecting information for the wider national project that aimed to identify entrepreneurship and innovation capacity in higher education and vocational education and training. In this article, we utilized only the data gathered from the HEI students.

In total, 2,460 HEI students responded the questionnaire. However, the questions related to entrepreneurship studies (see below questions 11 – 16), were shown only those students (n 1,038), who had taken entrepreneurial or innovation studies. Further, the descriptive background information questions (see Table 1) were mandatory to respond.

The survey reached 1,464 students at 24 universities of applied sciences and 996 university students, from 14 universities. Accordingly, the respondents represented all Finnish HEIs. About 59.5% of them were studying at university of applied sciences (UAS) and 40.5% at traditional research university, and all fields of education were represented. Most of the respondents (61.2%) were female. In addition to general background information, we used respondents' attendance to entrepreneurship studies as a measure: 42.2% of the respondents had studied entrepreneurship as part of their current degree studies.

Table 1: Characteristics of the respondents ($n = 2,460$)

		N	%
Gender	Male	915	37.2
	Female	1,506	61.2
	Other	39	1.6
Type of HEI	University	996	40.5
	UAS	1,464	59.5
EShip studies inc. in current studies	No	1,422	57.8
	Yes	1,038	42.2

In order to understand more about student's perceptions about HEIs entrepreneurial culture, a set of items was selected for this study: how fellow students and staff discuss entrepreneurship, how students are encouraged to engage in it, how entrepreneurship is supported, whether the studies have included co-operation with external stakeholders, and whether the respondent had participated in any activities arranged by student-led entrepreneurship societies. We will now present the 20 items selected, pointing out the most crucial references and the scales used.

The items

The first items are about how students perceive entrepreneurship is talked and encouraged in their HEI. There is a wide range of studies highlighting the importance of peers and how they effect. Moreover, teachers' role in promoting entrepreneurship has proved to be crucial and they can be seen as role models (Bergmann, Hundt and Sternberg, 2016; Handscombe, 2003; Hytti and O'Gorman, 2004; Parkkari and Kohtakangas, 2018; Peltonen, 2014; 2015, Pittaway et al., 2011). Based on these, five (5) items were formulated, to which students responded by using four-scale Likert, totally disagree (1) – totally agree (4).

In your opinion, how well do the following claims apply to your university community?

1. Staff talk about entrepreneurship in a positive manner
2. Staff encourage students to become entrepreneurs
3. Staff encourage students select entrepreneurship studies
4. Staff encourage students to take part in entrepreneurial activities

5. My study mates talk about entrepreneurship in a positive manner

The next set of five items had to do with how the students perceived entrepreneurship to be supported in their HEI. They were to respond 'Yes' (1) or 'No' (0). Prior work has shown that university characteristics have an impact on students' perceptions. These organisational level characteristics may encompass having a dedicated person responsible for entrepreneurship (Bergmann et al., 2018), entrepreneurship events (Kothari and Handscombe, 2007), support for student start-ups (Bergmann, Hundt and Sternberg, 2016) and other support services (Geissler, Jahn and Haefner, 2010; Walter, Parboteeah and Walter, 2013), and exposure to entrepreneurship through information distributed via various channels (Geissler, Jahn and Haefner, 2010).

How is entrepreneurship supported at your HEI?

6. Information on entrepreneurship studies is easily accessible
7. Students are given the names of those responsible for entrepreneurship studies or promoting entrepreneurship
8. Graduating students may use the HEI's facilities for their entrepreneurial activities (on lease or at no charge)
9. Experts at my HEI help students in starting a business (support services)
10. My HEI arranges entrepreneurship events for students

We were also keen on knowing if different external stakeholders were involved in courses. Earlier research (e.g. Chile and Black, 2015; Clauss, Moussa and Kesting, 2018; Matlay, 2011; Pittaway and Cope, 2007) has highlighted the important role of these stakeholders, the real-world approach they bring, and the skills that students learn in joint projects with them. Accordingly, the six items below, with the options of 'Yes' (1) and 'No' (0), were created.

Have your entrepreneurship studies included courses or projects that have involved cooperation with the following partners?

