Hannes Velt

ENTREPRENEURIAL ECOSYSTEMS AND BORN GLOBAL START-UPS
Hannes Velt

ENTREPRENEURIAL ECOSYSTEMS AND BORN GLOBAL START-UPS

Dissertation for the degree of Doctor of Science [Economics and Business Administration] to be presented with due permission for public examination and criticism at Lappeenranta-Lahti University of Technology LUT, Lappeenranta, Finland on the 11th of December, 2020, at 10 am.

Acta Universitatis
Lappeenrantaensis 939
Supervisors
Professor Sami Saarenketo
LUT School of Business and Management
Lappeenranta-Lahti University of Technology LUT
Finland

Associate Professor Lasse Torkkeli
LUT School of Business and Management
Lappeenranta-Lahti University of Technology LUT
Finland

Professor Kaisu Puumalainen
LUT School of Business and Management
Lappeenranta-Lahti University of Technology LUT
Finland

Reviewers
Professor Erik Stam
Department of Law, Economics and Governance
Utrecht University School of Economics
The Netherlands

Associate Professor Martin Hannibal
Department of Marketing & Management
University of Southern Denmark
Denmark

Opponents
Professor Erik Stam
Department of Law, Economics and Governance
Utrecht University School of Economics
The Netherlands

Associate Professor Martin Hannibal
Department of Marketing & Management
University of Southern Denmark
Denmark

ISBN 978-952-335-599-6 (PDF)
ISSN-L 1456-4491
ISSN 1456-4491

Lappeenranta-Lahti University of Technology LUT
LUT University Press 2020
Abstract

Hannes Velt
Entrepreneurial Ecosystems and Born Global Start-ups
Lappeenranta 2020
117 pages
Acta Universitatis Lappeenrantaensis 939
Diss. Lappeenranta-Lahti University of Technology LUT

This doctoral dissertation introduces the entrepreneurial ecosystem phenomenon to international entrepreneurship research to address its fragmentation. The main focus is systemic elements of entrepreneurial ecosystems and their conditioning to support entrepreneurial activities in local contexts. Specifically, I explore the interrelations and dynamics of ecosystem elements and their influence on born global (BG) start-ups, addressing a major gap in previous literature, and examine these start-ups in their preliminary life-cycle stages of development when internationalisation commences. I also scrutinise entrepreneurial ecosystem research, perform a comprehensive bibliometric investigation into the state of the art of this trending topic and present its main thematic streams to establish its connection to international entrepreneurship and the BG concept. My theoretical framework combines and updates systemic elements from previous studies relevant to new venture progress and allows a critical assessment of their critical influence on the discovery/stand-up and validation/start-up stages in two-country and transnational contexts. Further, I evaluate which elements can be considered nation-level strengths and weaknesses, which are perceived as less relevant and how they actually perform. Moreover, in introducing BG organisational and international characteristics, discrepancies in how BG start-ups apprehend their surrounding environment are revealed. These analytical steps collectively contribute to existing theoretical knowledge on how entrepreneurial ecosystems foster BG start-ups in their preliminary stages towards international growth and new value creation for global communities. The findings also point to new future research avenues and are relevant to practitioners as a founder’s roadmap to enhance their awareness of their immediate ecosystem, its dynamic mechanisms and how it enables successfully launching and growing their start-ups. Similarly, for policymakers and other stakeholders, the findings pinpoint hindering effects of these structural conditions, which new policies should address. This is vital to enable and enhance productive entrepreneurship and generate vivacious atmospheres that promote BG types of new venture development.

Keywords: ecosystems, entrepreneurial ecosystem, born globals, start-up, life cycle, internationalisation
Acknowledgements

‘This is the way’—the Mandalorian ethos

I have always been driven by the acquisition of knowledge and by the conversion of that knowledge into practical skills that allow me to further understand my surroundings. Therefore, in my career, I have continuously moved from university to industry and back. However, I never envisioned that I would join academia to pursue a doctoral degree. Never say never, as they say. As a novice start-up entrepreneur, I understood early on that success is not only achieved by trial and error but also by learning from other entrepreneurs and founders and their endeavours. Hence, from the reflection of their roadmap, it became imperative to comprehend how local entrepreneurial environments enable productive entrepreneurial action. This intertwined and reciprocal revelation led me to academia, and I began to research entrepreneurial ecosystems and how these complex adaptive systems nurture entrepreneurial processes and international aspirations. The road I have taken has been a rewarding one, and I would like to acknowledge everyone who has helped me along the way.

My foremost gratitude goes to my supervisors, Lasse Torkkeli and Sami Saarenketo. Lasse guided me when I was conducting my master’s thesis and suggested that I realize the shared potential of my topic and my work efforts by further developing my thesis as doctoral research. He has been mentoring and guiding me ever since. Likewise, Sami has been a valued advisor throughout my career and been supportive in every step of the way. I would also like to thank Kaisu Puumalainen for her expertise and spot-on feedback as my third supervisor. Thank you all for being there for me each step of the way.

I would also like to express special gratitude to my examiners and opponents, Erik Stam and Martin Hannibal. Erik’s work has been an inspiration and was the turning point for my research process. His 2015 publication and personal advice provided me with a eureka moment by clearing up the entrepreneurial ecosystem concept and inspired me to continue with my academic endeavours. Martin has been a supportive figure with his positive attitude and his insights into the research fields of born global ventures, start-ups and futuristic business models. I would also like to thank Allan O’Connor for his continuous support and constructive encouragement, which have helped me to stay on track and believe in myself.

Moreover, I would like to thank LUT and its amazing people. You have taken me in as an equal member of your community, and I highly appreciate your continuous support. Being part of LUT has brought out my A game and made me appreciate my academic life. I have made many new friends and found likeminded allies and valuable co-authors for the days to come. The list of people who have been there for me is long, and I have continuously tried to express my genuine gratitude to each of you for being part of my journey.

I would also like to thank my colleagues across Finland. I have enjoyed discussing research and life with all of you during our meetings and eventful conferences where we
have upheld the standards of Finnish research community. This is not the end but the beginning of my career as a researcher, and I am thankful to all of you for accepting me as a fully-fledged member of academic society. Similarly, I would like to thank the Finnish Foundation for Economic Education and the Marianne and Marcus Wallenberg Foundation for their financial support during my doctoral studies.

Additionally, I would like to express my gratitude to the start-up founders in Estonia and Finland for your input. Although we live in a somewhat peripheral region, our work ethic, motivation and drive have put us on the world map as two of the most prosperous countries in terms of innovative entrepreneurship. Through this systemic output we continue to create value in order to achieve a sustainable future for us and those who follow. Let us continue our hard work and show the world what small entrepreneurial countries are all about.

I know that my friends have always wondered why I chose to take the road of continuous learning. I chose this path because life is all about the experiences we have passing through our one-time journey in this world. I have always tried to educate myself so that I could support you and your endeavours and build a supportive community. I would like to thank you for being there for me when times were tough and when it was time to celebrate. Life and friendship are all about the small things that make our lives worthy of living.

Finally, I could not have made it to this stage of my life and career without my family. Kristina, my kindred spirit and the cornerstone of my life, I cannot express my gratitude for the support that you have given me. Without you, I would be an empty shell in this matrix in which we live. I have learned a lot from you and try to appreciate every moment we have had together for the past 10 years. I could not have achieved anything without you by my side. I will love you forever. I would also like to thank my children, Eleanor and Lukas. Your presence is everything to me, and your unconditional love ignited my endeavours to become a better father, husband and a human being. I love you and hope you forgive me for not being there as much as you and I wanted.

Hannes Velt
December 2020
Helsinki, Finland
There is nothing we cannot achieve, there are only things we do not dream about.
Contents

Abstract

Acknowledgements

Contents

List of publications 11
List of abbreviations 13

1 Introduction 15
  1.1 Research gaps and positioning ............................................................ 16
  1.2 Research questions ............................................................................. 20
  1.3 Definitions .......................................................................................... 22
  1.4 Research structure .............................................................................. 22

2 Theoretical background 25
  2.1 Entrepreneurial ecosystem ................................................................. 25
    2.1.1 Ecosystem as a concept ................................................................. 25
    2.1.2 Entrepreneurial ecosystem phenomenon ...................................... 27
    2.1.3 Entrepreneurial ecosystem formation ......................................... 29
    2.1.4 Entrepreneurial ecosystem elements .......................................... 31
  2.2 Entrepreneurial activity .................................................................... 38
    2.2.1 Entrepreneurial activity in context .............................................. 38
    2.2.2 Born global start-ups ................................................................. 39
  2.3 Theoretical integration ..................................................................... 42

3 Research design and methods 45
  3.1 Research design ................................................................................. 45
  3.2 Dissertation process in phases ........................................................... 48
  3.3 Research methods ............................................................................. 53
    3.3.1 State of the art ........................................................................... 53
    3.3.2 Empirical investigation ............................................................... 56

4 Publications and Findings 61
  4.1 Publication I ....................................................................................... 61
    4.1.1 Objective .................................................................................... 61
    4.1.2 Findings and Contributions ......................................................... 61
    4.1.3 Role in the dissertation .............................................................. 62
  4.2 Publication II ...................................................................................... 62
    4.2.1 Objective .................................................................................... 62
    4.2.2 Findings and Contributions ......................................................... 62
    4.2.3 Role in the dissertation .............................................................. 63
  4.3 Publication III .................................................................................... 63
5 Discussion and Conclusion

5.1 Answering the proposed research questions ........................................ 69
  5.1.1 Findings from bibliometric and literature reviews ....................... 69
  5.1.2 Findings from the quantitative investigation ................................ 74
5.2 Theoretical contributions ........................................................................ 79
5.3 Managerial and policy implications .......................................................... 83
5.4 Limitations and future research ............................................................... 87

References ..................................................................................................... 91

Publications
List of publications

This dissertation is based on the following papers. All necessary rights have been granted by the publishers to include the papers herein.


Author’s contribution

I am the principal author and investigator in Publications I, II, III and IV and was responsible for developing all parts of these publications. I came up with the ideas and theoretical framework, gathered and analysed data, discussed the findings, and presented the implications, limitations and suggested future research avenues. My supervisors Lasse Torkkeli, Sami Saarenketo and Kaisu Puumalainen guided me along the way to adjust my focus in many cases and worked on the general aspects of these publications. Igor Laine joined Publication I to assist in examining thematic clusters of the entrepreneurial ecosystem research field. All co-authors and supervisors continuously provided me with relevant feedback to improve my work presented as Publications I–IV in this dissertation.
### List of abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>artificial intelligence</td>
</tr>
<tr>
<td>ANOVA</td>
<td>analysis of variance</td>
</tr>
<tr>
<td>BA</td>
<td>business angel</td>
</tr>
<tr>
<td>BG</td>
<td>born global</td>
</tr>
<tr>
<td>EA</td>
<td>entrepreneurial activity</td>
</tr>
<tr>
<td>EE</td>
<td>entrepreneurial ecosystem</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GEDI</td>
<td>Global Entrepreneurship and Development Index</td>
</tr>
<tr>
<td>HR</td>
<td>human resources</td>
</tr>
<tr>
<td>IB</td>
<td>international business</td>
</tr>
<tr>
<td>IE</td>
<td>international entrepreneurship</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>research and development</td>
</tr>
<tr>
<td>SME</td>
<td>small and medium enterprise</td>
</tr>
<tr>
<td>STATA</td>
<td>software for statistics and data</td>
</tr>
<tr>
<td>CVC</td>
<td>corporate venture capital</td>
</tr>
<tr>
<td>VC</td>
<td>venture capital</td>
</tr>
</tbody>
</table>
1 Introduction

In recent decades, the ecosystem phenomenon has gained a great deal of attention from researchers representing many fields, from international business and strategic management to innovation, economic geography, entrepreneurship and, more recently, international entrepreneurship (IE) and marketing. Indeed, the ecosystem has become a concept to describe the complexities of an interconnected world. It was introduced from biology and social systems to the business and management scene to acknowledge that a single entity is not capable of succeeding without interacting with others in a system where they co-evolve within their surrounding environment, similar to biological systems that we see in the natural world (Moore, 1993, 1997). The concept has been employed in many contexts to describe the underlying interdependencies depending on the focus of interest. Business, entrepreneurial, innovation, and knowledge ecosystems are amongst the most commonly depicted variants; however, more recent additions include platform, service, and digital ecosystems (Iansiti and Levien, 2004; Adner and Kapoor, 2010; Ceccagnoli et al., 2012; Scaringella and Radziwon, 2018). Hence, it is a popular concept applied in wide-ranging domains that exhibit various overlapping properties while maintaining their own specific features that define their core essence and aims.

But one might ask: Why is this phenomenon relevant? In the present dissertation, I explore the entrepreneurial ecosystem (EE) phenomenon, which emphasises aspects of entrepreneurship and how this type of dynamic system supports entrepreneurial activities (EAs) and consequent value creation (Stam, 2015). Societies employ such systems to benefit all stakeholders who build a vital economy and find meaning for their roles in their respective communities. The concept of the entrepreneurial ecosystem has gained a great deal of attention from scholars in diverse research disciplines in recent years (Maroufkhani, Wagner and Wan Ismail, 2018); it is, however, still a young stream of research and lacks the coherent insights required to reveal the influence of such ecosystems on entrepreneurs and their role as productive mechanisms driving the system towards societal, economic and environmental benefits. Newer studies have stressed the co-creation and co-evolution of the setting and the aspirations of local entrepreneurs (Spigel and Harrison, 2018). Hence, this topic has become a prolific point of departure to acknowledge the local context in nurturing entrepreneurial activities (Audretsch et al., 2018) and value for all.

The entrepreneurial ecosystem is a multi-faceted phenomenon; it is a complex adaptive system (Phillips and Ritala, 2019), and many researchers have tried to map out its construct (Bahrami and Evans, 1995; Lichtenstein and Lyons, 2001; Mason and Brown, 2014; Feld, 2020). However, it is far from a simple task. There are many elements and sub-elements to be considered, as well as their criticality for developing new ventures (Cavallo, Ghezzi and Balocco, 2019). In the present dissertation, I extend these elements and specifically assess them from the perspective of the born global (BG) type of ventures (Rennie, 1993; Knight and Cavusgil, 1996). These firms are known for resource scarcity (Sasi and Arenius, 2012) and rapid development (Nummela, Saarenketo and Loane, 2016). Hence, to become successful, BGs need endowments to support their progress;
arguably, this is where the role of the local entrepreneurial ecosystem comes into play. The literature of IE focusing on BGs is scattered (Baier-Fuentes et al., 2019); thus, employing an entrepreneurial ecosystem framework would help in advancing research in this field. Recent review studies support this agenda as they discuss local elements in the new venture development and internationalisation contexts (Öyna and Alon, 2018; Dabić et al., 2019). Additionally, elements in entrepreneurial environments are applicable to different life-cycle stages (Mason and Brown, 2014; Mack and Mayer, 2016); thus, exploring their dynamic nature and interconnections through BG life stages would be a potentially important addition. Combining all these aspects together into one research framework would enable me to work on this topic in a meaningful way and, through the related findings, to generate a reflective roadmap for entrepreneurs to follow and from which to derive insights.

In the next sections, I will elaborate the main research gaps to argue for the relevance of my approach and its theoretical positioning vis-à-vis the main research fields. Subsequently, I will present an overview of my research questions and the overarching structure of this dissertation process.

1.1 Research gaps and positioning

The ecosystem phenomenon is still a little-developed research topic, even though it has been around for decades and has been trying to find its way into the mainstream literature. Specifically, the EE theme has been building momentum in recent years (Velt, Torkkeli and Laine, 2020) and is starting to converge at a level where it can establish a solid conceptual and theoretical framework for application. Even so, the relevance and suitability of EE to explain entrepreneurship and its interrelations and interdependencies with its specific surrounding environment have been questioned (Alvedalen and Boschma, 2017; Brown and Mason, 2017). Therefore, by reflecting upon its shortcomings and gaps in the extant literature, I argue for the importance of the present research and show that there is a great deal of potential to further our knowledge in this new research arena.

Gap 1—Concept
The EE is an interdisciplinary theme which encompasses international business, strategic management, economic geography, and entrepreneurship fields; it is well-positioned to explain how regional systems influence productive entrepreneurial endeavours through collaboration towards creating value for local and global communities (Stam and Van de Ven, 2019). It remains a vague concept because it encompasses a significant number of other research fields in its underlying foundation. However, its current ambiguous status opens up many avenues for inter- and cross-disciplinary research. The EE consists of elements and individuals that make it a dynamic and complex system (Acs, Autio and Szerb, 2014) which is not easily investigated. To render the EE more comprehensible, it is vital to advocate for entrepreneurial progress and successful performance; in doing so, a supportive environment becomes imperative (Vallaster et al., 2019); in taking this stance, we should investigate how these complex systems influence new venture creation
from entrepreneurs’ perspectives and experience (Ratten, 2020). As mentioned, there is a set of elements integrated into the EE which influence entrepreneurial individuals and new venture creation. All these elements are integrated under the EE umbrella, where they interact dynamically (Cavallo, Ghezzi and Balocco, 2019). Still, clear analytical frameworks that address their causes and effects (Stam and Spigel, 2017) and consider all the elements in this complex system jointly (Alvedalen and Boschma, 2017) are seldom found. Research on individual elements can be seen in fields where they are represented, but there are substantial differences in the division of attention amongst EE-specific literature as researchers highlight some fields more than others. Additionally, this uneven concentration of elements tends to result in the overemphasis of the relative significance of particular elements and their role in the structure (Velt, Torkkeli and Saarenketo, 2018a). Thus, research concentrating on and reviewing the underlying dynamism, interrelations, and performance of the EE would be inherently misleading. Current efforts to describe these conditions have tended to be inflexible and purely retrospective, resulting in survivor bias, by emphasising the most productive environments instead of offering a balanced view of the EE phenomenon (Mack and Mayer, 2016). Thus, some newer concepts could be mistakenly omitted. Uncovering all relevant EE-related frameworks developed and utilised, as well as their components, requires a systematic review of previous literature.

The consensus on what a productive EE consists of is not settled, so it is vital to investigate EEs to capture the phenomenon in full. How vivacious entrepreneurial environments are constructed (Kshetri, 2014) and how they encourage entrepreneurial ventures during their progress (Acs et al., 2016) are still questions to be addressed. In its current form in the literature, there are many gaps in the EE when looked at on the aggregate level. To deal with its complexity, it is necessary to establish a context for further inquiry and to dig deeper into its construct and how it influences EA. When conducting a systematic review of the literature, it is necessary not just to pinpoint the elements but also to extend the scope to encompass its sub-elements to better comprehend the underlying mechanism of EE that nurtures new venture development. In previous literature, these conditions have been divided into framework and systemic elements, of which the former guide the environment and indirectly influences productive entrepreneurship, while the latter dynamically interact and impact entrepreneurial behaviour (Stam and Van de Ven, 2019). However, as there are two layers of conditions with many sub-elements, it becomes reasonable to concentrate solely on the systemic elements due to their direct effects in enabling entrepreneurial action. Hence, it is imperative to identify critical and non-critical systemic elements and sub-elements and apprehend their dynamic interactions with one another and their effect on enabling entrepreneurial endeavours (Motoyama and Knowlton, 2017; Cavallo, Ghezzi and Balocco, 2019).

**Gap 2 - Context**

Advancing the EE framework regarding its construct would allow me to identify and incorporate the most recent concepts regarding EE elements (i.e. crowdfunding and engagement) to shed light on their complementary and supplementary aspects. Comparing these concepts to those previously found provides more explorative power in terms of their
interactions, thus challenging the status quo and gaining better insights into the conditions supporting venture progress and international expansion across regional geographies (Zander, McDougall and Rose, 2015). Hence, following new venture creation in certain contexts (Cavusgil and Knight, 2015; Acs et al., 2018) would help to further elaborate the structural elements and sub-elements that facilitate risk-taking (Isenberg, 2011) in the quest for global opportunities. Doing so requires positioning such ventures in a particular context which is dependent on the type of EA I choose to address. Accordingly, there are many types of firms to look at in this context (Stam, 2015). The ‘born global’ (Rennie, 1993) firm, which, ‘from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries’ (Oviatt and McDougall, 1994, p. 49), would be my preferred choice because these ‘young, entrepreneurial start-ups initiate international business soon after their inception’ (Cavusgil and Knight, 2015, p. 3) and employ unique sets of resources and knowledge to do so (Fan and Phan, 2007; Gassmann and Keupp, 2007). These resources, amongst other endowments, are then acquired from local contexts and configured based on entrepreneurs’ intentions (Velt, Torkkeli and Saarenketo, 2018b; Ratten, 2020).

Furthermore, BGs represent an interdisciplinary phenomenon which covers international business, entrepreneurship, strategic management, and marketing fields. From the intersection of the former two, a new research avenue was proposed (i.e. IE) to shed more light on these rapidly growing and internationalising new ventures (Jones and Coviello, 2005). However, IE is still quite a scattered and dispersed field (Knight and Liesch, 2016) and could critically use the integration of a framework such as an EE to move the field forward. It is notable that the concept of the EE has been clearly absent from previous literature on IE. For instance, reviews on IE (Jones, Coviello and Tang, 2011; Peiris, Akoorie and Sinha, 2012; Ribau, Moreira and Raposo, 2015) do not find any studies conducted on entrepreneurial nor any other kind of ecosystems. The most recent review, on the other hand, mentions the EE approach only once, in a policymaking context (Baijer-Fuentes et al., 2019, p. 404), which is clearly not sufficient. Therefore, there is a clear dearth of knowledge regarding how an EE can facilitate the international growth of new ventures. This is remarkable because research literature on BGs indicates that the core concepts of many of the elements of an EE are individually crucial for these types of ventures (Öyna and Alon, 2018); therefore, there is a direct link. Hence, an EE framework would enable examining BGs from a more holistic perspective in terms of their rapid development and alignment with local endowments. Therefore, introducing an EE framework into IE to assess BGs would be an impactful contribution in itself (see Figure 1).

Similarly, the BG reflects a concept that, at its core, entails internationalisation to foreign markets as its main objective. This inevitably introduces the EE framework to the marketing field, but this is beyond the scope of my dissertation framework. Nevertheless, a recent study on firm internationalisation identified a mixture of conceptual and empirical studies following the EE and its elements (e.g. human capital, networks, knowledge, capital, geography) (Dabić et al., 2019). To date, only a fraction of EE studies have focused on internationalisation; thus, further inquiries are needed in this regard (Ratten, 2020). Hence, EE is indeed an important framework to be employed in the IE field, in general,
and applied to BGs and their internationalisation processes, in particular. Likewise, it is important to acknowledge that the criticality and interrelations of elements shift over time, reflecting their dynamic nature (Mason and Brown, 2014; Mack and Mayer, 2016). Hence, the EE framework represents an interesting viewpoint to add and investigate in terms of which elements and their links are vital for the respective stages of development (Alvedalen and Boschma, 2017). This movement between stages would render such elements detectable, reflect their dynamics and provide evidence of their relevance as perceived by the entrepreneurs who drive their new ventures through their life-cycle stages. All of the above gaps in the EE and BG literature have been utilised to establish the context for the present research inquiry.

**Figure 1. Research positioning**

In sum, I divided the gaps into the categories of ‘concept’ and ‘context’ to make a clear distinction regarding the status of the EE phenomenon and the relevance of a review study versus how I set up my research framework context for empirical investigation. During my doctoral studies, I have let these two streams of gaps guide my research framework, thereby reflecting a founder’s roadmap. Furthermore, I have aligned these accordingly to construct a comprehensive research agenda for further examination with the aim of introducing the EE concept into the IE domain. In the next sections, I will discuss the research questions aligned with these gaps and the theoretical positioning of this research, followed by the research structure.
1.2 Research questions

I devised the main objective of this dissertation as a central question with which my research agenda and research gaps are aligned, and I introduced seven research questions for detailed inquiry. The guiding research question of the dissertation is as follows:

*What is the role of an entrepreneurial ecosystem in supporting born global start-up development?*

I used this question to build my research framework to discover how the surrounding environment nurtures local BG start-ups during their preliminary life-cycle stages and prepares them for internationalisation. The following research questions are aligned with this previous one, as well as with the identified gaps, and subjected to logical analysis to support my research agenda of exploring interconnections between the ecosystem and venture-level activities.

The first journal article (Publication I) covers the bibliometric mapping and thematic clustering of the EE research framework. It identifies the countries, institutions, journals, and authors and their co-authors most active in the research field, as well as the most important publications driving this research and the most prevalent themes in the extant literature. This process prepared the ground for my theoretical base. Additionally, as there were no extensive bibliometric studies available, my work is positioned at the cutting edge of the EE field. The next questions were the following:

**RQ 1. What is the state of the art of the entrepreneurial ecosystem domain?**

**RQ 2. Which thematic streams are embodied in the entrepreneurial ecosystem domain?**

In the next journal article (Publication II), I began the research by exploring the characteristic conditions of the EE from a theoretical standpoint and discovered that many previous studies have taken different positions in this regard; however, for the most part, the literature is aligned in involving similar structural elements and topics. I covered all the frameworks listed in the theory chapter and discussed them further in the conclusion chapter. I acknowledge that many elements also have sub-elements that are relevant in this study context. Hence, I conducted a concise systematic literature review by focusing on EE-related works for each element in order to select 16 elements as the basis of inquiry. I have not published this research separately but have applied it to extend my study framework and utilised it for the theoretical sections in Publications II–IV. The question was as follows:

**RQ 3. Which systemic elements represent a healthy entrepreneurial ecosystem that can nurture born global start-ups?**

RQ 1–RQ 3 conclude the overview of previous research regarding the ‘concept’ gaps. The latter one was defined to prepare the ground for the empirical investigation and a set of sub-questions was composed to explain the ‘concept’ in the ‘context’.
In Publications II–IV, I explored the critical and non-critical elements for BG start-up development in the discovery and validation stages, where the local environment exerts the strongest influence upon new venture progress. RQ 3.1 is imperative as it enables considering what is relevant to novice entrepreneurs during start-up development and detecting their dynamic interactions and behaviour. I employed RQ 3.1 in various contexts with respect to publications to validate my findings and detect any discrepancies between them with the aim of further explaining the system- and venture-level interconnections.

It was interesting to find a marked overlap between country-level contexts. This research question was as follows:

**RQ 3.1. Which systemic elements are critical for born global start-up development during the preliminary stages of its life cycle?**

I then introduced another measure to detect the presence of EE elements for both stages. This allowed me to explore which elements could be considered strengths and weaknesses and how they differed in a two-country context (Publications II and III). This measure became a crucial resource for my conceptualisation of a transnational EE context (Publication IV). The research question was as follows:

**RQ 3.2. Which systemic elements can be considered an entrepreneurial ecosystem’s strengths and weaknesses?**

In addition, in a comparative study (Publication III) to validate my research data, I was able to measure the performance of this two-country context. These findings were similar to those of other studies from a macro-perspective, and they further supported my approach to measuring an EE and its key elements. The research question was as follows:

**RQ 3.3. How does a set of systemic elements explain the performance of comparable ecosystems?**

Lastly, I aligned the objectives to address the weaknesses of both country contexts by exploring them from a transnational EE perspective. To this end, I introduced a set of organisational and international features characterising BG start-ups. From this, I was able to take a closer look at all the systemic elements, their dynamics, and their influence on stage-wise development. It was an informative viewpoint to take, as various ventures perceived these elements rather differently respective to their stage. This could yield some new insights and ideas for future research agendas and guide novice founders who apply these reflections to their own organisations to launch and grow BG start-ups more effectively. The respective question was as follows:

**RQ 3.4. How do intra-group characteristics describe born global perceptions of the entrepreneurial ecosystem?**

In conclusion, all these research questions adhere to a logical analysis aimed at comprehending how EEs are constructed and interconnected, their dynamic behaviour, and how they nurture BGs during preliminary life-cycle stages. In addition, the questions are
aligned in a constructive manner so that the reader can learn from the relevant insights they raise to reflect upon and guide their own endeavours. This concludes the description of my efforts to present a founder’s roadmap.

1.3 Definitions

In this section, I provide an outline of key concepts employed in this dissertation to serve as a synopsis. The terms here defined give the reader a concise overview of the essence of my research framework. Even though some of them are closely related, it is relevant to elaborate the involvement of each one in preparing my framework (e.g. life cycle). A more inclusive discussion of these concepts is established in the theoretical background chapter. The terms are presented in order of appearance (see Table 1)

Table 1. Definitions of key concepts

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem</td>
<td>‘the biome considered together with all the effective inorganic factors of its environment is the ecosystem’ (Tansley, 1935, p. 306)</td>
</tr>
<tr>
<td>Entrepreneurial ecosystem</td>
<td>‘a set of interconnected entrepreneurial actors, entrepreneurial organisations, institutions and entrepreneurial processes which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment’ (Mason and Brown, 2014, p. 4)</td>
</tr>
<tr>
<td>Entrepreneurial activities</td>
<td>‘a wide range of activities such as creation, founding, adapting, and managing a venture’ (Cunningham and Lischeron, 1991, p. 46)</td>
</tr>
<tr>
<td>Born globals</td>
<td>‘from inception, [seek] to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries’ (Oviatt and McDougall, 1994, p. 49)</td>
</tr>
<tr>
<td>Born global start-ups</td>
<td>‘young, entrepreneurial start-ups that initiate international business soon after their inception’ (Cavusgil and Knight, 2015, p. 3)</td>
</tr>
<tr>
<td>Organisation life cycle</td>
<td>‘unique configuration of variables related to organisational context, strategy, and structure’ (Hanks, 1990, p. 1)</td>
</tr>
<tr>
<td>Start-up life cycle</td>
<td>‘discovery, validation, efficiency, and scale stages’ (Marmer et al., 2012, p. 7)</td>
</tr>
<tr>
<td>Entrepreneurial process</td>
<td>‘stand-up, start-up, and scale-up activities in entrepreneurial ecosystems’ (Autio et al., 2018, p. 4)</td>
</tr>
<tr>
<td>Internationalisation</td>
<td>‘the process of increasing involvement in international operations’ (Welch and Luostarinen, 1988, p. 36)</td>
</tr>
</tbody>
</table>

1.4 Research structure

I now present an overview of the research structure. The opening step was to search for appropriate literature relevant to the EE field. At that time, not many topic-related studies were available; thus, it became a continuous process to update, review and map key
works. Therefore, the bibliometric technique was primarily employed to follow advances in research, and I utilised this technique to identify research gaps and help to position my dissertation framework (see Figure 2). This is the first publication in this dissertation structure (Publication I).

Based on the previous efforts, it was vital to derive a suitable set of research questions which would be aligned with previous research recommendations for future studies and generate insights to reflect a founder’s roadmap to guide me and others alike from opportunity recognition towards developing my own start-up. As the agenda was established, I started to dig deeper into the EE construct to detect which elements are most common in these supportive environments. I used bibliometric and systemic review inquiries to bring out the elements and sub-elements to build my theoretical background. This was also one of the first studies to include crowdfunding and engagement events, along with other conditions, as part of the extended model, and it became a resource for the other publications in this dissertation. All the previous steps helped me to generalise EE-related literature to comprehend the concept and enabled working on my research design and choosing the methods that were the most suitable to searching for answers to these pre-established research questions.
Moreover, I searched for a relevant context in which to investigate this model. The decision was made to focus on Estonia and Finland because these countries have amongst the highest rates of launching and growing BG start-ups per capita (Quack, 2018) but are still quite different in their socio-economic and business settings due to their historical background and economic development despite their close geographic proximity. Estonia and Finland are famous for cultivating ‘unicorn’ (i.e. firms valued over one billion dollars) BG start-ups (e.g. Rovio, Supercell, Bolt, Skype and TransferWise). Both of these countries have a strong concentration of talent in their capital areas, making them a cross-border region that shares and competes over this vital recourse (Mikhaylov and Mikhaylova, 2015) while co-evolving and creating economic synergies (Nauwelaers, Maguire and Marsan, 2013). Therefore, this context becomes highly conducive to studying the EE and its influence in supporting BG start-up development. I embarked upon my investigation to explore how these country-level ecosystems achieve this high level of productivity, as well as the underlying connections and dynamics. This resulted in two journal articles and one conceptual book chapter (Publications II–IV), all of which have their own contextual foundations. The final chapter discusses and draws conclusions from the findings. This is where I answer the research questions in greater detail to make concise theoretical, practical and policy-related implications and, finally, discuss the limitations of this dissertation process and future directions to advance the EE research field.

In the chapters that follow, I will discuss in detail the theoretical background, research design and choice of methods and provide an overview of my publications and their respective findings. Then, I will discuss these in detail to conclude my dissertation.
2 Theoretical background

In this chapter, I will provide a short overview of the ecosystem phenomenon and focus on the EE construct and its formation, as well as conditions relevant to sustaining entrepreneurial activity (EA) to facilitate BG start-up creation and development.

2.1 Entrepreneurial ecosystem

2.1.1 Ecosystem as a concept

Etymologically, the word ‘ecosystem’ originates from a combination of ancient Greek οίκος (home) and σύστημα (system). It has recently become a buzzword that is widely applied in policymaking, industry, management and in various research fields, such as strategy and regional development (Audretsch et al., 2019), to describe interlinkages and interdependencies amongst diverse sets of actors in a particular locality (Acs et al., 2017). Ever since Moore (1993) introduced the ecosystem construct to business and management contexts, many academics have tried to extrapolate the application of the term and its implementation to a variety of research fields (Clarysse et al., 2014; Aarikka-Stenroos and Ritala, 2017; Jacobides, Cennamo and Gawer, 2018; Scaringella and Radziwon, 2018; Hakala et al., 2020). Holistically, in line with its ‘home system’ origins, ‘ecosystem’ has its roots in a territorial approach (e.g. industrial districts, regional innovation systems, knowledge clusters) (Autio et al., 2014; Scaringella and Radziwon, 2018; Freire-Gibb and Gregson, 2019). It can exhibit complementary characteristics that are largely different in terms of their underlying modular dynamics (Jacobides, Cennamo and Gawer, 2018) and model narratives (Hakala et al., 2020). In such previous efforts to review the antecedents of the phenomenon, four generic archetypes of ecosystems have been emphasised most often, namely business ecosystems (Moore, 1993), entrepreneurial ecosystems (Van de Ven, 1993; Bahrami and Evans, 1995), innovation ecosystems (Adner, 2006) and knowledge ecosystems (van der Borgh, Cloodt and Romme, 2012). Even though there is an array of other types of ecosystems used in the literature (e.g. platform ecosystems, service ecosystems, digital ecosystems, open innovation ecosystems, industrial ecosystems, entrepreneurial university ecosystems), the underlying notion remains the same. Thus, elaborating the dominant types becomes sufficient (see Table 2).

Simply put, an ecosystem includes an intertwined network of multilevel stakeholders that, through their interactions, create collective value as an outcome. Moreover, from previous definitions, ecosystems respectively focus on value creation via business expansion, entrepreneurship development, innovation creation and knowledge formation. Still, the usefulness of ‘ecosystem’ to explain such complex adaptive systems (Phillips and Ritala, 2019) has received critical scrutiny (Oh et al., 2016; Alvedalen and Boschma, 2017; Brown and Mason, 2017); in some cases, the research community has only recently found its consensus on the suitable term to be employed (i.e. entrepreneurship system, national system of entrepreneurship and entrepreneurial ecosystem, all of which address the same underlying notion) (Velt, Torkkeli and Laine, 2020).
Table 2. Ecosystem types and definitions

<table>
<thead>
<tr>
<th>Ecosystem Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business ecosystem</td>
<td>‘An economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. This economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they co-evolve their capabilities and roles and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments and to find mutually supportive roles’ (Moore, 1997, p. 26).</td>
</tr>
<tr>
<td></td>
<td>‘Loose networks—of suppliers, distributors, outsourcing firms, makers of related products or services, technology providers, and a host of other organizations—affect, and are affected by, the creation and delivery of a company’s own offerings. Like an individual species in a biological ecosystem, each member of a business ecosystem ultimately shares the fate of the network as a whole, regardless of that member’s apparent strength’ (Iansiti and Levien, 2004, p. 2).</td>
</tr>
<tr>
<td>Entrepreneurial ecosystem</td>
<td>‘The entrepreneurship ecosystem consists of a set of individual elements—such as leadership, culture, capital markets, and open-minded customers—that combine in complex ways’ (Isenberg, 2010, p. 4).</td>
</tr>
<tr>
<td>Innovation ecosystem</td>
<td>‘The collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution. Enabled by information technologies that have drastically reduced the costs of coordination, innovation ecosystems have become a core element in the growth strategies of firms in a wide range of industries’ (Adner, 2006, p. 1)</td>
</tr>
<tr>
<td>Knowledge ecosystem</td>
<td>‘The flow of tacit knowledge between companies and the mobility of personnel (Saxenian, 1996, 2006) have been advanced as the main advantages of geographic co-location which characterize these hotspots. Such hotspots have been characterized as knowledge ecosystems where local universities and public research organizations play a central role in advancing technological innovation within the system’ (Clarysse et al., 2014, p. 1164).</td>
</tr>
</tbody>
</table>
2.1 Entrepreneurial ecosystem

Moreover, such complex social constructs can be further differentiated and compared by their territory; values; stakeholders; economics; social, knowledge and outcome invariants (Scaringella and Radziwon, 2018); modularity; complementarity and governance designs (Jacobides, Cennamo and Gawer, 2018); and thematic, enstoried and rhetorical narratives (Hakala et al., 2020). Hence, these concepts can be investigated through a multitude of perspectives, making ecosystem formation an interesting topic for learning about surrounding environments and how their configurations and participants lead to reciprocal value creation. Consequently, this concise overview suggests that there is not a single concept that explains, in their entirety, the complex relationships between stakeholders when exploring contemporary business landscapes. Therefore, since incorporating all of these types would entail a tremendous effort beyond the scope of the present dissertation, a suitable premise must be chosen for its purposes. Consequently, as the ecosystem phenomenon could be a rewarding lens to adopt, I will be focusing on the topic of the EE and its influence on new venture development and internationalisation.