11. Students at my HEI who are studying other subjects
12. (Another) university of applied sciences
13. Volunteer organisation
14. (Other) university
15. A company
16. Education institution outside Finland

Scholars have identified that student-led entrepreneurial clubs and societies inspire students to pursue entrepreneurship (Parkkari, 2019) and prepare them with skills and practical experience that may prove useful in entrepreneurship (Pittaway et al., 2011). Furthermore, a good majority of Finnish HEIs have a student-led entrepreneurship society (ES). Therefore, it was crucial to ask issues related to ES entities. The questionnaire listed all 20 of the societies existing at the time, by name, to assist the students in identifying them. Four items were created, with the respondents being instructed to select the one(s) describing their activities.

Student entrepreneurship societies (ES) and participating in their activities:

17. I am an active member of an ES (a board member or a member who is active in other ways)
18. I have been to one or more events organised by an ES
19. I have heard about ES activities and am interested in what they are doing, but I have not yet participated in their work
20. I don't know what 'ES' means and have not participated in any such events; I'm not interested

Next, we present the methods used for analysing our data.

Method

The large quantitative dataset was analysed by IBM SPSS Statistics (version 26) software. First, we analysed students at a general level, for example, how they perceived entrepreneurship, whether they had studied it, whether their HEI seemed to value, promote and support entrepreneurship. Next, we formed four sum measures – for entrepreneurial culture, institutional strategies, collaboration, and student community – after which we conducted an analysis of variance (ANOVA) for the measures in regard to the background variables characterising the respondents. Finally, by using linear regression analysis, we examined how particular elements explain students' perceptions of entrepreneurial culture.

Results

In general, entrepreneurship-related courses seem to be gaining ground in HEIs, with 80% of all respondents stating that their institution was offering such courses and 42.2% of respondents had studied entrepreneurship in their current degree studies. Furthermore, the majority (52.5%) found information on entrepreneurship studies to be easily accessible, and 85.7% saw entrepreneurial attitudes and entrepreneurship as highly valued at their HEI. In addition to this, roughly half of these students were aware of their HEI arranging entrepreneurship-related events for students. Interestingly, nearly 60% of the students did not know whether there were designated persons responsible for promoting entrepreneurship, and about one tenth indicated that experts at their HEI do not help students with their business start-ups, though a third stated that they do. For us, these results indicate that, while the results are positive in many respects and students find that entrepreneurship is valued, it has not reached its full potential for visibility or in terms of promotion and awareness.

As for how the topic is discussed, approximately 85% agreed that the staff speak positively of entrepreneurship, and 71.8% stated that staff encourage them to become entrepreneurs and that they feel encouraged to take part in entrepreneurial activities (69.7%). This indicates that students perceive HEIs' culture as entrepreneurial in nature. Our results correspond with earlier research indicating the significant role of teachers in entrepreneurship promotion (Hytti and O'Gorman, 2004; Matlay, 2011; Peltonen, 2015; Ruskovaara and Pihkala, 2013). That said, our finding contradicts with study by Geissler, Jahn and Haefner (2010), who did not detect a direct influence between positive attitudes of faculty members toward entrepreneurial activities and students' perceptions of HEIs entrepreneurial culture. Also, the results indicate that UAS students find the culture significantly more entrepreneurial compared to traditional research university students.

Next, for more in-depth understanding of respondents' perceptions of their HEI's entrepreneurial culture, we built four new sum measures. These are named as entrepreneurial culture (EC), institutional strategies (IS), collaboration (Coll), and student community (ES) (Table 2 presents the variables in more detail). The first three of these sum measures (EC, IS, and Coll), were tested via confirmatory factor analysis and Cronbach's alpha reliability tests. The alphas varied between .698 and .876, which can be regarded as satisfactory. For the ES sum measure, we created a new sum variable, labelled 'student community', describing students' level of activeness in student-driven entrepreneurship communities. The frequencies visible in the students' profiles ranged from 0 to 3, and the mean was 0.25. In practice, this indicates that most of the respondents were not active in students' entrepreneurship societies, though some had been taking part in events arranged by these entities.