In the following sections, I will be discussing the EE phenomenon in greater detail, its formation and structural elements, and their focus on EA in launching and growing BG start-ups towards an international presence.

2.1.2 Entrepreneurial ecosystem phenomenon

The previous section noted that the overall ecosystem conceptualisation and theorisation agenda started with Moore (1993). However, all these dominant ecosystem types have roots that extend back decades prior, when policies describing these complex, intertwined designs were often ambiguous, and other prevalent terms roamed the academic literature landscape. The entrepreneurial ecosystem concept is no different in this regard. Historical reflection indicates that well-studied terms such as ‘clusters’, ‘industrial districts’ and ‘innovation systems’ all have overall characteristics similar to those of EE. It is not just a traditional versus modern conceptualisation of these networked structures but rather the existence of very strong, unique distinctions. The old guard concentrates on industry and innovation as the focal point; however, the EE has a direct role to play in supporting entrepreneurship and new venture creation (Spigel and Harrison, 2018) by accentuating the position of external entrepreneurial opportunity-seeking through the utilisation of new business models and knowledge spillovers enabled by new digital frontiers (Autio et al., 2018). Thus, in the EE context, there is a continuous necessity for a networked flow of resources, knowledge and capital to successfully support growth and sustain competitive advantage on the venture level, which simultaneously strengthens the surrounding ecosystem (Spigel and Harrison, 2018) in a sort of a self-reinforcing continuous dynamic process.

The EE has been established as a concept to move economics towards acknowledging the role of entrepreneurship in ecological systems thinking by introducing it as a mechanism for entrepreneurial value creation in the regional development and strategy literatures (Acs et al., 2017; Audretsch et al., 2019). This tendency has been visible not only in the academic literature but also in more practical works (Mason and Brown, 2014) guiding
recent policies to emphasise individual- and environmental-level collaboration aimed at new value creation as an essential objective to boost common benefits (Tsvetkova, Pugh and Schmutzler, 2019). Therefore, the context in which this entrepreneurial process occurs not only matters (Autio et al., 2014) but has become a focal point to address how to generate local entrepreneurial action (Audretsch et al., 2012). One influential effort has been made by Acs, Autio and Szerb (2014) by introducing National Systems of Entrepreneurship as a framework, wherein this system of resource allocation is driven by individual-level opportunities to establish ventures to create new value in and from the local context (Acs et al., 2016). However, geographic locality in the EE framework could be studied not only at the national level but also at the city, country or pre-determined regional levels (e.g. urban, rural). Hence, understanding that the EE incorporates the contextual relevance affecting EA as an output of the system with value creation as the outcome is critical (Stam, 2015).

Moreover, even though the EE can be depicted as a straightforward formation of interactive and interrelated layers, it is still a complex adaptive system (Ritala and Gustafsson, 2018; Phillips and Ritala, 2019); it incorporates many regulating conditions and their dynamic behaviour, which directly and indirectly foster productive entrepreneurial action, and vice versa (Stam and Van de Ven, 2019). These underlying mechanisms can be explored in detail through the technological, economic and societal dimensions; their configurations create vital conditions that shape entrepreneurial ventures (Audretsch et al., 2019) and, reciprocally, are shaped by entrepreneurial intentions, coherence of activities and resource injections (Roundy, Bradshaw and Brockman, 2018). In addition, building on this complexity, it has become crucial to recognise that through these environmental and entrepreneurial/venture-level interactions, every ecosystem becomes coherent while maintaining its unique diversity (Spigel, 2017). Moreover, from their interplay is generated the ecosystem-level resilience (Roundy, Brockman and Bradshaw, 2017) necessary to become viable in providing a sustainable competitive advantage for the locality (Han et al., 2019). Hence, a social-ecological system such as the EE needs to become resilient to achieve sustainability in the long run because building up sustainability demands resilience at certain points in time (Johnson et al., 2018). Sustainability should become a goal for the EE to reflect its viability for stimulating dynamic interactions between the micro- and macro-levels to enable a fully-functional ecosystem (Cohen, 2006). Previous research has found that all of the following improve EE sustainability: stakeholder orientation and role, resource mobilisation and leverage, collaboration, opportunity recognition and co-evolution, response to societal criticism, value commitment, market demand, regional entrepreneurial culture and formal institutional context (Mason and Brown, 2014; Bischoff, 2019; DiVito and Ingen-Housz, 2019; O’Shea, Farny and Hakala, 2019; Pankov, Velamuri and Schneckenberg, 2019). Accordingly, the complexity of the local system and the intensity of its integration create EE resilience to promote a sustainable system, which emphasises the relevance of the integral dynamic conditions and interactions which reflect the effectiveness and vitality of an ecosystem. It is clear that the EE has become much more than the quintuple helix model (Carayannis et al., 2018). Thus, a set of principles managing these complex dynamic processes and interrelations have been proposed (Isenberg, 2010; Kuckertz, 2019).
In summary, the EE is a more complex system than its predecessors and has a unique focus on entrepreneurship and supporting venture development, thereby leading to new value creation for local and global communities. EEs are configured differently, shaped by their regional context, and far from static constructs. The EE is a complicated adaptive system of multilevel and multilateral interactions and interconnections that incorporate many conditions and stakeholders to build up inherent resilience mechanisms and sustainability. In the next section, I will go into greater detail to reflect what lies underneath the engine of this complexity and elaborate the structural conditions and elements vital for new ventures.

2.1.3 Entrepreneurial ecosystem formation

EE research has gained a great deal of momentum in recent decades as many scholars from various fields have concentrated on studying the EE and its role in society (Velt, Torkkeli and Laine, 2020). Generally, regional development, strategy, international business and entrepreneurship research encourage studies of the EE phenomenon in the economic development context (Isenberg, 2014) as such environments both directly enable and limit EA (Stam, 2015). Bahrami and Evans (1995, p. 63) argued that ‘the ecosystem provides an anchor of stability within which incumbent firms and new start-ups can flourish and become a source of innovation and employment, and yet remain sufficiently flexible to accommodate the constant stream of kaleidoscopic changes’. Ever since their seminal study based on Silicon Valley, many researchers have tried to capture the essence of this dynamic system and have focused on different aspects of the EE, for example, its geographic location and level of analysis (Stephens et al., 2019; Szerb et al., 2019), temporal dynamics (Mack and Mayer, 2016; Auerswald and Dani, 2017), structural dynamics (Auschra et al., 2019; Martínez-Fierro, Biedma-Ferrer and Ruiz-Navarro, 2019), measurement (Corrente et al., 2019; Liguori et al., 2019), legitimation (Kuratko et al., 2017; Jarchow and Röhm, 2019), governance (Audretsch and Link, 2019; Colombo et al., 2019), resilience (Roundy, Brockman and Bradshaw, 2017; Han et al., 2019) and sustainability (DiVito and Ingen-Housz, 2019; O’Shea, Farny and Hakala, 2019).

However, to better comprehend EE formation, we must explore the construct. The EE incorporates a set of stakeholder actors and their interlinkages, which should operate relatively efficiently and sustainably. The main objective of the ecosystem is to foster those synergies and ensure their convergence on an equal level of economic efficiency. To ensure proper functionality, interlinkages amongst these elements should be enabled and sources of local productivity must be recognised and organised accordingly (Boutillier, Carré and Levratto, 2016). Firstly, emphasis should be placed on the supportive conditions of the local ecology, economy and society to enable, support and sustain productive EA. Secondly, there should be a solid presence of EA, which will create a fertile ground for developing new ventures. Finally, these layers of conditions and activities should be intertwined as a reciprocal system of interactions and relations to yield an active and lively atmosphere to support venture launches and growth endeavours, with the objective of creating new value (Stam and Van de Ven, 2019). Likewise, individual-level opportunity-seeking becomes crucial as the main driver of these intricate systems (Spigel,
and their fundamental need for certain resources become prerequisites to pursue such opportunities (Acs, Autio and Szerb, 2014; Acs et al., 2016). In other words, behind the ecosystem’s dynamics lies system-level resource distribution, and new venture creation should be considered as the mechanism driving this resource allocation. Hence, EA is driven by individuals who exploit resources for opportunity seeking (Acs et al., 2016; Autio and Levie, 2017). The above definition points towards the presence of stakeholders and conditions (e.g. institutions, finance, attitudes, infrastructure, and technology transfer) but does not provide details on the specific elements of the EE.

Table 3. Ecosystem terminology and elements

<table>
<thead>
<tr>
<th>Terminology</th>
<th>Conditions/Elements</th>
<th>Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components of industrial infrastructure for entrepreneurship</td>
<td>Institutional arrangements, resource endowments, proprietary functions</td>
<td>Van de Ven, 1993</td>
</tr>
<tr>
<td>Constituents of the ecosystem</td>
<td>Focal firm, universities and research institutes, VC, support infrastructure, entrepreneurial spirit, lead users, talent pool</td>
<td>Bahrami &amp; Evans, 1995</td>
</tr>
<tr>
<td>Entrepreneurial system</td>
<td>Business structure, socio-cultural structure, economic cycle, entrepreneurial climate, actors, opportunities, entrepreneurial events</td>
<td>Spilling, 1996</td>
</tr>
<tr>
<td>Entrepreneurial development system</td>
<td>Skills, service providers, community</td>
<td>Lichtenstein &amp; Lyons, 2001</td>
</tr>
<tr>
<td>Entrepreneurial system components</td>
<td>Incubators, spin-offs, informal network, formal network of university, government, professionals, capital sources, talent pool, large corporations, physical infrastructure, culture</td>
<td>Neck et al., 2004</td>
</tr>
<tr>
<td>Sustainable entrepreneurial ecosystem components</td>
<td>Informal and formal network, university, government, professional and support services, capital services, talent pool</td>
<td>Cohen, 2006</td>
</tr>
<tr>
<td>Domains of entrepreneurial ecosystems</td>
<td>Policy, finance, culture, supports, human capital, markets</td>
<td>Isenberg, 2011</td>
</tr>
<tr>
<td>Attributes of a successful start-up community</td>
<td>Leadership, intermediaries, network density, government, talent, support services, engagement, companies, capital</td>
<td>Feld, 2012</td>
</tr>
<tr>
<td>Attributes of entrepreneurial ecosystems</td>
<td>Culture, entrepreneurial history, worker talent, investment capital, networks, mentors/role models, policy and governance, universities, support services, physical infrastructure, open markets</td>
<td>Spigel, 2017</td>
</tr>
<tr>
<td>Structural framework of entrepreneurial ecosystems</td>
<td>Digital and spatial affordances, entrepreneurial opportunity, structures, processes, contingencies, goals, and outcomes</td>
<td>Autio et al., 2018</td>
</tr>
<tr>
<td>Key elements of entrepreneurial ecosystems</td>
<td>Framework conditions of institutions, culture, physical infrastructure, and demand and systemic conditions of networks, leadership, finance, talent, knowledge, and support services/intermediaries</td>
<td>Stam, 2015; Stam &amp; Van de Ven, 2019</td>
</tr>
</tbody>
</table>
In this regard, many scholars have been mapping out the elements and principles of a vigorous EE (Isenberg, 2010; Stam, 2015) (see Table 3). However, there is a great deal of variation in terms of the perspectives adopted regarding what constitutes a successful formation in practice and which structural configurations and location-related features influence EA. In the 90s, researchers conducted the earliest explorations of EE formations, focusing on entrepreneurship development systems arising in Western countries. ‘Components of industrial infrastructure for entrepreneurship’ (Van de Ven, 1993), ‘constituents of the ecosystem’ (Brahmi and Evans, 1995), and ‘entrepreneurial system’ (Spilling, 1996) were pioneering concepts in exploring these complex environments where supportive conditions enabled entrepreneurial action. In the 2000s, other studies followed on the ‘entrepreneurial development system’ (Lichtenstein & Lyons, 2001), ‘entrepreneurial system components’ (Neck et al., 2004), and ‘sustainable entrepreneurial ecosystem components’ (Cohen, 2006), which addressed the structural aspects of these earliest attempts.

Even though ecosystem thinking started to gain traction, it was not well-established in the mainstream literature until Isenberg’s (2010) ‘big idea’ on ‘how to start an entrepreneurial revolution’ (re)introduced the EE phenomenon by triggering a new wave of academic and political attention by moving away from other established concepts (e.g. clusters, industrial districts and innovation systems) to focus on the relevance of entrepreneurship. He presented the ‘domains of entrepreneurial ecosystems’ (Isenberg, 2011) to better illustrate the structural aspect of the ecosystem, its interrelations and its dynamic behaviour. This breakthrough was followed by studies on the ‘attributes of a successful start-up community’ (Feld, 2012, 2020), ‘attributes of entrepreneurial ecosystems’ (Spigel, 2017), ‘structural framework of entrepreneurial ecosystems’ (Autio et al., 2018) and ‘key elements of the entrepreneurial ecosystem’ (Stam, 2015; Stam and Van de Ven, 2019), all of which positioned themselves to investigate, extend and reveal the underlying dynamics of this configurational system and its role in endorsing and building resilient and sustainable structures for entrepreneurship.

Accordingly, from the previous keystone publications, a comprehensive set of terminology has been drawn (‘beloved children have many names’—a Finno-Ugric proverb) to signify a wide array of conditions and elements which directly or indirectly influence entrepreneurial action as an outcome of these multilevel dynamic exchanges in the ecosystem context. In the following section, I will cover these elements in more detail.

### 2.1.4 Entrepreneurial ecosystem elements

As seen in the previous section, the ecosystem components fall within a range of 6–12 overarching conditions and elements based on the perspective from which researchers have derived these structures. The objective is to explore the dynamics and interrelationships of the EE and its influence on EA. Therefore, I employ one of the most cited publications to clearly present this environment in two layers (Stam, 2015). Stam devised a constructive synthesis and presented a holistic view, which introduced EA as the output and aggregate value creation as the combinational outcome. It is a valuable approach to
uncovering fundamental relationships in the system in which the ecosystem is divided into framework and systemic conditions or elements which play an important role in venture development and productive entrepreneurship (Stam and Van de Ven, 2019). Framework elements represent the local conditions which set the scene and characterise the local conditions that influence systemic elements and determine the context of the system (i.e. the rules of the game). These elements are formal and informal institutions, infrastructure and market demand. However, systemic elements are the ones that directly interact with, guide and nurture venture-level activities and control human behaviour and intentions. Framework elements are always present, but systemic elements might be absent, not fully available, or inaccessible. Thus, the configuration of these elements becomes an imperative factor in enabling venture development by shaping its strategies and business model design (Autio et al., 2018; Velt, Torkkeli and Saarenketo, 2020). In other words, systemic elements reflect the EE’s moral and motivational aspects (leadership) and show the availability and quality of the required endowments (finance, talent) that are essential to launching and growing innovative and technology-intensive businesses (knowledge). All these elements are connected (networks) and embraced (support). Still, some of these elements can and should be separated into sub-elements to better illustrate their dynamic relations and impact on entrepreneurial ventures (Velt, Torkkeli and Saarenketo, 2018a) (see Table 4).

Table 4. Systemic elements and sub-elements, adapted from Stam (2015)

<table>
<thead>
<tr>
<th>Systemic elements</th>
<th>Sub-elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>- venture leadership (venture effect)</td>
</tr>
<tr>
<td>Finance</td>
<td>- bootstrapping (using own finance or reducing its role)</td>
</tr>
<tr>
<td></td>
<td>- informal capital (family, friends and ‘fools’*)</td>
</tr>
<tr>
<td></td>
<td>- business angels (private investors or a consortium)</td>
</tr>
<tr>
<td></td>
<td>- venture capital (strategic equity investors)</td>
</tr>
<tr>
<td></td>
<td>- corporate venture capital (large corporate equity investors)</td>
</tr>
<tr>
<td></td>
<td>- formal debt (banks and credit institutions)</td>
</tr>
<tr>
<td></td>
<td>- crowdfunding (community of small capital investors)</td>
</tr>
<tr>
<td>Talent</td>
<td>- entrepreneurial talent (founders and key managers)</td>
</tr>
<tr>
<td></td>
<td>- worker talent (key employees and teams)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>- explicit and tacit (data, proprietary assets, experience, skills)</td>
</tr>
<tr>
<td>Networks</td>
<td>- social networks (personal networks and social capital)</td>
</tr>
<tr>
<td>Support</td>
<td>- professionals (legal, financial, HR)</td>
</tr>
<tr>
<td></td>
<td>- intermediaries (incubators, accelerators)</td>
</tr>
<tr>
<td></td>
<td>- networking services (chambers, associations, alumni)</td>
</tr>
<tr>
<td></td>
<td>- engagement events (bootcamps, hackathons)</td>
</tr>
</tbody>
</table>

Leadership
Entrepreneurs can be seen as the leaders of organisations (Gupta, MacMillan and Surie, 2004) and are defined as ‘individuals who, through an understanding of themselves and the contexts in which they work, act on and shape opportunities that create value for their organizations, their stakeholders, and the wider society’ (Greenberg, McKone-Sweet and Wilson, 2012, p. 2) and influence and direct team performance to achieve organisational
goals involving recognition and exploration of entrepreneurial opportunities (Renko et al., 2015). The EE needs ‘champions’ to revitalise the entrepreneurial community (Roundy, 2019a) by facilitating its creation and success (Miles and Morrison, 2018) through enabling collaboration, establishing trust and legitimacy in the locality (Porras-Paez and Schmutzler, 2019) and building networks (Haines, 2016). Leadership is a critical element of initiating new ventures (Velt, Torkkeli and Saarenketo, 2018a).

Finance
Entrepreneurial finance focuses on new ventures and how they acquire and allocate financial capital. Entrepreneurs discover and generate inventions that need to be commercialised into innovative products and services (Burgelman and Hitt, 2007). However, this process is time sensitive (Suddaby, Bruton and Si, 2015) and requires considerable investment (Ebben and Johnson, 2006), making it a crucial endowment. However, bootstrapping logic might be applied, suggesting that financial resources can be obtained creatively without raising capital as credit or in exchange for equity or just by minimising the need for financial resources (Harrison et al., 2004). This is not a popular method, but non-science-based new ventures (Auschra et al., 2019) and firms led by women founders (Jayawarna, Jones and Marlow, 2015) are more likely to employ it. Similarly, most new ventures do not have sufficient funds to launch and grow their business and are considered too uncertain for formal lenders. Thus, the only capital they can access is from family, friends and other unofficial sources in the community (i.e. ‘fools’) (Chua et al., 2011; Szerb, Acs and Autio, 2013). Informal capital comes with much lower transaction costs and lower preliminary fees, the lending decisions are made quicker due to less bureaucracy, and there are typically no collateral or guarantor obligations required (Wu, Steven and Wu, 2016). Informal capital could be an indicator of a community’s tolerance towards high-risk endeavours (Velt, Torkkeli and Saarenketo, 2020).

Additionally, equity investors are considered an important source of finance; these include business angels (BAs), venture capital (VC), and corporate venture capital (CVC). BAs use their personal funds as ‘seed capital’ to invest in new ventures in their early stages (Wong, Bhatia and Freeman, 2009; Chemmanur and Fulghieri, 2014) to improve their survival prospects (Kerr, Lerner and Schoar, 2014). BAs usually tend to be regional founders (Cumming, Walz and Werth, 2016) familiar with the local conditions who invest in ventures in close proximity (Harrison, Mason and Robson, 2010) to provide hands-on support (Brown and Mason, 2017). Hence, the BA is a more informal type of equity investor (Wong, Bhatia and Freeman, 2009) who, arguably, prepares local new ventures for VC entry (Elitzur and Gavious, 2003; Malecki, 2018). Research has found that BAs are unable to satisfy the needs of swiftly internationalising start-ups, which explains their stage-wise intermediary role (Velt, Torkkeli and Saarenketo, 2018b). For this reason, VC could be considered seed investment; however, it is the most prone to facilitating the growth and scaling of new ventures (Autio et al., 2018) and entering EEs where EA is visible (Feldman, 2001; Mason, 2008). VC enables new ventures to extend their networks to internationalise to new markets, gain access to new resources and build credibility with potential partners and customers, whether internal or external to the EE (Engel and Keilbach, 2007; Chemmanur and Fulghieri, 2014; Wapshott and Mallett, 2016; Schäfer
Once adopted, the target venture becomes a pet project of VC, which it helps to govern, guide and monitor, and for which it makes executive decisions (Kaplan and Strömberg, 2001; Auschra et al., 2019; Colombo et al., 2019). However, VC’s focus on maximising returns in a short time period might conflict with the active founders’ agenda (Cumming, Werth and Zhang, 2019) by pushing the venture towards a merger or acquisition (Schillo, 2018). Similarly, CVC refers to large companies providing venture capital for high returns. In comparison to traditional VC, CVC acts as a corporate accelerator (Goswami, Mitchell and Bhagavatula, 2018). CVC has long-term investment plans, and targeted ventures should become aligned with corporate-level strategies and financial goals to take advantage of complementary corporate assets and industrial and technological expertise to improve performance (Dushnitsky and Lenox, 2006; Drover et al., 2017). Nevertheless, conflicts may arise from misaligned mission statements and asymmetries between corporate- and venture-level knowledge and commitment (Chemmanur and Fulghieri, 2014; Wu, Steven and Wu, 2016).

Furthermore, even though credit institutions advertise themselves as being a source of financial capital and venture support (Auschra et al., 2019), and despite policies having been introduced to support entrepreneurial lending (Autio et al., 2014), information asymmetry persists between banks and new ventures (Xu, Yang and Sun, 2018). Novice entrepreneurs and new ventures usually do not have the requisite collateral to receive credit (Ebben and Johnson, 2006; Zott and Huy, 2007); however, if they do, it might become practical. These institutional lenders conduct thorough due diligence by assessing venture performance, monitoring collateral violations and value changes, continuously conducting risk, feasibility, and liability analyses and lending money with fixed interest rates to help with financial planning (Winton and Yerramilli, 2008; Wu, Steven and Wu, 2016). Cooperative banks that have strong relations with local communities could be a great resource supporting the pursuit of entrepreneurial opportunities; however, they continue to be restrained by their inherent risk aversion (Ghio, Guerini and Rossi-Lamastra, 2019), which is the reason for collateral requirements in the first place. In this regard, previous studies have found that credit institutions are irrelevant to venture financing in the preliminary stages (Velt, Torkkeli and Saarenketo, 2018a) and have a hindering effect for venture development (Colombo and Grilli, 2007) and rapid internationalisation (Velt, Torkkeli and Saarenketo, 2020).

In addition, the very recent concept of crowdfunding is an innovative funding mechanism that enables new ventures to raise small amounts of capital from many individuals at once over the internet (Mollick, 2014). There are four types of crowdfunding. These are based on donations, rewards, equity and lending structure. The four types are differentiated by the motivation of the funder(s) and the types of contributions made, with all having their ethical dilemmas (Belleflamme, Omrani and Peitz, 2015; Hossain and Oparaocha, 2017). The latter two types could be the most suitable for new venture development. However, they involve strong information asymmetry because investors are relatively underinformed and can easily lose their investments in high-risk endeavours; in this regard, incorporating crowdfunding does not entail the same benefits attained from formal equity investors (Chemmanur and Fulghieri, 2014). Hence, crowdfunding as a
source for capital investment has been found to be relatively less central to the preliminary progress of new ventures (Velt, Torkkeli and Saarenketo, 2018b).

**Talent**
The availability of and access to a ‘melting pot of talents’ (Grabher, 2002) are vital criteria for developing a vivacious and dynamic EE (Cohen, 2006; Qian, Acs and Stough, 2013). Talented people are a fundamental force that enables entrepreneurial action and are very visible in more diverse and welcoming localities (Lee, Florida and Acs, 2004). These localities will prosper when there is a continuous flow of talented individuals interacting and pursuing entrepreneurial endeavours (Autio et al., 2018). Thus, an EE with high levels of talent further attracts other highly-skilled workers with suitable entrepreneurial, managerial and technical competences to pursue challenges with the aim of creating new value (Bliemel et al., 2019; Brown et al., 2019; Feld, 2020). Such an environment is crucial in nurturing new ventures (Thomas, Sharapov and Autio, 2018; Auschra et al., 2019); moreover, maintaining it appropriately curbs the relocation of talented and visionary people (Neck et al., 2004) and initiates a cyclical process to attract others of their kind to the locality (Florida, 2002) to further facilitate EA (Audretsch and Belitski, 2017). In addition, there is a constant rotation occurring as people move between ventures; some stay employed, and some start their own businesses (Cohen, 2006). Following this logic, talent can be divided into two categories: entrepreneurial talent defined as ‘the ability to discover, select, process, interpret and use the data necessary to take decisions in an uncertain world and, then, to exploit market opportunities’ (Ferrante, 2005, p. 169); and the talent of workers who use their specific skill sets to assist entrepreneurs to develop new ventures (Spigel, 2017). Entrepreneurial talent is the most critical element when launching and growing new ventures (Velt, Torkkeli and Saarenketo, 2018a, 2018b, 2020), which is well-aligned with investors’ philosophy of ‘betting on the jockey, not the horse’. Worker talent becomes more critical once a new venture moves forward along its life cycle.

**Knowledge**
The availability of and access to new knowledge are critical requirements for innovation-driven international firms (Oviatt and McDougall, 1994, 2005). Firms that are unable to develop such endowments by themselves (Huggins and Thompson, 2015) must screen and absorb it through knowledge spillovers (Katila, 2002; Qian, Acs and Stough, 2013). Entrepreneurs identify opportunities for exploiting these spillovers to initiate new ventures to commercialise this uncovered knowledge by converting it to economic knowledge which, in turn, enables them to enter new markets to sustain economic value creation (Acs et al., 2009, 2018; Acs, Audretsch and Lehmann, 2013). In other words, local talent is the source of the entrepreneurial absorptive capacity required to sense and seize spillovers, from which new knowledge is created, leading to business opportunities and the further promotion of EA (Qian and Acs, 2013; Qian, Acs and Stough, 2013). In addition, a shared knowledge base in an EE affects not only opportunity creation but also business model innovation and scale-up; these are facilitated locally by spatial affordances and globally by digital affordances (Autio et al., 2018). Thus, a healthy EE is
associated with internal and external spillover absorption, as well as new knowledge creation and accumulation, to enable reaching higher levels of productivity (Acs et al., 2016). Even though knowledge is studied in multiple dimensions (Zander and Kogut, 1995; Simonin, 2004; Dufva and Ahlvist, 2015; Maravilhas and Martins, 2019), the main emphasis is placed on tacit and explicit knowledge. Tacit knowledge is related to individual skills that are dependent on the context and are practice- and experience-driven, while explicit knowledge can be coded and articulated and is easier to transfer (Polanyi, 1967; Simonin, 1999). However, tacit and explicit knowledge are conjoined and interdependent (Cairó Battistutti and Bork, 2017); therefore, they should be considered inseparable in practice. Knowledge is a critical element in the EE context to sustain and advance EA and performance outcomes (Carayannis, Provance and Grigoroudis, 2016; Horváth and Rabetino, 2019).

**Networks**

Networks, which consist of ties connected through nodes, represent structures and patterns of connections (Ahuja, Soda and Zaheer, 2012). Furthermore, networks are either self-organised and self-regulated by organisations, individuals and groups (Casper, 2007; Weber and Khademian, 2008; Mason and Brown, 2014) or are configured by architects (Moser, Ganley and Groenewegen, 2013; Spigel, 2017) to cooperate in obtaining and distributing resources (e.g. talent, capital), knowledge, information, activities and capabilities (Bryson, Crosby and Stone, 2006) to build and leverage the values, innovation, trust and legitimacy relevant to new ventures (e.g. via digital affordances) (Autio et al., 2018; Du et al., 2018). Hence, local and international networks facilitate social capital movements that help to sustain EE dynamics and successful EA (Audretsch and Keilbach, 2004; Malecki, 2018; Theodoraki, Messeghem and Rice, 2018). Social entrepreneurship, social networks, and social enterprises have been focal points in the recent years in emphasising the centrality of networks and social capital movements in the EE construct (Neumeyer, Santos and Morris, 2019; Pittz, White and Zoller, 2019) and its imperative role in sustainable EE development (Cohen, 2006).

**Support Systems**

Professionals form a collective support mechanism that enables new ventures to focus on their core activities of commercialising new value and outsourcing background activities to expert service providers (Bahrami and Evans, 1995). Individual professional (e.g. mentors, consultants) and specialised organisations offer a multitude of services (e.g. technical, financial, accounting, legal, head-hunting, market intelligence, advertising, real estate) (Wolpert, 2002; Levie and Autio, 2008; Spigel, 2017; Brush et al., 2019). These services support venture development and facilitate information and knowledge flows in order to improve innovation capabilities (Zhang and Li, 2010) through interaction with other organisations and industries (Wolpert, 2002) involved in the local EE. Outsourcing these services mitigates the risk of interruptions in the innovation process (Saxenian, 1990) and leads to aggregate cost advantages (McEvily and Zaheer, 1999) in terms of time and finances spent and diminished tensions and stress.
Moreover, intermediaries play an essential role in developing new ventures during their preliminary stages (Barbero et al., 2014; Spigel, 2017; Auschra et al., 2019; Cohen et al., 2019). A vital EE includes ‘a solid presence of effective, visible, well-integrated accelerators and incubators’ (Feld, 2020, p. 204) which speed up new venture development and improve their survivability (Pauwels et al., 2016) by mediating expertise between the organisational and environmental levels (i.e. by connecting, developing, coordinating, and selecting) (Goswami, Mitchell and Bhagavatula, 2018). These intermediaries educate and mentor firms; enable access to office services, scouting and brokering resources (e.g. finance, talent); disseminate knowledge and expertise, extend venture networks and share market data (Bøllingtoft and Ulhøi, 2005; Carayannis and von Zedtwitz, 2005; Howells, 2006; Cohen and Hochberg, 2014; Autio et al., 2018; Bliemel et al., 2019; Brown et al., 2019; Brush et al., 2019). Moreover, intermediaries are essential in validating ventures and improving commitment to driving ecosystems (Goswami, Mitchell and Bhagavatula, 2018). However, there are slight differences between intermediaries. Arguably, incubators focus mostly on very early-stage ventures with novice founders of potentially scalable businesses but who take their time to graduate (Isabelle, 2013; Stagars, 2015), while accelerators concentrate on already established knowledge-intensive ventures by endorsing and certifying their rapid growth (Bosma and Stam, 2012; Pauwels et al., 2016).

Furthermore, networking services (e.g. trade and industry associations, supply chain networks, alumni) provide networking support and enable information exchange and other relevant interactions (Saxenian, 1990; McEvily and Zaheer, 1999; Howells, 2006; Suresh and Ramraj, 2012) to allow new ventures to obtain required resources for further development. In addition, online social media and networking sites (e.g. LinkedIn, Twitter, Instagram) facilitate and promote the movement and exchange of social capital to develop relationships (Nicotra et al., 2018), acquire certain knowledge (Carayannis, Provance and Grigoroudis, 2016), and adjust attendees’ business models (Neumeyer and Santos, 2018). Thus, social platforms are more than just simple networking constructs and could be a fruitful avenue to determine networking performance (Credit, Mack and Mayer, 2018).

Lastly, engagement events where local EE stakeholders (e.g. founders, BAs, VC, community members) gather and cooperate by initiating, pursuing and assembling new inventions and innovations play a crucial role in motivating new ventures to launch and grow (Feld, 2020). These challenge-driven events (e.g. social events, meet-ups, start-up weekends, bootcamps, hackathons, education programmes) are crucial to charming and motivating a new generation of founders to discover new ideas to pursue (Autio et al., 2018), as well as to validate their business models, acquire new resources, extend their networks, and enable sales activities (Sarma and Sunny, 2017; Velt, Torkkel and Saarenketo, 2018a; Auschra et al., 2019). Successful participants therefore receive invitations as prizes to continue either to build on their hard work with incubators and accelerators (Stam, 2015; Harrington, 2016, 2017) or to use those events as marketing platforms.

To sum up, I have concisely introduced the EE concept: its roots, lineages and what it stands for in comparison to other types of ecosystems. Additionally, I have provided an
overview of the EE phenomenon, its formation and structural conditions by highlighting 16 elements relevant to this research inquiry. As the stage is now set, I will move forward with EA by explaining its relevance and focus on a specific type of best-in-class ventures—BG start-ups—which require a certain set of elements as a catalyst to thrive in their locality.

2.2 Entrepreneurial activity

In this section, I will provide an overview of EA and prior research assessing EE conditions with respect to it. Further, I will focus on a specific type of new venture to elaborate the ecosystem configuration and dynamics that are beneficial for the rapid development of internationalisation and consequent performance.

2.2.1 Entrepreneurial activity in context

EE directly enables and limits EA and subsequent value creation (Stam, 2015). Moreover, based on its configuration, the ecosystem incorporates a set of entrepreneurial elements that ensure its efficient and sustainable functionality to promote these activities further. Thus, to launch and grow new ventures, there should be a solid presence of productive entrepreneurs (Stam and Van de Ven, 2019). As stated earlier, there is system-level resource distribution, and new venture creation is driven by entrepreneurial founders who are considered the mechanism coordinating these resource allocations (Acs, Autio and Szerb, 2014). Hence, EA is led by individuals who exploit resources to seek opportunities (Acs et al., 2016; Autio and Levie, 2017) and have strong perceptions and interconnections aimed at continuously creating and scanning for these opportunities in and from their respective contexts to create economic, societal and environmental value (Wennekers and Thurik, 1999; Parker, 2009; Neumeyer and Santos, 2018). Through this process, they motivate others to join and (re)start new ventures by initiating the ‘flexible re-cycling’ of entrepreneurs (Bahrami and Evans, 1995).

Even though the elements in a local ecosystem encourage productive EA (Stam, 2015), entrepreneurial performance differs systematically across regional settings, depending on their unique framework, which is reflected by their start-up patterns (Kuivalainen, Saarenketo and Puumalainen, 2012). These arrangements become visible when entrepreneurs strategically utilise these elements (e.g. BAs versus VC) based on their relative applicability and availability in the system (Autio et al., 2014; Acs et al., 2016; Song, 2019). Hence, there is a direct link between system-level EE configuration and its conditioning of firm-level entrepreneurial intention and action. In addition, to acknowledge these patterns, it is imperative to investigate these elements further and explore their dynamics in enabling venture development, their connections and which are crucial in supporting new venture launch and growth (Cavallo, Ghezzi and Balocco, 2019).

Previous empirical attempts have investigated these conditions from the macro-level using regional- and country-level data and indices mostly obtained from secondary sources (Acs, Autio and Szerb, 2014; Lafuente, Szerb and Acs, 2016; Audretsch and Belitski,
2.2 Entrepreneurial activity

2.2.1 Entrepreneurial activity

Entrepreneurial activity has been investigated using various data sources (Acs et al., 2017; Bruns et al., 2017; Content et al., 2020). At the meso-level, structures like ‘smart’ cities, urban systems, municipalities, joint ventures, research projects, industries have been investigated using various data sources (Audretsch et al., 2012; Nylund and Cohen, 2017; Audretsch and Link, 2019; Barba-Sánchez, Arias-Antúnez and Orozco-Barbosa, 2019; Lai and Vonortas, 2019; Nepelski, Van Roy and Pesole, 2019). At the micro-level, the research focus has been on entrepreneurs and new ventures and employed mostly primary data (Audretsch et al., 2012; Nylund and Cohen, 2017; Audretsch and Link, 2019; Barba-Sánchez, Arias-Antúnez and Orozco-Barbosa, 2019; Lai and Vonortas, 2019; Nepelski, Van Roy and Pesole, 2019). At the micro-level, the research focus has been on entrepreneurs and new ventures and employed mostly primary data (Schillo, 2018; Bischoff, 2019; Cumming, Werth and Zhang, 2019; Ghio, Guerini and Rossi-Lamastra, 2019; Simmons et al., 2019; Sperber and Linder, 2019; Xie, Xie and Martinez-Climent, 2019). As seen in recent years, assessment efforts from the micro-level perspective have gained traction; unfortunately, they only focus on some of the micro-foundational aspects (e.g. gender, failure, VC, internet) and do not incorporate a more holistic view by utilising the bottom-up approach to evaluate the structural and dynamic facets of the construct, which would provide useful contrast versus the previous macro- and meso-level studies that have employed a top-down approach.

Therefore, my attempt to focus on the EE configuration and dynamics seen by entrepreneurial founders is still timely and relevant. Ergo, to assess EE constructs, it is important to focus on the EA that has the highest potential to prosper by taking full advantage of what the local ecosystem can provide. Hence, I will focus on the ‘born global’ type of new ventures (Knight and Cavusgil, 1996; Kuivalainen, Sundqvist and Servais, 2007; Kuivalainen et al., 2012), which outperform other firms in the ecosystem, for example in revenue and team growth (Braunerhjelm and Halldin, 2019). This focus will allow me to best capture the full exploitation of EE support in relation to internationalisation (Dabić et al., 2019). To my knowledge, this is the first attempt to bring these two fascinating phenomena under one research framework and to introduce EE to IE research with the aim of tackling the issue of the fragmentation of the field (Knight and Liesch, 2016). I will discuss BGs in detail in the following section.

2.2.2 Born global start-ups

The BG is part of a typology constructed to comprehend a category of new ventures that, from their inception, have followed a rapid growth model and internationalise very early, though these ventures are relative novices, young, small, and suffer from resource constraints (Oviatt and McDougall, 1994; Knight and Cavusgil, 1996). The traditional internationalisation frameworks (Vahlne and Johanson, 2017) have been unable to explain this new phenomenon and its international aspirations. Thus, this form of EA has been broadly defined as ‘the cognitive and behavioural processes associated with the creation and exchange of value through the identification and exploitation of opportunities that cross national borders’ (Peiris, Akoorie and Sinha, 2012, p. 296). This highlighted the significance of the entrepreneur (Madsen and Servais, 1997, 2017) and founded the IE research field as focusing on a variety of firms with the common denominator of achieving an international presence, regardless of their attributes. One of these new ven-
Theoretical background

Ventures was referred to as ‘born global’ (Knight and Cavusgil, 1996), which, ‘from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries’ (Oviatt and McDougall, 1994, p. 49). These ventures have a strong drive to innovate and develop ‘particular types of knowledge, which drives the development of organisational capabilities that support early internationalisation and superior performance in diverse international markets’ (Knight and Cavusgil, 2004, p. 135). Hence, the EE and the BG both articulate the relevance of entrepreneurs and their role in launching new ventures in a nurturing environment to pursue a global agenda. This renders the context significant and makes possible placing the BG phenomenon into the EE framework, as well as aligning and connecting BG research streams with the EE to reflect this construct (Øyna and Alon, 2018).