Table 2. Measures for Entrepreneurial culture (EC), Institutional strategies (IS), Collaboration (Coll) and Student community (ES) (n=2,460).

	Mean	Sd.
EC (Cronbach a .876)	15,23	3,72
1. Staff talk about entrepreneurship in a positive manner	3,24	,79
2. Staff encourage students to become entrepreneurs	2,93	,93
3. Staff encourage students to select entrepreneurship studies	2,92	,96
4. My study mates talk about entrepreneurship in a positive manner	2,86	,89
5. Staff members encourage students to take part in entrepreneurial activities	2,30	,91
IS (Cronbach a .836)	,98	1,53
6. Information on entrepreneurship studies is easily accessible	,26	,44
7. My HEI arranges entrepreneurship events for students	,24	,43
8. Students are provided with the names responsible for E studies / promo	,21	,41
9. Experts at my HEI help students in the start-up of their business	,16	,37
10. Graduating students may use the HEI's facilities for their entrepreneurial activities	,10	,31
Coll (Cronbach a .698)	1,82	1,61
11. Students at my HEI that are studying other subjects	,53	,50
12. (other) UAS	,23	,42
13. Volunteer organisation	,20	,40
14. (other) UNI	,18	,39
15. Company	,18	,39
16. Education institution outside Finland	,17	,38

ES	,25	,65
17. I am an active member of an ES (board member, e.g.)	yes 2.2%	
18. I have been to an event(s) organized by an ES	yes 5.3%	
19. I have heard about ES activities and I'm interested in – not yet participated	yes 8.2%	
20. I don't know what ES means, have not participated any events	yes 84,3%	

To gain broader understanding, we considered the new sum measures in the light of respondent characteristics (presented in Table 1). Table 3 describes the ANOVA results, which point to highly significant gender-specific differences in how the institutional strategies, student community, and collaboration with various stakeholders are perceived. These findings support earlier research showing student entrepreneurship to be gender-biased (Walter, Parboteeah and Walter, 2013). According to our analysis, male students had a more positive view of all of these than did their female peers.

Furthermore, perceptions of these three factors differed significantly between traditional research university and UAS students, with the latter sharing more positive views on entrepreneurial culture and institutional strategies, whilst university students had more positive perceptions of the student community.

Finally, we found that students with experience of entrepreneurship studies had a more positive view of the entrepreneurial culture than the ones who had not enrolled in entrepreneurship-related courses. The difference between these groups was highly significant with regard to views of institutional strategies: those who had engaged in entrepreneurship courses find the element 10 times stronger than their peers. Also, the student community was viewed significantly more positively by those who had taken part in entrepreneurship courses.

Table 3. ANOVA results for Entrepreneurial culture (EC), Institutional strategies (IS), Student community (ES) and Collaboration (Coll).

		EC	IS	ES	Coll
Gender	Male	15,37	1,14	,33	2,08
	Female	15,15	,88	,20	1,69
	Other	14,38	,85	,36	1,30
	F-value (sign)	,52	8,44***	11,58***	6,35***
Type of HEI	University	13,84	,71	,34	1,94
	UAS	15,76	1,16	,20	1,77
	F-value (sign)	39,01***	53,30***	26,81***	1,94
Entrepreneurship studies inc. in current studies	No	13,32	,22	,09	
	Yes	15,59	2,02	,47	1,82
	F-value (sign)	26,13***	1251,38***	220,30***	N.A.

Note: * $p < .05$. ** $p < .01$. *** $p < .001$

Next, we run a regression analysis to learn if the selected variables effect on how students perceive entrepreneurial culture. We found that gender does not explain the experienced EC. However, the type of HEI has a significant impact on perceived culture, with being an UAS student seeming to have a positive effect on perceptions of the EC. Due to their practical orientation and stipulated role in regional development, universities of applied sciences are considered more supportive to entrepreneurship than traditional research universities are (Bergmann, Hundt and Sternberg, 2016; Bergmann et al., 2018; Viljamaa and Moisio, 2015; Lahikainen, Pihkala and Ruskovaara, 2018). The analysis revealed that institutional strategies have a significant impact on perceived culture. Interestingly, as the constant (11,140***) had high statistical significance, the students' perceptions of the EC were positive in general. Our regression model explains acceptable 25.8% of the EC-related variation.