Furthermore, new ventures with strong innovation capability and early and rapid foreign deployment, which have been under the microscope for decades and subjected to thorough theoretical and practical scrutiny, have been labelled in various ways. The most studied terms are ‘international new ventures’ (Oviatt and McDougall, 1994) and ‘born globals’ (Rennie, 1993; Knight and Cavusgil, 1996), which have been used interchangeably. However, their classifications vary substantially; thus, their definitions should be aligned in terms of their international performance outcomes measured by speed of internationalisation, scale of export sales and scope of markets entered (Madsen, 2013). Additionally, other terms have been used, such as ‘high-tech start-ups’ (Jolly, Alahuhta and Jeannet, 1992), ‘global start-ups’ (part of the international new venture classification) (Oviatt and McDougall, 1994), ‘instant internationals’ (Preece, Miles and Baetz, 1999), ‘micromultinationals’ (Dimitratos et al., 2003), ‘entrepreneurial start-ups’ (Sorensen and Sorenson, 2003), ‘born-international SMEs’ (part of the born global classification) (Kundu and Katz, 2003), ‘early internationals’ (Aspelund and Moen, 2005) and ‘high-growth start-ups’ (Mason and Brown, 2014; Acs et al., 2016). All of these labels denote ‘young, entrepreneurial start-ups that initiate international business soon after their inception’ (Knight and Cavusgil, 2004; Cavusgil and Knight, 2015, p. 3), showing not only that there is a great deal of fragmentation in IE (Paul and Rosado-Serrano, 2019) but also that the EE could be a useful framework for elaboration. After this realisation, the label ‘BG’ was seen as the best example to highlight the global potential that this concept inherently possesses.

Additionally, BGs are driven ‘by distinctive entrepreneurial prowess, typically championed by founders or managers’ who ‘explicitly or implicitly view the world as their marketplace’ and whose new ventures ‘derive a significant portion of their revenue from international sales’, ‘exhibit a high degree of international entrepreneurial orientation’, and, even though they are ‘relatively small in scale and limited in tangible resources’, ‘usually are endowed with distinctive intangible resources and capabilities’ and are ‘especially adept at allocating their resources under asset parsimony’ (Cavusgil and Knight, 2015, p. 4). In this respect, BGs are operationalised by top-notch entrepreneurial and worker talent with a global mindset who are willing to take risks. Further, they incorporate innovative products and services to target global demand, establish extensive networks to collaborate with their value-chain partners and are relatively better at attaining sales revenues and
2.2 Entrepreneurial activity

attracting best talent (Coviello, 2006; Zhou, Wu and Luo, 2007; Nummela, Saarenketo and Puumalainen, 2009; Cavusgil and Knight, 2015; Torkkeli, Nummela and Saarenketo, 2018; Braunerhjelm and Halldin, 2019). Also, BGs are highly dependent on their local environment and its support to deal with resource scarcity (Sasi and Arenius, 2012) and facilitate rapid development (Nummela, Saarenketo and Loane, 2016) targeting international markets (Zander, McDougall and Rose, 2015). Hence, as EE studies constantly draw attention to productive entrepreneurship and growth-oriented ventures as the output of the ecosystem (Mason and Brown, 2014; Alvedalen and Boschma, 2017; Stam and Van de Ven, 2019), the BG turns out to be a suitable form of EA to explain the system and firm-level interactions. In addition, its internationalisation mission harmonises with new ventures’ capacity to extend their networks externally from their locality to acquire new knowledge and other endowments (Autio et al., 2018).

Moreover, in the organisational life-cycle field, firms are seen as interacting with their surrounding environment to acquire relevant resources to encourage screening for opportunities to drive further growth (Penrose, 1952). Life-cycle stages differ in terms of certain strategies and structures required for ventures to progress (Chandler, 2003): each stage has a ‘unique configuration of variables related to organizational context, strategy, and structure’ (Hanks, 1990, p. 1), and certain issues need to be addressed and coped with (Kazanjian and Drazin, 1989). In general, there are four to five stages which a firm passes through (Kazanjian and Drazin, 1989; Lester, Parnell and Carraher, 2003); however, in specific cases, some firms tend to skip these stages (or fall back into previous ones) (Miller and Friesen, 1984) by ‘leapfrogging’ (Hedlund and Kverneland, 1985) or rapidly moving from one to another (Marmer et al., 2012). These are typical features visible during BG progress (Freeman and Cavusgil, 2007). Therefore, researchers have found studying this behaviour imperative. For this purpose, they integrate the BG’s development, internationalisation activities and life-cycle stages into one framework to explore the progress of a BG during its lifespan (Gabrielsson, Sasi and Darling, 2004; Luostarinen and Gabrielsson, 2007; Gabrielsson, Gabrielsson and Dimitratos, 2014). In the EE context, start-up-focused life cycles become better prepared to explain stage-wise movements (Marmer et al., 2012; Autio et al., 2018) and able to integrate EE-associated structural and processual activities (i.e. stand-up, start-up and scale-up) with venture life-cycle stages (i.e. discovery, validation, efficiency, scale) to further explore BGs in ecosystem contexts. These stages generally encompass the entrepreneurial processes of forming and founding suitable teams and working on value proposals (i.e. stand-up, discovery), validating these proposals and business development via local endowments (i.e. start-up, validation), initiating aggressive growth and ensuring efficiency in customer acquisition (i.e. scale-up, efficiency and scale). Hence, this perspective would enable the exploration of the dynamic interactions between the systemic elements and their stage-related effects on the venture level.

Next, considering that the internationalisation process which BGs actively pursue (Kuivalainen et al., 2012; Kuivalainen, Saarenketo and Puumalainen, 2012) is contingent on the surrounding environment, the role of the local EE should be emphasised (Coviello,
2006; Andersson, Evers and Griot, 2013). However, the internationalisation process exposes firms to other peripheral EEs and global demand, shifting the focus of the local EE to compete with these external forces, whereby it arguably loses some of its effect. For example, when start-ups are established in a locality, they extend their networks and social capital to link with other EEs to acquire knowledge and resources (Schäfer and Henn, 2018). This is especially visible in small countries where there is a high concentration of BG start-ups which must internationalise to sustain their competitiveness (Cavusgil and Knight, 2015). In other words, the international environment takes over some of the responsibilities as their importance grows during and after internationalisation has been undertaken to compensate for the deficiencies involved with the local EE (Mahroum, 2016), which might even lead to start-up relocation (Velt, Torkkeli and Saarenketo, 2018a). Nevertheless, both internal and external contexts play an important role during the life-cycle stages when catering to the needs of a new venture whilst enduring this pull-and-push relationship. It is not a clear-cut effect, but it is relevant to consider the power-play between internal and external systems facilitated by internationalisation activity while emphasising the local ecosystem’s impact on the start-up development of the BG. Thus, it is appropriate to limit the investigation to the preliminary stages of discovery (stand-up) and validation (start-up) to control and assess the home-ground effects when the BG has commenced internationalisation but has not yet begun its full scaling activities.

In summary, BG start-ups are a fascinating breed of ventures that are run by top-line entrepreneurs and arise from the efforts of their founder(s) and aligned with what the local EE can provide. Hence, a true BG can be considered a benchmark of ecosystem vitality. In the next section, I will combine the EE and BG theories into one framework.

2.3 Theoretical integration

In the previous section, the BG theory was presented by demonstrating its dependency on the local environment. However, to comply with their needs, BGs internationalise rapidly to connect with external demand and resource endowments to maintain momentum. In this section, I will dovetail both theories into the theoretical framework that I have been developing through my dissertation work.

When incorporating all the contingent aspects into the framework, the systemic structure of the ecosystem presents a wide array of elements, each exerting its own effect on BG start-up development in the preliminary stages (Mason and Brown, 2014). The EE construct highlights EA as the principal avenue distinguishing it from other types of ecosystems (Acs, Autio and Szerb, 2014; Lafuente, Szerb and Acs, 2016; Scaringella and Radziwon, 2018); EA is used to represent the combined output of this interrelated system. EA can be presented as a form of entrepreneurial employee activity, innovative start-ups, or high-growth start-ups (Stam, 2015). Hence, the EE framework emphasises the relevance of entrepreneurial action seen from many viewpoints. I have aligned my work with this notion; however, I argue that the best way to elaborate the function and role of the
2.3 Theoretical integration

EE is to operationalise the most prolific type of firms as the output, which inherently utilises all aspects of the construct. Thus, the BG emphasis, through its internationalisation aspects, would reflect the local EE conditions in terms of similar external counterparts.

As discussed, BG start-ups incorporate the best entrepreneurial talent in pursuit of novel inventions and innovations to create global value. Therefore, I see two main points of convergence. Firstly, both the BG and the EE phenomena focus on EA. Entrepreneurial talent creates ventures and, through collective actions, drives and regulates its entrepreneurial environment. Thus, the role of entrepreneurial talent is imperative for both concepts. Secondly, they both have deficiencies. The BG is a fast mover from its inception; however, due to its liabilities of smallness, newness, foreignness and rapid growth, it requires a certain mix of endowments to enable its development. These endowments are usually depicted as systemic elements present in the local context, and if any element becomes a bottleneck, then this demonstrates the weakest links amongst EE responsibilities (Acs, Autio and Szerb, 2014; Acs et al., 2016). In other words, BGs internationalise not just to follow market demand but also to extend their networks to acquire relevant endowments from external sources if not present locally (Autio et al., 2018; Song, 2019). Consequently, if this becomes a visible pattern, it will directly reflect local environmental conditions and enable the assessment of their vitality and performance. A simple representation of the importance of local supply and demand might be this: a plant grows as only as well as its soil allows.

In addition, I have observed from the BG start-up studies that all systemic elements have received some attention, for example leadership (Mets, 2015), financial capital (Gabrielsson, Sasi and Darling, 2004; Gabrielsson et al., 2008), talent (Luostarinen and Gabrielsson, 2004; Jantunen et al., 2008), networks (Gabrielsson and Kirpalani, 2004; Laanti, Gabrielsson and Gabrielsson, 2007), knowledge (Loane, Bell and McNaughton, 2007; Rialp, Galván-Sánchez and García, 2012) and support (Pauwels et al., 2016; Harrington, 2017). Further, in these studies, the EE construct is aligned with streams from the BG (Øyna and Alon, 2018) and internationalisation (Dabić et al., 2019) literature. However, these studies usually do not consider all of the systemic elements at once to reflect their dynamic behaviour. Thus, a holistic illustration becomes appropriate. To address this gap, I have integrated the BG start-up life-cycle model to enable exploration of the dynamic changes that occur between the systemic elements and their stage-related effects on the venture level. The combined framework is presented below (see Figure 3).
In conclusion, the ecosystem phenomenon has gained a great deal of traction in recent years and drawing on its widespread use in practice, a typology was developed. Taking this as a point of departure, I focus on the entrepreneurship aspect to acknowledge its relevance in creating fertile ground for BG start-up development. Likewise, to understand the dynamics of this system, I have divided the systemic aspects into 16 elements to present the local endowments relevant to launching and growing firms that create communal value. The best representation of these entrepreneurial endeavours are BG start-ups, which, despite their deficiencies, manage to rapidly expand their international presence. However, to shed more light on the systemic and venture-level interactions, I concentrate on the preliminary stages of the new venture to elaborate its stage-wise dynamics by exploring which elements are critical antecedents for BG start-up progress and internationalisation. In the next chapter, I will provide the rationale for the research design and explain the methodological aspects of this inquiry.
3 Research design and methods

In this chapter, I will elaborate the design of the doctoral research, which is conducted in six phases, and explain its theoretical focus as it aligns with publication process, my individual strategic activity plan for preparation, progression and completion of my investigation, as well as establishing an empirical outline. Each of these layers and phases will be discussed in an integrated manner.

3.1 Research design

In this research arena, it is important to understand that we are exploring real-life phenomena (i.e. EEs and BGs) and studying their interconnections and fundamental dynamics. In empirical research, this line of investigation of relationships through observations is immensely valuable, particularly in management studies (Helfat, 2007), and to conduct empirical research, a well-designed research agenda should be in place involving a series of activities that are critical to discovering the answers to proposed research problems (Sinkovics and Alfoldi, 2012; Sekaran and Bougie, 2016). Hence, my research process incorporates six temporal phases; each corresponds to a certain period, with its activities, from the start of my journey to the final steps of finalising this dissertation. These activities are divided into five layers in order to group these processes in a logical and comprehensive manner (see Figure 4).

The first layer shows the theoretical focus and how it has changed. When moving into the ecosystem field, there was a great deal of confusion regarding the aggregate level of ecosystem research as many different types have been employed interchangeably. As noted in the previous chapter, we have four main types of ecosystems—business, entrepreneurship, innovation and knowledge—all of which are connected to new venture development; however, the difference is in the perspective adopted. Hence, as the focus is on new venture creation, the entrepreneurial side becomes the most appropriate as other types arguably build on already incorporated forms of organisations. Thus, these ecosystem types have common theoretical underpinnings but distinct aims in addressing new venture development. In addition, inherent in the EE construct, structural conditions are established to enable productive entrepreneurship and integrate EA into the output of the systemic interactions and dynamics (Stam and Van de Ven, 2019). Therefore, it was critical to include this aspect by reflecting it in terms of specific types of firms that, from their inception, create new knowledge and value. However, I also argue that every local EE is in competition with other ecosystems (like real-estate companies competing for key tenants), and there is competition between the internal and external environments. This led me to introduce the lens of the organisational life cycle to better comprehend how the local EE nurtures these rapidly growing firms with strong demand for various endowments with respect to their preliminary stages. In light of the above, the first layer represents the progress and refinement of my theoretical framework development.
Figure 4. Research design of dissertation, adapted from Sinkovics and Alfoldi (2012)
3.1 Research design

The second layer depicts the publication process. In this connection, I have had three journal articles and one book chapter published. The journal article, situated as the first publication, has been a work in progress and is the last one to be published. The reasoning is that when I started my research, it was imperative to establish the theoretical ground to be able to navigate the research realm. Hence, I continuously reviewed and mapped the topics arranged in the first layer and updated them when necessary. This work in progress was critical to comprehending the complexities of the ecosystem- and new-venture-related literature, and as I reached the completion of my dissertation process, it became appropriate to publish one part of this extensive work. The second publication was more concrete in bringing together the EE elements and BG start-up research to build the founder’s roadmap, and the best place to do this was in the land of the ‘start-up mafia’, namely Estonia, one of the largest ‘unicorn’ creators per capita in Europe (Quack, 2018). The essence of this inquiry was to acknowledge critical aspects of how ecosystem elements influence the launch of new ventures and growth, as well as how founders understand their surrounding ecosystem. The results were quite interesting, but they were arrived at in the context of only one small country; therefore, I had to validate the results. For this, I made an additional round of data gathering to assess another small country with a high level of BG firms. The best candidate was our northern neighbour, Finland. Both countries are similar due to their Finnic roots, while their differences arise from their historical background. Finland has enjoyed the full potential of a market economy, while Estonia has regained its independence from a planned economy. This arguably made for an interesting point of comparison. Thus, the third publication focused on juxtaposing the related findings, and despite their different economic paths, many aspects regarding new venture development and ecosystem construct were nonetheless aligned. These findings were essential to preparing the ground for the last inquiry. Thus, the fourth publication was a more conceptual one, and as it was in book chapter format, it allowed me to theorise on the ‘transnational’ aspects of the phenomenon by opening up the possibility of ‘what if’ both communities were to converge their local ecosystems to balance each other’s weaknesses and enhance their strengths to produce a more prevalent vital regional environment to nurture BG start-ups. Arguably, the potential is there, and the right set of policies would make this peripheral region more attractive to entrepreneurial talent to generate new knowledge and facilitate required resource provision. In sum, all of these publications are well-positioned to maximise the effectiveness of my research efforts and demonstrate the theoretical and practical underpinnings relevant to the present dissertation, as well as to bring it to a successful conclusion.

Moreover, the third layer shows the cyclical process of my work, from considering how to build the founder’s roadmap until finalising my dissertation. It involves strategic, tactical and operational activities presented as preparation, progression and completion procedures. The process started with the agenda to explore the EE construct and how it is involved with new venture creation. This understanding was necessary to reflect a founder’s roadmap for practical reasons, which morphed into a mechanism of initiation into establishing my theoretical framework and launching empirical investigations. Thus, choosing the appropriate research field and topics by reviewing this large body of literature became critical to pinpointing and adjusting my research focus. Running bibliometric
and bibliographic inquiries and conducting literature reviews is essential to covering the main aspects of any given subject, the understanding of which builds up over time. Hence, it had to be a continuous process. Also, negotiating access to data to conduct the empirical investigations was another imperative matter to be addressed during the preparation activities. Similarly, once the groundwork was completed, further steps needed to be strategically and tactically planned before operationalising the next steps of activities. The progression of these steps involved creating and testing the survey method to be employed for data collection and verifying its appropriateness. Afterwards, data gathering from the two country contexts could begin, after which the data had to be verified and examined accordingly. This was followed by comparison and analysis of this primary data and its results and reflecting upon and discussing it in light of previous findings. The final step was drawing meaningful conclusions and presenting the results to the wider public. Even so, between the preparation and progression activities, there was a continuous feedback loop, which made all these processes iterative and symbiotic. After going through these steps, the dissertation could be drawn up and completed.

Finally, the empirical outline consists of two layers of the state of the art and investigation. The former is relevant to setting the scene and begins with a comprehensive understanding of the literature. Reviewing previous literature enabled gap spotting and confirming the issues to which the research field is currently dedicated. Hence, a solid literature review is the baseline from which to discover these voids and try to fill them in with new knowledge. This knowledge was derived from a certain set of research questions that I chose to focus on to guide my empirical efforts. To answer these questions, I needed to consider an appropriate set of methods to employ. To this end, every empirical inquiry should be discussed by reflecting upon previous research and conclude with new research avenues to be explored. Therefore, it was critical to prepare the ground for the research and connect it to previous literature to create an overview of the relevant gaps in and findings of that literature and, subsequently, to conduct specific empirical investigations to observe and support this pre-established agenda. Hence, the two main methodological aspects utilised were bibliometric and systematic reviews of the literature to set the scene for further inquiry and empirical investigation to advance our knowledge on the particulars of the matters of inquiry and to create new knowledge by answering the pre-defined research questions.

3.2 Dissertation process in phases

In this section, I will describe the dissertation phases and present these in a consecutive format to make a storyline.