Table 4. Regression analysis of student perception of entrepreneurial culture.

Variable	Model 1
Constant	11,140***
Institutional strategies (IS)	1,035***
Student community (ES)	.211
Collaboration (Coll)	-,067
Gender	-,193
Type of HEI	1,191***
R-square	.258***

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Conclusion and implications

Exploring entrepreneurial culture in HEIs, especially from the students' point of view, has not received much attention in current literature on entrepreneurial HEIs. For instance, which elements of entrepreneurial culture are recognised by HEI students has been unclear. Our study provides insights into how students perceive the elements of EC and which factors explain the students' perceptions of EC.

Our research question was *How students perceive HEIs entrepreneurial culture and especially, which factors explain their perception of entrepreneurial culture?* In order to answer these questions, we took a closer look at students' background characteristics. We also analysed how university with its strategy and entrepreneurship promotion activities, students' collaboration with external stakeholders, fellow students, and teachers influence students' perceptions of EC.

The results show that, based on students' perceptions, entrepreneurship is valued at Finnish HEIs and that, in general, HEI students perceive the culture of their HEI as entrepreneurial. The results indicate that HEIs in Finland are effectively implementing the policy guidelines set for them. That said, our results highlight the type of university effect on how students perceive the culture; i.e. UAS students find their institution more entrepreneurial than their university counterparts do.

Many factors influence students' perceptions of EC. Firstly, entrepreneurship-related courses are promoted in a way that they are recognisable by students. Additionally, students find that the staff value entrepreneurship and encourage them towards it. This seems to indicate that in Finnish HEIs, entrepreneurial culture has diffused to the 'academic heartland', in a concrete manner and with strong practices being developed (Clark, 1998). Our results show that students who have studied entrepreneurship view the entrepreneurial culture, institutional strategy, and student-led activities more positively than those not expressing an interest in entrepreneurship-related courses. That is understandable – those students interested in entrepreneurship recognise such elements and have more positive perceptions of them. This finding is partly in line with the work of Bergmann et al. (2018), which showed that fellow students have a positive impact on one's perceptions. However, in their study, the peers' positive effect extended also to students who had not studied entrepreneurship.

Furthermore, our results show that teachers' encouraging actions and positive mindset towards entrepreneurship have a great influence on students' perceptions of entrepreneurial culture. Therefore, entrepreneurship promotion aimed at teachers is just as important as that among students. This is consistent with prior studies (e.g. Matlay, 2011; Peltonen, 2014; 2015; Ruskovaara and Pihkala, 2013), which stresses the significant role of teachers and emphasise the development of teachers' entrepreneurial readiness (Peltonen, 2014; 2015).

There have been various studies highlighting the crucial role of external stakeholders. Studies have shown that external stakeholders bring novel approaches to teaching and learning settings and that teachers would benefit from utilizing such stakeholders (Matlay, 2011; Pittaway and Cope, 2007; Ruskovaara and Pihkala, 2013). However, our analysis suggests that collaboration with such external entities does not explain the perceived entrepreneurial

culture. This is interesting, though it is important to understand that such collaboration can have a positive influence on many other aspects of entrepreneurship.

Earlier findings prove that investments from universities, governments and companies support student societies in a worthwhile manner, since they facilitate student learning (Pittaway et al., 2015), while also fostering a sense of belonging and enhancing development of an entrepreneurial culture among students (Parkkari, 2019). Interestingly, our results suggest that student-led practices do not affect students' perceptions of entrepreneurial culture. Further, our results add interesting details to current understandings in this regard: Although ES does not explain the perceived entrepreneurial culture, ES activities receive the highest scores from male university students who have participated in entrepreneurship-related courses. Earlier studies have shown that fellow students and student-led peer-to-peer learning activities have a positive effect on students' perceptions of entrepreneurship (Bergmann, Hundt and Sternberg, 2016). Our results do not support that. This finding should be taken with caution, because the vast majority of students (84.3%) in our sample had not participated in any activities offered by student entrepreneurship societies, often not knowing what such a society involves. This indicates that ES activities need to be promoted more, for both male and female students, with active communication.