Phase 1: Introduction to the field
I have been following new venture creation from a practical standpoint, namely from entrepreneurship- and innovation-related policies and reports introduced by governments, the OECD, Babson College, and start-up foundations around the world, amongst others. Coming from the start-up-rich nation of Estonia, I have always found it intriguing how
these firms are launched and developed and how the surrounding environment supports or hinders such activities. The main motivation to conduct my doctoral dissertation is rooted in my personal endeavour to describe a roadmap for novice founders like myself in order to gain relevant insights to crack the code on how to successfully launch a new venture. When I started my investigation while conducting my undergraduate studies, the EE research field was just forming and, in some sense, it still is (Velt, Torkkeli and Laine, 2020).

Subsequently, my introduction to academia started with a knowledge gap, and I needed to comprehend the ecosystem phenomenon at a deeper level. It was imperative that my research framework be established in light of the newest theoretical advances and built on the ‘shoulders of giants’. However, even though more than two decades had passed from the time when Moore (1993) brought the ecosystem concept from biology to business and management studies, it was still confusing for me as a newcomer to grasp the complexity of the topic. There was a great deal of uncertainty regarding which direction to take and on which to concentrate. After preparing my first review to make sense of the stream and connect it to new venture creation, the puzzle received its first corner piece. There are many differences amongst the types of ecosystems, and it was not a mere buzzword, as noted by recent works (Jacobides, Cennamo and Gawer, 2018; Scaringella and Radziwon, 2018). Hence, it became clear that even though a ‘business’, ‘innovation’ and ‘knowledge’ emphasis is an integral part of new venture development, previous concepts do not focus on the entrepreneurship facet and could not elaborate the context in which or how this activity occurs. Therefore, the entrepreneurial ecosystem became prevalent in related research.

Phase 2: Connecting the dots
An entrepreneurship focus is not something new per se as it is an important mechanism for economic development and has been the topic of debate between Schumpeterian and Kirznerian schools of thought; however, its role for the present context (e.g. the country level) remained vague until the establishment of the EE construct (i.e. National Systems of Entrepreneurship) (Acs, Autio and Szerb, 2014; Acs et al., 2016). However, this was not the first time researchers noticed an interdependency between entrepreneurship and its context (Van de Ven, 1993; Bahrami and Evans, 1995; Spilling, 1996), which makes the ecosystem a relevant topic to address the complexities, interdependencies and dynamics underlying the surrounding environment, the main purpose of which is to support entrepreneurial development (Cohen, 2006; Isenberg, 2010). Hence, the EE is a relevant context to be considered when exploring entrepreneurship as an economic, societal and environmental value-creation mechanism (Wennekers and Thurik, 1999; Parker, 2009).

Meanwhile, acknowledging that the EE is the most appropriate construct to employ when focusing on new venture creation, I continued my efforts to gather and assess relevant literature to investigate the phenomenon further. At first, it was not a simple task because, as noted in the theory chapter, there were not many studies available using the search terms ‘ecosystem’ or ‘entrepreneurial ecosystem’; thus, I had to investigate the bibliometric reference lists to uncover their lineages. Hence, I found that some researchers have
been investigating the phenomenon by observing and mapping structural constituents and components of entrepreneurial environments in certain localities around the Western world (Bahrami and Evans, 1995; Lichtenstein and Lyons, 2001; Neck et al., 2004). This became the second piece of the puzzle by enabling the exploration of the mechanism underlying the complex system, and my attention was drawn to its elements and conditions, which interact with and enable productive entrepreneurship (Stam, 2015). The more I dug into the literature, the better I became at the bibliometric review technique. Hence, this phase made me appreciate not only the groundwork but also the acquisition of a valuable method to improve my academic proficiency. Thus, I was determined to continue working on it so that I would be able to produce a solid research publication based on this foundation (see Publication I).

Phase 3: Going for a deep dive
As I worked my way through the ecosystem concept and adjusted my sights towards the EE phenomenon and its underlying structure, I noticed that the deeper it went, the more sophisticated it became. Not only does the EE framework consist of layers of elements which have different effects on entrepreneurial action; these also include sub-elements that all play complementary and supplementary roles in supporting a variety of ventures. It felt like I had opened a Matryoshka doll. Nevertheless, my genuine interest drove me forward, and I started to see that the EE construct includes elements that all have their own separate research streams (e.g. institutions, leadership, finance, networks) and that the EA layer includes all types of firms that benefit from their surrounding environment (e.g. gazelles, SMEs, high-growth start-ups, BGs). Now, it became clear that even though I enjoyed reviewing literature, I would never be able to comprehensively include all of the related studies under one framework umbrella. Delimiting my investigation became appropriate, and as described in the theory chapter, I decided to focus on the systemic elements to address the best-in-class firms with the most intricate requirements and study new venture development in the preliminary life-cycle stages in which the local EE arguably has the strongest influence.

Once the theoretical framework was established with its delimitation and research focus adjusted, I set out to search for the appropriate focus group to further my investigations. Even though, theoretically, BG start-ups are rapidly internationalising firms with a focus on their stand-up and start-up stages, it was not an easy task to locate such ventures in practice. I turned to Start-Up Estonia: an organisation set up specifically to assist policy development to create a vital environment for launching start-up firms. I met with their consultant, and it turned out that they consider a ‘start-up’ any kind of firm that has the potential to become a success story. It was a vague description, but as I am able to detect which new ventures are BGs based on their performance, measured by speed, scale, and scope, I decided to introduce another important delimitation. Similar to academic validation, I then employed peer-review logic by arguing that start-ups are new ventures which have been attested by other entrepreneurs, founders, and the wider start-up community to

1 a set of wooden dolls of decreasing size placed one inside another.
inherently possess the business potential which might lead to a significant value proposition. This argumentation enabled me to search for these firms in different start-up listings, which also allowed me to create a stratified sample and exclude ventures which were not in their start-up stage. This combination of considerations was crucial because the assumption was that if a BG is in its start-up stage, it might not yet have fulfilled the speed, scale or scope criteria; however, I could still make an argument for their BG potential. Specifically, if the BG was much younger than three years old and did not yet have export sales or an international presence of scale, it still had time to fulfil these criteria. However, this was the case for only a couple of start-ups which had already rapidly moved to the validation stage, which indicated their potential to be an early BG. This is arguable, but the reasoning was adequate to include these start-ups, as well to enable the study of such BGs in their preliminary stages.

Moreover, I contacted some of them to have a preliminary discussion about my research and proposed that they join the study. There was a chance of failure because, as I learned later, many of them have been answering all sorts of questionnaires around that time, including one from Start-Up Estonia. Hence, I followed up by contacting the consultants again about writing my dissertation based on their recently acquired data. However, they politely declined, even though they admitted that they did not use all of their data for lack of a more sophisticated approach and analytical skill set. I then continued my negotiation with the start-up founders, and when they learned that I covered quite a few elements in my survey, they became sceptical about participating in my research. This was important feedback, as I was thinking to employ items and scales from previous empirical works for all the elements that make up the EE construct, but this made me think otherwise. Hence, I adopted a minimalist approach to the survey questionnaire, which would still align with my research focus. Therefore, by incorporating a reduced version of the literature review on EE elements and simplified data collected from Estonian start-up founders, I was able to publish my first journal article (see Publication II).

Phase 4: Looking across the sea
The Estonian results represented a first attempt to explore how founders perceive their surrounding environment and which elements are deemed critical for new venture discovery and validation. This gave me my first sense of what is relevant to their business development to use in creating the first draft of the founder’s roadmap. However, these results needed validation, and I thought that even though there are other start-up-intensive countries on the shores of the Baltic Sea, the best comparison would be drawn from Finland. As previously mentioned, it has a similar cultural background but a more advanced economy. Juxtaposing Estonian results with Finland would make it possible to understand more about the roadmap and compare and validate the founders’ perceptions from another country’s point of view. The main assumption is that in the preliminary stage, founders should perceive critical elements rather similarly, even if their comparative presence and context vary. I then started to compile the start-up lists and launched the same data gathering process. The results were quite fascinating, mostly because they aligned with one another by subsequently validating my findings. Overall, they showed that there is a primary set of elements that are critical for development and other elements that are not
Research design and methods

central in the preliminary stages. I also managed to detect both systems’ strengths and weaknesses and calculated their overall performance levels. From this comparative data, I was able to publish another journal article (see Publication III).

Phase 5: What if?
The two-country data collection showed that these countries have different levels of availability of and access to critical EE elements. By combining criticality rankings with perceived presence, I was able to calculate each element’s performance ratios and group them in terms of the strengths and weaknesses of the ecosystem. Comparing this information for the various elements, it became clear, that these ecosystems can complement each other’s strong and weak points. Therefore, I began to ask myself: ‘What if’ these two small countries had the potential to converge to some degree and create common policies to improve their performance in nurturing new ventures and in supporting their internationalisation activities? For this reason, I introduced the ‘transnational’ dimension to the EE context and argued that in small countries where there is a high concentration of BG start-ups, which must internationalise to sustain their competitiveness (Cavusgil and Knight, 2015), policies should be in place to enable the formation of a transnational EE. I further advanced the study by looking at the organisational and international characteristics of BG start-ups and checked their variance to gain more insights into how these new ventures perceive their potential transnational environment. This perspective led to my final publication, which took the form of a conceptual book chapter (see Publication IV).

Phase 6: The plan is coming together
My knowledge and experience were lacking regarding how to build a start-up. For example, to do so, it was unknown to me which EE elements one needs to focus on as an entrepreneur to use time efficiently and mitigate the risks of misaligning one’s endeavours by concentrating on elements which do not support it adequately. Thus, this became my proposition: to join academia to shed light on EA and how local systemic conditions enable the launch and growth of certain types of ventures. The research design presented has been the blueprint for creating a meaningful inquiry into building a founder’s roadmap. Most of all, it has helped me discover my inner researcher and further advance my skill set for working on multi-layered multi-phase projects. During my two years in academia, I have managed to attend many international workshops, seminars, courses, and conferences and discussed my research agenda with best-in-class researchers to learn, gather new insights and develop expertise on how to create valuable research. It has been an interesting journey indeed.

Now, I am in the final stages of aligning my research steps with its intended agenda. On the one hand, the state of the art from previous research has been a continuous effort of following where EE research is heading and in what research future studies should be engaged. Bibliometric and literature reviews have become an academic roadmap to help me position my research efforts, given me guidance to better orientate myself in the research community, and assisted in setting new objectives to advance my career. On the other hand, the empirical investigation has enabled me to work with interesting topics and
3.3 Research methods

expanded my knowledge and experience of the practicalities of developing a BG type of a start-up and the most critical requirements to enhance its vitality and survival rate depending on the local context. These inquiries have strong relevance to me in keeping my promise to depict a founder’s roadmap to help and guide others in their endeavour towards offering new value propositions for their community. There remain just the final steps to complete my effort and present a concise overview within a dissertation format. In the next section, I will discuss the state of the art and empirical investigation in greater detail, supported by the Publications I–IV as the output of this dissertation.

3.3 Research methods

In this section, I will discuss the empirical outline in terms of state of the art and investigation and discuss each publication from this standpoint as well as based on the premises of its data collection, quality, and analyses.

3.3.1 State of the art

Review design

As noted, it is important to set the scene by looking for ideas and directions amidst the body of previous literature. The most common methods to derive such knowledge are bibliometric analyses, thematic literature reviews, and meta-analyses. In running the first search through the academic databases, it became clear that the EE research field is only recently gaining momentum, and there are not many empirical studies to use in conducting a thorough meta-analysis on the construct. Hence, bibliometric and systematic literature reviews became the most appropriate approaches, and as many aspects of these methods are aligned (e.g. descriptive statistics, thematic clustering), I decided to conduct the former one as sufficient to provide a concise overview by highlighting the most relevant EE studies, intellectual networks and thematic intersections inherent to the topic. A bibliometric review provides a up-to-date overview of the focal research field by allowing assessment of the metadata of scientific publications from academic research databases (Osareh, 1996). This metadata comprises information on source publication year, title, abstracts, keywords, reference list and citation count. Further, it allows for gathering insights from the entire corpus of the literature of interest. This method also mitigates the interpretive bias related to systematic literature reviews because the results are based on software-related algorithmic parameters. Hence, a well-conducted review study becomes a directory of the field to guide research efforts and enable novice researchers to strategise when building their collaboration networks and careers.

Therefore, Publication I prepared the ground for the study and provided an overview of the research agenda. Further, it was fundamental in adjusting the investigation focus to support the creation of research questions for empirical inquiry. It is noteworthy that I have conducted a bibliometric review every half-year since joining academia to keep myself up to date on the subject matter. Even in this, my last publication in terms of publication year, it has continued to be the grounding mechanism for my research process. It
3 Research design and methods

should also be noted that the bibliometric technique is not an inductive research approach in terms of theory building; rather, it is inductive in nature when considered as a separate study which elicits elements for setting up a research agenda and focus. In drawing generalities from specifics (Decoo, 1996), the bibliometric technique builds on previous research to establish generalisable results, for example in terms of intellectual networks and thematic clustering. It employs a bottom-up approach, in which the conclusion is likely founded on the premises. Additionally, it should be noted that a deductive process always contains an ingredient of induction (Bell, Bryman and Harley, 2019); therefore, as Publication I generated the theoretical foundation for the dissertation and Publications II–IV, I can argue that the bibliometric technique represents this inductive ingredient in the present endeavour. However, a hypothetico-deductive approach also applies to this process because, in the EE literature, there exist many theoretical frameworks which will help form the basis for my empirical inquiry as it builds on previous studies to determine their applicability in other contexts (Sprenger, 2011; Byon and Zhang, 2019). The EE, like other ecosystems employed in the business and management literature, arguably mimics biology and natural bionetworks in the hypothetico-deductive sense (Siponen and Klauvuniemi, 2020). In fact, in the EE field, this was found to be a typical approach (Ratten, 2020). Hence, it is constitutive of how this review process is viewed and interpreted.

Further, Publication I includes a solid bibliometric process that was praised by one reviewer for ‘the use of co-citation analysis in extending the pool of articles. This is a great example of a strategy where the investigators only seed the bibliometric analysis and let [the results] emerge with the help of complementary analysis’. This provides strong evidence that Publication I has established a solid background for the inquiry by enabling inductivity and hypothetico-deductivity as components of its assessment protocol. Similarly, Publication II reflects a larger literature examination which extends the list of elements derived from multiple theoretical frameworks and research fields. However, only a concise adaptation is included due to the word count restrictions based on the publisher’s guidelines. Therefore, this review process also has an inductive and hypothetico-deductive nature which further complements Publication I and completes the state of the art of the dissertation to initiate the empirical investigation.

I divided the bibliometric research process into the six main steps of formulation, identification, selection, confirmation, analysis and synthesis, presented in a logical manner in a straightforward overview on how to employ such techniques. I also provide a concise explanation of the process itself while emphasising its illustrative and exploratory nature and replicability (Denyer and Tranfield, 2009). However, I cover these steps in detail from three viewpoints to align with the format of this section.

Data collection
Every empirical study starts with setting up the research agenda and research-question formulation. In line with my preliminary desk research, it was already apparent that the EE phenomenon is a new research field that has only recently started to become an attractive enough to be pursued; therefore, it is certainly an important field to assess and for which to establish the foundation of the status quo. Studies in this area that offer such
a concise and rigorous approach are scarce, making this study timely and relevant. Therefore, to successfully investigate the EE phenomenon, I formulated a set of clear research questions (Nguyen, de Leeuw and Dullaert, 2018) to conduct a bibliometric review on advances in the previous literature.

To collect the data, I identified the most relevant publications for the bibliometric study and focused on the three sub-steps of the first inclusion criteria, the data query and the second inclusion criteria. Following Wang and Chugh (2014), I set the parameters to choose an appropriate electronic database, listed a set of keywords and identified a reasonable timeframe. The database of choice was Clarivate Analytics’ Web of Science by virtue of its quality (van Eck and Waltman, 2019). Then, I chose a suitable set of keywords to align with the EE research and ran the query to search for metadata (Danese, Manfè and Romano, 2018). The last sub-step was to consider only peer-reviewed journal articles which have the full text available (Dada, 2018; Kauppi, Salmi and You, 2018), are written in English (Deng, 2012) and are in categories relevant to EE studies (e.g. management, economic geography).

Data quality
I reviewed the titles and abstracts to match with my research agenda and excluded studies on other types of ecosystems. Further, I checked that only journal articles from the highest quality Q1 and Q2 sources were included. I used the SCImago Journal Rank to do this, which is a more suitable tool for bibliometric inquiry (Johnson, Cohen and Grudzinskas, 2012) in comparison to other journal rankings (Falagas et al., 2008). It has been utilised in a number of bibliometric studies across different research domains (Zacca-González et al., 2014). Thereafter, I downloaded the text corpus for VOSviewer software (van Eck and Waltman, 2010) and investigated its contents to clean it of inaccuracies and manually corrected any if found (Sinkovics, 2016). I then sent this cleaned list of publication to external assessors who would include any missing studies from their perspective (Nofal et al., 2018) and ran a complementary analysis of co-citations to detect any others that were missing (Dada, 2018; Vrontis and Christofi, 2019).

Data analysis
I then prepared descriptive analyses to provide an overarching view of information on the research field and created an intellectual network of co-authorship, which is established based on co-occurrence patterns (Callon et al., 1983) and a social network perspective (Peters and Van Raan, 1991) on the authors working in the field. Thereafter, I employed algorithmic clustering analysis (van Eck & Waltman, 2017), which is founded on the direct-citation technique (Boyack and Klavans, 2010; van Eck and Waltman, 2014), to establish the framework for clustering. All the journal articles were automatically synthesised into specific clusters guided by the algorithmic outcomes. The descriptive statistics, intellectual networks and combined clusters became the takeaway of Publication I (RQ 1, 2) as it explicitly showed the different themes under the EE umbrella, as well as which authors and publications each covered and was connected to. A bibliometric review thus enables anyone interested in the subject to explore it and elicit the state of the art from the databases.
Likewise, the same process was applied to gather information on the literature review to discuss EE structure; however, as each element has its own research field, I retained and cited mostly publications that were connected to the EE field. Hence, this became the baseline for the empirical investigation and the theoretical section of Publication II (RQ 3). This approach was similarly reflected in the respective sections of Publications III and IV. In addition, I applied a parallel logic when gathering information on BG start-ups and organisation life-cycle studies to further prepare them for inclusion in my theoretical framework.

3.3.2 Empirical investigation

Quantitative design
I now move from state of the art towards deductive investigation (Decoo, 1996). Quantitative research depends on deductive reasoning (Sekaran and Bougie, 2016) and employs a selection of quantitative analysis techniques (Saunders, Lewis and Thornhill, 2015) which explore underlying relationships through numerical data (Bryman and Bell, 2015). Previous research has showed that there are a substantial number of elements to be considered under one framework umbrella which all influence the EA of new venture development, as indicated in Publications I and II. Hence, it became imperative to consider conducting empirical investigations to observe these relationships. The quantitative approach would be fitting for the purpose of observing and accounting for all these elements in a two-country setting; moreover, it would make it possible to adopt a more holistic perspective to describe and explain these underlying relations in the EE context of a larger sample size.

Data collection
From interactions with the Estonian authority and founders, I understood that I could not implement the full range of items and scales developed by previous research in my survey; instead, it was necessary to adopt another viewpoint and focus on basic measures to comply with the participants’ suggestions. In the EE research field, there were not many measures explicitly available at that time (Audretsch and Belitski, 2017), and every team was trying to develop their own (Corrente et al., 2019; Liguori et al., 2019). Therefore, to discover the EE and BG start-up interconnections and dynamics, I focused on two dimensions relevant to detecting EE performance in the perceptions of founders. I wanted to understand how critical these elements were for new venture development during the discovery and validation stages, as well as how these elements performed in terms of their availability and access in the local context. Thus, I extended this reasoning to all elements and established a scale from 0, indicating not critical/not available or accessible to 100, highly critical/readily available and accessible. Even though ‘availability’ and ‘accessibility’ refer to different features, in the context of EE, they represent the extent to which an element is present in the system, I did some preliminary testing, and it was commonly understood by the entrepreneurs. The rest of the survey questions addressed the background of the founders and their new ventures and was delivered in the English language.
Afterwards, I proceeded to compile the appropriate list of candidates from both countries as potential respondents to the survey. I compiled the list from internet databases, such as Start-Up Estonia, Garage48, FunderBeam, Crunchbase and ArcticStartup. The assumption was that all these start-ups found in the databases have been certified by their respective start-up community and confirmed as new ventures that possess the potential of becoming a BG of the next generation. I then employed a stratified sampling method (Neyman, 1934) to target only firms which have experience in the discovery (stand-up) and validation (start-up) stages by employing filtering options of these databases based on self-reporting of their current stage; therefore, the search results returned only the most recent knowledge and experience in this regard. Subsequently, I gathered their contact details and other information from the ORBIS database. The list provided 347 potential BG start-ups from Finland and 143 from Estonia. When the survey was converted into an online format, pretested and the contact list compiled, I started to call start-up founders. I also emphasised that only founders could respond to the survey and had a verification question set up. The survey method allowed me to gather data from the grassroots to accurately comprehend the perceptions and opinions of the local new ventures.

**Data quality**
I received an acceptable response rate from 51 (14%) founding entrepreneurs from Finland and 33 (24%) from Estonia. I verified that most of them were already BG-qualified by checking their speed, scale, and scope (Kuivalainen, Saarenketo and Puumalainen, 2012). However, I was less stringent about the scope in terms of continents because digital affordances (Autio et al., 2018) enable new ventures to be global on the spot. Previous studies have also been lenient in this regard (Nummela et al., 2014), as it is mostly relevant in the context of larger countries and less of a concern for smaller ones (e.g. Finland, Estonia) (Choquette et al., 2017). Further expected quality issues were that some new ventures would not have revenue yet, for example, due to their young age (less than three years), and some would not be internationalised, even though they responded that they were. As I targeted only peer-reviewed ventures with BG potential, I argue that these start-ups could therefore have employed inward internationalisation (Fletcher, 2001) and could have internationalised via other value-chain activities (e.g. global team allocation, entering platform ecosystems).

Additionally, due to the utilisation of the survey method, it was vital to control for the presence of common method bias (Podsakoff et al., 2003). When reviewing EE literature, it was critical to introduce sub-elements (e.g. finance, talent) to study the ecosystem conditions. Hence, I argue that using this division helped to clarify distinctions between dissimilar types of elements and sub-elements to ensure that the respondents would assess these in an objective manner by relying on their own experience. Thus, this direct overview of their differences should have mitigated the risk of common method bias. Additionally, I conducted Harman’s single-factor test post hoc and did not detect any single factor affecting the analyses.
Analyses were conducted to conform to the research questions and the overall agenda of the empirical investigation. Firstly, all mean averages were calculated for each element in their respective stages for Estonia (Publication II, RQ 3.1), for Finland (Publication III, RQ 3.1), and for both countries combined (Publication IV, RQ 3.1); subsequently, they were ranked in descending order. I then calculated the aggregate averages as cut-off points to indicate that elements above the line were critical to BG start-up development, while I considered those below somewhat inessential for these stages. This allowed me to clearly demonstrate which elements are critical to the preliminary stages of the BG life cycle, depending on the context. Similarly, movements in criticality rankings between the stages enabled me to detect the stage-wise changes and argue for the existence of dynamic interactions in between respective elements and stages.

Secondly, I added the presence (availability/access) dimension to introduce an index ratio system exclusively for these critical elements and derived a set of performance ratios by juxtaposing the averages of perceived presence with the averages of perceived criticality for each element. These ratios demonstrated inconsistencies in performance by showing how well each element behaved in comparison to its influence on new venture development. The lowest ratios indicated hindering propensities because these elements would likely constrain new venture progress. This aided me in grouping these into strengths and weaknesses of the Estonian (Publication II, RQ 3.2) and Finnish (Publication III, RQ 3.2) ecosystems and in calculating the overall performance of each (Publication III, RQ 3.3), yielding similar results as found in previous research (Acs, Autio and Szerb, 2014). The rest of the elements were less relevant. Additionally, by utilising STATA software, I applied a paired samples t-test to all elements to confirm that the previous grouping was solid and without any significant statistical differences amongst connected pairs. However, the inessential elements in Estonia indicated that one was even perceived as irrelevant to the discovery and validation stage.

Lastly, I collected data on multiple features of new ventures regarding their organisational (i.e. age, team size, service-product orientation and revenue) and international characteristics (i.e. team allocation, origin of the owners, speed of internationalisation and market scope) and, based on the data, divided the firms into binary groups. These characteristics elaborate how ecosystem elements influence specifics of BG start-up development. I then again utilised STATA by applying the analysis of variance (ANOVA) to compare the statistical significance of the founder’s perceptions to uncover relational inconsistencies between their new venture and transnational environment (Publication IV, RQ 3.4). I found nine differences in the discovery stage and seven in the validation stage. This concluded my empirical investigation.

Regarding the sophistication level of the quantitative investigation, I have to relate that as I was constrained and somewhat afraid of the founders being too reluctant to respond to my questionnaire if it were full of items on each element. Therefore, I felt I had no better choice than to gather data that did not allow me to apply more complex statistical
3.3 Research methods

methods. However, the results stand for themselves, and there is value in demonstrating that other methods would lead to similar results (Morgan, 2014, p. 11).

In conclusion, I have now presented my research design and methodology by creating a concise overview of my doctoral dissertation process. I have discussed the horizontal layers of my research by elaborating its theoretical focus, publication course, empirical outline, and my iterative thinking process. Additionally, I have presented each vertical phase of this dissertation process through a brief storyline and covered the methodological considerations to demonstrate my personal line of argumentation. It has been a rewarding endeavour initiated from a practical need to comprehend how to create successful startups, beginning with a need for founder's roadmap and culminating in writing up my work while reflecting on my academic work and becoming a scholar. In the next chapters, I will go through the findings regarding each publication and discuss the research question in more detail, finally concluding the dissertation by presenting implications, limitations and future research avenues.
4 Publications and Findings

In this chapter, I discuss the state of the art (Publication I) and empirical investigation (Publications II–IV) of my inquiries and provide a concise overview regarding their objectives, findings and contributions and role in the dissertation (see Table 5).

4.1 Publication I

4.1.1 Objective

The entrepreneurial ecosystem explains how local conditions influence the development of entrepreneurial action, which, in turn, becomes the point of origin for international business environments. As the field itself is rather new and fragmented, it became necessary to consolidate the research by preparing an overview of the main countries, institutions, journals, scholars, publications and thematic contexts populating the entrepreneurial ecosystem domain (Audretsch et al., 2019). The bibliometric review process enabled me to generalise the EE field and establish a study agenda to set the scene for empirical investigation. Therefore, I prepared a bibliometric inquiry based on the Web of Science database to create a concise overview of the state of the art by focusing on the descriptive and intellectual foundations, as well as the thematic structures, of the phenomenon. The research process encompassed 153 articles from top journals published during 1993–2019.

4.1.2 Findings and Contributions

The bibliometric review showed significant recent interest in the EE concept and solidified the role of Silicon Valley as the base model. Most of the research conducted refers to it as the prime example of cultivating similar environments. Also, the scholars who have been on the frontlines in advancing this literature stream are most often affiliated with institutions located in the United States. However, Stam (2015), reasoning with regard to his home country of the Netherlands, helped me to better recognise the complexities of the ecosystem via a straightforward framework addressing its conditions, outputs and outcomes. For this reason, I introduced it as the principal model to be followed during my empirical investigation. Even though descriptive analysis yielded more interesting findings and ideas for my scholarly career, its main role was to establish an overview of the field to provide a better contextual orientation. Furthermore, I discovered that there were six main thematic clusters within the entrepreneurial ecosystem context. These themes involved the perspectives of the complexity, context, governance, geography, agency and network of the ecosystem. I then divided each of these into sub-themes with their relevant findings.

Moreover, the main contributions of this study were not just to guide my own work but also to reflect the status quo of the field: where we currently stand and what matters. The overview of descriptive statistics will benefit everyone interested in the topic, and the
intellectual networks illustrate the essentials of the stream. Likewise, thematic clustering enables us to explore which research areas are currently the most prolific, where the potential for further contribution by setting a research agenda lies, and how to integrate other fields with the current research (Zupic and Čater, 2015; Lampe, Kraft and Bausch, 2019).

4.1.3 Role in the dissertation

The bibliometric mapping and review enabled me to assess the entrepreneurial ecosystem field and where I should focus my empirical investigation. I decided to follow Stam and Van de Ven (2019) by concentrating on the surrounding environment and its stakeholders. This reasoning enabled me to partially integrate all the thematic perspectives exposed by clustering analysis. Specifically, it became evident that I need to explore the relations between the structural conditions and their role in fostering EA.

4.2 Publication II

4.2.1 Objective

The objective of the second empirical study was to explore in a holistic manner how the surrounding environment influences BG development. I wanted to advance our knowledge of how a unique local configuration of structural elements nurtures a firm’s development and its consequent internationalisation. To this end, I centred my study around the systemic elements of the EE which directly influence entrepreneurial-level action and focused on BGs in their preliminary stages of the life cycle as arguably the best representation of an EE’s output. Furthermore, I extended the list of systemic elements to cover the core functions and, thereafter, aimed to explore which elements are critical for these new ventures and which represent the strengths and weaknesses of the locality. From a practical point of view, it was important to create a reflection of founder’s roadmap so that all stakeholders might better comprehend the systemic complexity and what matters the most.

4.2.2 Findings and Contributions

One of the main findings was that even though most research discusses 6–12 elements, on average, representing a healthy ecosystem, many of these elements must be divided into multiple sub-elements to facilitate better comprehension of their differences, and newer topics should be included (i.e. crowdfunding, engagement events). For these reasons, from a theoretical perspective, I expanded the list to include 16 elements (i.e. leadership, bootstrapping, formal debt, informal capital, VC, BAs, CVC, crowdfunding, entrepreneurial talent, worker talent, knowledge, networks, professionals, intermediaries, networking services and engagement events) representing those that are the most typical in a healthy entrepreneurial system. I then identified seven elements (i.e. entrepreneurial talent, informal capital, bootstrapping, leadership, knowledge, engagement events and networks) that are critical to the discovery stage and 10 (i.e. entrepreneurial talent,
knowledge, networks, worker talent, VC, BA, bootstrapping, leadership, professionals and intermediaries) that are critical to the validation stage of BG start-up development. Nevertheless, even though these elements might be critical, their influence is largely dependent on their presence in the system. Therefore, the findings revealed that five elements (i.e. engagement events, professionals, intermediaries, leadership and bootstrapping) performed relatively well and, thus, could be considered strengths of the case example, whereas three (i.e. BA, knowledge and networks) were in between and four elements (i.e. informal capital, VC, entrepreneurial talent and worker talent) represented weaknesses of the system. The rest of the elements (i.e. networking services, crowdfunding and CVC) were less central for BG start-ups, and one element (i.e. formal debt) was even considered irrelevant.

Furthermore, the main contribution of this study was to initiate discussion on the EE as a systemic construct and its direct involvement in firm development on the way to developing an international presence (Kshetri, 2014; Acs et al., 2016). In this case, I aligned two research fields in a way never previously attempted and in the transitional country context of Estonia. Another novel aspect was mapping out the elements of the literature review, which included some newer concepts (i.e. crowdfunding, engagement events), and then ranking these based on the perceptions of BG start-up founders in terms of the criticality of each element for the respective development stage of their business. In addition, by assessing each element’s presence in the system, I managed to illustrate its main strengths and weaknesses while acknowledging that some elements were less central. Therefore, this practical guideline for founders delivers the first overview of bordering ecosystems and what matters in the local context.

4.2.3 Role in the dissertation

The second empirical article served the purpose of detecting and connecting the ecosystem concept and its structural composition with the BG type of start-up development. It was necessary to expand the systemic configuration to reflect what is critical for the discovery and validation stages of such firms in an example country context. In addition, I evaluated criticality aspects of the elements for firm development and their subjective performance for start-up founders. Finally, I prepared the groundwork to further extend the empirical investigation into a two-country context to substantiate my initial findings and introduced and connected the EE phenomenon specifically to IE research field to deal with its dispersion and ambiguity (Paul and Rosado-Serrano, 2019).

4.3 Publication III

4.3.1 Objective

The objective of the third empirical study was to investigate how the EE influences BG start-up development by juxtaposing the results for two unique countries in close prox-
imity. Comparative studies on BGs have been called for to advance the IE literature (Terjesen, Hessels and Li, 2016). In response, I compared Finland and Estonia by delving into their ecosystem constructs to detect structural commonalities considered critical for the preliminary advancement of new ventures. I wanted to verify the findings of previous studies and discover if founding entrepreneurs’ benefit from the same systemic elements when launching and growing their new ventures. Additionally, I measured the performance of these two neighbouring ecosystems and comparatively assessed their strong and weak points.

4.3.2 Findings and Contributions

The main finding was that the most critical elements tend to be the same, even though I compared two different country-level EEs. Hence, I can assert that BG start-up founders perceive the same systemic conditions relevant to preliminary development with variations in their criticality ranking. After adjusting the cut-off points, I determined that Finnish and Estonian BG start-ups perceived nine common systemic elements (i.e. entrepreneurial talent, knowledge, leadership, informal capital, networks, bootstrapping, worker talent, engagement events and BAs) in the introduction stage and seven such elements (i.e. entrepreneurial talent, knowledge, leadership, networks, worker talent, BAs and VC) in the validation stage. However, in the latter stage, Finnish ventures deemed ‘professionals’ to be critical, whereas their Estonian counterparts believed ‘bootstrapping’ practice to be. In addition, I divided these critical elements in terms of their strengths and weaknesses. The Finnish ecosystem exhibited five elements as their strengths (i.e. networks, engagement events, knowledge, BAs and professionals), two potential strongpoints (i.e. entrepreneurial talent and worker talent) and four weaknesses (i.e. VC, informal capital, leadership and bootstrapping). For their part, Estonians exhibited three strengths (i.e. networks, engagement events and leadership), three potential strongpoints (i.e. knowledge, BAs and bootstrapping) and four weaknesses (i.e. VC, informal capital, entrepreneurial talent and worker talent). Although all elements are relevant to stage-wise progress, some might be less essential (i.e. formal debt for Estonians). Also, I discovered that the Finnish EE performed better in terms of these critical elements than the Estonian one did (Acs, Autio and Szerb, 2014).

Moreover, the main contribution of this study was to verify the configuration similarities between variations of the ecosystem construct in their influence on the BG start-up process. I discovered that there is indeed a common set of elements which firms perceive as critical in the preliminary stages, even if there exist considerable differences in terms of stage-wise and country-wise rankings and performance. Such a common orientation suggests that EEs are unique in their configuration and abundance, whilst their underlying structural composition remains rather similar. In addition, this research has made an important contribution by reflecting a layout which founders can employ to improve their own entrepreneurial journey and that policymakers can use to introduce better legislation to support entrepreneurs, and through their mutual interaction, they can create well-performing local EEs.
<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th><strong>Publication I</strong></th>
<th><strong>Publication II</strong></th>
<th><strong>Publication III</strong></th>
<th><strong>Publication IV</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Deliver an overview of the entrepreneurial ecosystem research field and its main thematic clusters.</td>
<td>Detect ecosystem elements and their significance in developing BG start-ups during their preliminary life-cycle stages.</td>
<td>Assess ecosystem elements in two-country context in fostering BG start-ups during their preliminary life-cycle stages.</td>
<td>Introduce transnational entrepreneurial ecosystem concept by exploring ecosystem elements in terms of BG attributes.</td>
</tr>
<tr>
<td><strong>Main findings and contributions</strong></td>
<td>This article gives a concise overview on the countries, institutions, journals, authors and articles in the research domain, implying a rapid growth across disciplines. The main research themes cover complexity, context, governance, geography, agency and network perspectives of the phenomenon. [RQs: 1, 2]</td>
<td>This article identifies 16 systemic elements considered essential for a healthy ecosystem, out of which 7 elements are important during introduction and 10 elements during validation stage of BG. In addition, 5 elements represent strengths of the principal ecosystem, 3 are borderline, 4 are deemed weaknesses, 3 are less central and 1 is considered irrelevant. [RQs: 3.1, 3.2]</td>
<td>This article extends the previous study by juxtaposing systemic elements within two-country context. We find 9 elements commonly crucial during introduction and 7 in validation stage. In addition, Finnish ecosystem performs better than Estonian equivalent. And, Finnish BGs perceive all elements relevant for the preliminary stages, while Estonians exclude formal debt. [RQs: 3.1, 3.2, 3.3]</td>
<td>This article introduces the transnational concept to entrepreneurial ecosystem context to draw attention to potential synergies of country-level ecosystem collaboration. In addition, by following criticality rankings of systemic elements, we explicate stage-wise dynamics and thereafter investigate perceptual differences centred on BG features. [RQs: 3.1, 3.4]</td>
</tr>
<tr>
<td><strong>Role in the dissertation</strong></td>
<td>Provides a thematic landscape to guide empirical inquiry.</td>
<td>Pinpoints most critical systemic elements influencing BGs.</td>
<td>Compares most critical systemic elements influencing BGs.</td>
<td>Considers a new research area and reviews BG predispositions.</td>
</tr>
</tbody>
</table>
4.3.3 Role in the dissertation

The empirical work presented seeks to consolidate understanding of the systemic configuration. I compared the criticality rankings, the presence of ecosystem elements and their performance in preliminary stages and in a two-country context. This led me to validate the results of the second empirical inquiry. In addition, due to the critical similarities of the ecosystems and the alignment of strengths to weaknesses, and vice versa, I was able to further develop a conceptual view of ecosystem integration for the following fourth empirical study.

4.4 Publication IV

4.4.1 Objective

The objective of the fourth empirical inquiry was to elaborate the previous findings and discuss the EE phenomenon through the transnational dimension to draw attention to synergies of collaboration potential between Finland and Estonia and enhancements of their strengths to tackle some of the common weaknesses. To do so, I conceptually integrated these two-country contexts, evaluated the criticality levels according to a uniform ecosystem, and discussed the perceptions of founders of BG start-ups in terms of their ventures’ organisational and international characteristics.