Finally, our major finding draws attention to the importance of institutional strategies and institutional level activities. These have the largest impact on perceived entrepreneurial culture. Our findings stress the key role of different support services, information, facilities, and events of various sorts that HEIs provide for students. Interestingly, our results show that institution-level promotion has a greater impact on the perceived entrepreneurial culture than student-driven activities do. Therefore, our results encourage institutions to provide students with information concerning entrepreneurship studies, organise related events and provide the students with names responsible for entrepreneurship promotion. Our findings give support to what is stated in strategy documents prepared both within HEIs and externally by various stakeholders (European Commission, 2013; Ministry of Culture and Education, 2017), and provide new understanding in this regard. According to Lyytinen (2014), Guerrero and Urbano (2012), and Mascarenhas et al. (2017), entrepreneurial culture and practices have grown prominent in HEIs' strategies. Our findings point to the value of this by highlighting the significance that institution-level decisions and activities have for students' perceptions of entrepreneurial culture. Irrespective of these encouraging results, though, space seems to remain for stronger promotion of entrepreneurship. Since students do not recognise all the available entrepreneurship-related functions and support services, HEIs could consider clarifying staff responsibilities and making the support services offered more visible to students.

Earlier studies have shown that student entrepreneurship is gender-biased (Walter, Parboteeah and Walter, 2013). Our analysis partially supports that and adds knowledge to earlier understanding by showing that male students find the role of institutional strategy, the student community, and collaboration with external stakeholders more positively than their female peers do. At the same time, according to Walter et al. (2013), entrepreneurship education increases only male students' entrepreneurial intentions. That said, whilst female and male students differ significantly in their perceptions of these elements, our results suggest that gender does not explain the perception of entrepreneurial culture.

In sum, our findings indicate that if HEIs wish to build an entrepreneurial culture and operate entrepreneurially, it is vital to support teachers' entrepreneurial behaviour and thinking; after all, from students' perspective, they are the key people promoting entrepreneurship and creating learning environments that enable creativity, development of new ideas, opportunity recognition, new value creation, risk-taking and learning from failures, as noted by Wong (2014). Furthermore, just as much emphasis needs to be put on the observable artefacts (e.g. visible support services) and clear, well-communicated organisational structures and processes as on the values articulated in strategic guidelines. Hence, our findings support the ideas presented by Schein (1988).

As does any research, ours has its limitations. First, we were able to capture the first two layers of EC presented by Schein (1988): 1) observable artefacts and organisational structures and processes and 2) the values espoused values. However, we could not address the third level that is the underlying assumptions, since that would have required in-depth qualitative data. Exploring the underlying assumptions represents an interesting avenue for further research. Second, entrepreneurial culture in HEIs is an emerging field of study that as of yet does not have any single established theoretical framework for tackling this multidimensional construct with its various dimensions and elements (Wong, 2014). Therefore, we had to start by combining elements from several sources and fields of study. In this work, we used only a small number of variables explaining entrepreneurial culture to test our model. Accordingly, there might be other items that would be interesting to whether they capture the essence of entrepreneurial culture even better. For example, including variables connected with specific fields of education might bring us broader understanding of EC-related phenomena.

There are several additional ways in which researchers could approach students' perceptions of entrepreneurial culture. For example, future studies could explore what underlying assumptions influence students' perceptions of EC at HEIs and how they affect the students' perceptions. At the same time, more knowledge is needed regarding the impact of the observable artefacts, such as dedicated entrepreneurship spaces and collaborative learning environments that connect student and working life. Another angle might be to explore university–business collaboration in greater depth. According to our results, such collaboration does not have a direct effect on perceived entrepreneurial culture. Nevertheless, it would be interesting to study and clarify the role of university-business collaboration and gain new understanding of its impact on entrepreneurship and EC. Finally, examining students' perceptions of EC in HEIs in other countries could bring new insights.

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