4.4.2 Findings

The main findings indicate that there were six elements (i.e. entrepreneurial talent, knowledge, leadership, networks, worker talent and BAs) critical in the preliminary stages, five (i.e. informal capital, bootstrapping, engagement events, professionals and VC) were shifting in their criticality by exhibiting stage-wise dynamics, and five (i.e. intermediaries, networking services, crowdfunding, CVC and formal debt) were less central for progress. In addition, it was imperative to explore the disparities amongst these perceived rankings. In doing so, I detected intra-group variance for more than half of the elements, indicating that new ventures have mixed perceptions of their surrounding environment. I found nine divisions (knowledge and age, knowledge and team size, informal capital and age, informal capital and ownership origin, engagement events and revenue, networking services and owner origin, VC and ownership origin, CVC and revenue and CVC and ownership origin) in the discovery stage and seven (knowledge and revenue, knowledge and firm offer, knowledge and number of markets, leadership and team allocation, BAs and age, BAs and internationalisation and formal debt and internationalisation) in the validation stage. These findings reflect variations in the perceptions of BG start-up founders.

Furthermore, the main contribution of this study was to create a conceptual understanding of the potential integration and convergence of two neighbouring ecosystems; thus, a transnational dimension was introduced to the EE context. This enabled me to investigate
two BG start-up-intensive countries grouped as one in order to look at their critical and non-critical elements (Cavallo, Ghezzi and Balocco, 2019) and demonstrate their effect on new venture characteristics. In other words, it became fitting to elaborate critical and non-critical conditions based on the intra-group differences to gather new insights regarding which elements and their combinations in stages should be emphasised to further improve the launch and growth activities of new global start-ups. Also, the division of stages revealed an increasingly complex view of interactions essential to this transnational environment.

4.4.3 Role in the dissertation

The fourth empirical article was written to utilise the associations and alignments stemming from the previous studies. I considered the potential convergence of the two country ecosystems and introduced the transnational dimension to the context. This enabled me to explain the structural configuration of the ecosystem and stage-wise dynamics based on the intra-group variations of BG start-ups. This article represents an interesting new viewpoint to further explore the EE- and EA-level relationships and dynamics.

In the next chapter, I will discuss these results in greater detail by answering the research questions before concluding my dissertation by presenting theoretical, managerial and policy implications, as well as providing an overview of its limitations and ideas for future research.
5 Discussion and Conclusion

5.1 Answering the proposed research questions

The objective of this dissertation was to explore the EE phenomenon and how it influences BG start-up development. Due to the topic’s newness, timeliness, and research scope, I focused on the context and its influence on discovering and validating firms with rapid-growth potential aiming to enter international markets. A set of research questions were developed and aligned (see Table 6) to set the stage for a multilevel empirical inquiry through a bibliometric investigation and context-driven exploration of EE and its role in new venture development.

Table 6. Research questions and their links to publications

<table>
<thead>
<tr>
<th>Research Questions (1–7)</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ 1. What is the state of the art of the EE domain?</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>RQ 2. Which thematic streams are embodied in the EE domain?</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ 3. Which systemic elements represent a healthy EE that can nurture BG start-ups?</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ 3.1. Which systemic elements are critical for BG start-up development during the preliminary stages of its life cycle?</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>RQ 3.2. Which systemic elements can be considered an EE’s strengths and weaknesses?</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ 3.3. How does a set of systemic elements explain the performance of comparable ecosystems?</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>RQ 3.4. How do intra-group characteristics describe BG start-up perceptions of the EE?</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

5.1.1 Findings from bibliometric and literature reviews

The main rationale behind conducting bibliometric and literature reviews was to acknowledge the prominence of EE research and that it has become one of the newest and most interesting streams of research for IB and entrepreneurship scholars. By conducting these reviews, the rigour and objectivity of the bibliometric method (Zupic and Čater, 2015) allowed me to assess the previous efforts to advance this topic and further assisted
me in developing the framework for the empirical investigation. In addition, via a literature review, I sought to take a closer look at the systemic side of how the EE directly shapes firm growth, as well as enumerate the elements relevant to a healthy ecosystem.

**RQ 1. What is the state of the art of the EE domain?**
Understanding the entrepreneurial ecosystem field and studying its origins is an important matter for any party interested in learning about the domain. Hence, a bibliometric review can be employed as a roadmap of sorts for the research field to provide a concise overview of the state of the art regarding countries, institutions, journals, researchers, and publications. For novice researchers, it is especially relevant to distinguish the most influential scholars, their most impactful works and publishing venues. Recent years have witnessed exponential growth in EE studies, which have gained immense momentum in research attention (Velt, Torkkeli and Laine, 2020). This trend is particularly evident when comparing the publication growth rate of EE research with the rates of more mature fields, such as clusters and regional innovation systems (García-Lillo et al., 2018; Suominen, Seppänen and Dedehayir, 2019). Since the Silicon Valley model started to produce top-performing firms in their regional system, the research field had found itself the centre of attention not only of academics but also of practitioners and policymakers. However, beginning a few years ago, there has been a heterogeneous dispersion of studies across academia as researchers from various disciplines, such as entrepreneurship, economic geography, strategic management and international business, have started contributing to EE research and publishing in a variety of outlets. For example, EE studies have found their way into top journals such as *Research Policy*, *Entrepreneurship Theory & Practice* and *Urban Studies*. Notably, despite the relatively short history of EE research, more than 100 publications were published in journals classified in the top quartile. These recent developments are indicative of a surge in the relevance and popularity of the topic in the business and management literature.

Moreover, the findings of this study also highlight the clear authority of several influential scholars in the EE domain, including Acs, Audretsch, Autio, Spigel and Stam, who belong to Western institutions that lead the research in their respective fields and collaborate with various reputable authors. The social collaboration networks demonstrate that the domain has been a significant procreative mechanism igniting interest in other scholars to join and lead the field forward. It is important to have a diverse set of authors working along the periphery as well as new and independent ones introducing fresh ideas that are not bounded by existing intellectual structures or network dynamics. In addition, many of the most influential publications have presented research that has reflected and conceptualised the structural conditions of the ecosystem and, thus, have been a guiding force for my dissertation in constructing an outline for the empirical inquiry.

**RQ 2. Which thematic streams are embodied in the EE domain?**
The bibliometric technique and its direct cross-citation method (Boyack and Klavans, 2010; van Eck and Waltman, 2014) allowed me to explore the thematic construct of the EE research domain. The clusters were derived rather equally in terms of citation count...
and the number of publications included, meaning that these central ideas have been relatively uniform in their research evolution. These thematic clusters have been focusing on the complexity, context, governance, geography, agency and network perspectives of the ecosystem, and each one is composed of sub-themes worthy of additional explanation.

Firstly, the complexity perspective encompasses the emergence, formation and micro-foundations of the EE. Such environments have emerged from collective entrepreneurial action and are further defined by it (Van de Ven, 1993; Bahrami and Evans, 1995). The most well-known example is Silicon Valley, which is used as the principal in benchmarking other such environments founded across the world (Spilling, 1996; Neck et al., 2004). The system’s formation is inherently complex as it reflects the interplay between entrepreneurial action and the surrounding environment (Roundy, 2017; McMullen, 2018; Roundy, Bradshaw and Brockman, 2018), as well as how the vibrancy, diversity and trajectory of these interdependencies are further manifested and governed through time (Mack and Mayer, 2016; Auerswald and Dani, 2017; Colombelli, Paolucci and Ughetto, 2019). However, the emphasis should be placed on the configuration of the system and how different narratives (Roundy, 2016, 2019c; Roundy and Bayer, 2019a) and strategies explain the local interactions (Motoyama and Knowlton, 2017; Harper-Anderson, 2018; Roundy, 2019b; Roundy and Bayer, 2019b) and how to measure these mechanisms that foster firm development (Nylund and Cohen, 2017; Liguori et al., 2019; Roundy and Fayard, 2019) while sustaining equal opportunities for all entrepreneurs (Brush et al., 2019; Hechavarría and Ingram, 2019; Sperber and Linder, 2019).

Secondly, the context covers the genesis, policy, dimension and actors of the ecosystem. In comparison to clusters and innovation systems, the EE differs in its focus on entrepreneurial activities that involve capturing opportunities, acquiring new knowledge, developing business models and launching firms (Autio et al., 2018; Spigel and Harrison, 2018) under continuous conditions of institutional cause-effect alterations (Alvedalen and Boschma, 2017). Hence, a varied mix of policies is needed (Szerb, Acs and Autio, 2013) to deal with the configurational challenges (Bramwell, Hepburn and Wolfe, 2019; Brooks, Vorley and Gherhes, 2019) and better promote the quality aspects of entrepreneurial action (Brown and Mawson, 2019). In addition, it is pertinent to focus on the digital dimension (Autio et al., 2018) to enable learning and knowledge creation across locally bounded systems while tapping into cross-regional value chains (Auschra, Schmidt and Sydow, 2019; Pugh et al., 2019) to improve the sustainability of the system (Thompson, Purdy and Ventresca, 2018; DiVito and Ingen-Housz, 2019; O’Shea, Farny and Hakala, 2019). The same actors responsible for endorsing entrepreneurship, knowledge transfer and the vigour and quality of the community (Theodoraki, Messeghem and Rice, 2018; Vedula and Kim, 2019) also validate venture viability (Goswami, Mitchell and Bhagavatula, 2018), extend networks (Brown et al., 2019; Qin, Wright and Gao, 2019) to gain access to resources (Feldman, Siegel and Wright, 2019; Lai and Vonortas, 2019) and facilitate entrepreneurship growth through spatial and digital dimensions (Fraiberg, 2017b; Schäfer and Henn, 2018; McAdam, Harrison and Leitch, 2019).
Thirdly, the governance perspective facilitates discussion of the lineages, institutions, knowledge, and culture as its sub-themes. The coining of the term economic ‘ecosystem’ implies to efficient resource allocation to develop global value (Audretsch et al., 2019; Colombo et al., 2019), led by a legitimate entrepreneurial entity (Acs et al., 2017; Kuratko et al., 2017). This distribution system has been extended via digital platforms to utilise knowledge creation and innovation governed by institutions (Sussan and Acs, 2017; Colombo et al., 2019; Song, 2019), such as large multinationals, VCs and universities, all of who provide access to networks and finance to improve efficiency and encourage venture development (Bhawe and Zahra, 2019; Cumming, Werth and Zhang, 2019; Ghio, Guerini and Rossi-Lamastra, 2019; Leceta and Könnölä, 2019) through the interactions of internal and external factors (Xie, Xie and Martínez-Climent, 2019). In addition, these institutions support entrepreneurial attitudes (Acs, Autio and Szerb, 2014; Acs et al., 2016; Yan and Guan, 2019), foster value creation and economic growth (Acs et al., 2018), enable knowledge spillovers for efficiency gain (Lafuente, Szerb and Acs, 2016) and facilitate invention commercialisation (Audretsch, 2019). Even though deficiencies occur, they can be mitigated by enhancing entrepreneurial readiness (Schillo, Persaud and Jin, 2016) via knowledge-intensive business services (Horváth and Rabetino, 2019), research-based spinoff companies (Schillo, 2018) and smart-society models (Barba-Sánchez, Arias-Antúnez and Orozco-Barbosa, 2019) by creating a knowledge-driven culture which would recognise business failures as part of the entrepreneurial agenda and community goals (Bischoff, 2019; Simmons et al., 2019).

Fourthly, geography becomes the focal point as the EE location and its unique configuration of elements are characterised by aligning the location-specific advantages with firm-specific advantages to support local entrepreneurial activities (Lichtenstein and Lyons, 2001; Feldman, 2014; Content et al., 2020). For instance, to create a strong knowledge base to serve EA for firm formation and consequent success, elements such as talent, networks, knowledge, culture and support mechanics (Lichtenstein and Lyons, 2001; Qian, Acs and Stough, 2013; Feldman, 2014; Qian, 2017) should be in place and available at the national or regional level. However, in many cases, to identify the right composition, the borders of the locality should be defined. Most research is focused on the urban context (Audretsch and Belitski, 2017; Brown and Mason, 2017; Qian, 2017) some on the rural (Miles and Morrison, 2018; Muñoz and Kimmitt, 2019), while others include an entire region as the measurement (Martínez-Fierro, Biedma-Ferrer and Ruiz-Navarro, 2019). Still, the challenges of small size (Reidolf et al., 2019), inadequate needs (Sheriff and Muffatto, 2015) and peripheral placement (Xu and Dobson, 2019) endure. Nonetheless, it is important to emphasise that EA relates to firm development (Stam and Van de Ven, 2019) and is strengthened by geographic positioning (Content et al., 2020) and other nearby ecosystems (Szerb et al., 2019).

Fifthly, the agency perspective addresses the intended and unintended agency of stakeholders influencing the emergence and development of the EE. Entrepreneurial agency makes a strategic choice regarding when and where to launch its activities (Pitelis, 2012). This is largely dependent on government’s role, policies and regulations (Kshetri, 2014; Cicchiello, 2019), as well as its enabling of cultural, social and material attributes (Spigel,
5.1 Answering the proposed research questions

2017) which directly empower entrepreneurial agency’s legitimation, differentiation and integration with the heterogenous system. However, governmental overcontrol, favouritism and introduction of bad policies (Jung, Eun and Lee, 2017) could lead to system failure by distorting relations between entrepreneurial agency and other stakeholders. In addition, these self-regulating mechanisms are driven by mutual trust (Muldoon, Bauman and Lucy, 2018), sociocultural capital (Pillai and Ahamat, 2018) and national characteristics (Hemmert et al., 2019), and they represent collective agencies such as smart-cities (Sarma and Sunny, 2017), technopolises (Levenda and Tretter, 2020), meta-organisations (Du et al., 2018), helix systems (Dubina et al., 2017; Erina, Shatrevich and Gaile-Sarkane, 2017; Carayannis et al., 2018) and project-based coordination (Auschra et al., 2019; Cunningham, Menter and Wirsching, 2019), all of which generate multi-agentic symbiotic interactions to sustain the ecosystem’s vitality.

Lastly, the network perspective discusses the connections of interacting actors as they establish links to facilitate the movement and exchange of social capital. The ecosystem construct consists of dense ties of interconnected elements which, as their principal role, preserve the system through networking and social capital flows by creating common outputs and outcomes (Isenberg, 2010; Stam, 2015). Such capital movements promote knowledge acquisition (Carayannis, Provance and Grigoroudis, 2016), business model alterations (Neumeyer and Santos, 2018) and development of causal relationships (Nicotra et al., 2018). Therefore, these complex social constructs (Neumeyer et al., 2019) are beyond being just simple networking structures (Corrente et al., 2019) and, in their essence, are responsible for creating multilevel platforms for capital exchange to facilitate EA and its interactions with other stakeholders with the goal of resilient ecosystem formation.

Consequently, the entrepreneurial ecosystem construct is a complex framework, and a simplified focus should be applied. Thus, it is important to elaborate the role of the EE and its elements in promoting EA, although the latter is responsible for managing the system via its core principle of collective effort.

RQ 3. Which systemic elements represent a healthy EE that can nurture BG start-ups?

The literature review revealed that many scholars have been mapping out the conditions and principles of a healthy EE (Isenberg, 2010). However, there is a great deal of variation in terms of the perspectives of scholars regarding ecosystem levels and the locations they have chosen to focus on. The most impactful examples have already been enumerated and covered in the theory chapter (see Table 2). Nonetheless, to incorporate all these perspectives into one framework would be beyond the scope of this research, and its broad spectrum would hamper data collection. Therefore, I decided to include only systemic level conditions/elements (Stam, 2015) which arguably entail the capacity to directly influence entrepreneurial level activities and thus yield more specific explanatory power compared to indirect framework conditions. Hence, in this perspective, a healthy EE has six main conditions that need to be present—leadership, finance, talent, knowledge, networks and support. All of them can be extended, but for the sake of clarity, I determined to leave leadership, knowledge and networks on a more abstract scale and extended only
finance (i.e. bootstrapping, informal capital, BAs, VC, CVC, formal debt and crowdfunding), talent (i.e. entrepreneurial and worker talent) and support conditions (i.e. professionals, intermediaries, networking services and engagement events). Thus, I derived 16 systemic elements representative of a healthy ecosystem that directly shape EA as explored in several contexts.

5.1.2 Findings from the quantitative investigation

In contrast, after setting the scene with review findings, it became imperative to use those insights to further investigate the ecosystem and entrepreneurial-level connections. For this inquiry, it became appropriate to acknowledge the most critical elements for firm development, the strengths and weaknesses of the ecosystem and their performance, as well as how BG start-ups with various characteristics perceive these conditions from their own perspectives. All these questions are answered below.

RQ 3.1. Which systemic elements are critical for BG start-up development during the preliminary stages of the life cycle?

The empirical inquiry covered three contextual settings, as did this research question. The main rationale behind the question was to detect the most critical systemic elements based on their rankings to obtain relevant information to help entrepreneurs to prioritise and then validate these within another country context. In light of the findings, I was also able to propose a list of elements to further the analysis and retrieve possible new insights. In Publication II, I focused on the Estonian country-level EE (Brown and Mason, 2017) and found out that, altogether, 17 elements were perceived as critical for preliminary BG stages. Even though the results are depicted in a single country context, it was interesting to note that many elements were not critical for both stages, and the ranking between the stages changed, allowing me to argue for their complementarity, substitutability and stage-wise dynamics. Likewise, I validated these results in a comparative study: I introduced the Finnish country-level ecosystem in Publication III. In this case, I adjusted the cut-off point for better assessment. The results yielded nine systemic elements common to both countries in the discovery stage and seven elements in the validation stage. However, professionals for the Finnish and bootstrapping for the Estonian ecosystem were the distinguishing component. It was a significant discovery that for BGs, the development of the set of elements was almost the same, although with a different configuration in all cases.

Based on the above findings, I am able to argue that entrepreneurial talent is by far the most important element behind well-performing start-ups (Rauch and Rijsdijk, 2013; Talia, Pisoni and Onetti, 2016) in the introduction stage for both ecosystems. However, for Finnish BG start-ups, this most important element was replaced with worker talent in the validation stage. Unquestionably, the entrepreneurial founders initially seize opportunities and then take risks to validate those commercial proposals (Kuivalainen, Sundqvist and Servais, 2007; Vissak, 2007; Nummela, Saarenketo and Puumalainen, 2009). As their business grows, entrepreneurs use their own knowledge and experience until they require support from the rest of the worker pool (Karra, Phillips and Tracey, 2008). Arguably,
5.1 Answering the proposed research questions

the difference between the perceptions of the validation stage might be based on the Estonian ‘individualistic’ and Finnish ‘collective’ union-backed approaches. Similarly, the leadership role and its value proposal shifted (Gabrielson et al., 2008) from pioneers and role models to direct stimulus aimed at start-up progress through mentoring and capital allocations. One of the main facilitators of relationship-building is the social capital which could be developed through engagement events (Harrington, 2017; Feld, 2020) and enhanced within ever-extending networks. Hence, these networks become essential (Sharma and Blomstermo, 2003; Mort and Weerawardena, 2006) for strong BG progress towards building an international mindset (Nummela, Saarenketo and Puimalainen, 2009; Torkkeli, Nummela and Saarenketo, 2018), as well as for acquiring new knowledge and information and sharing the activities, resources and capabilities relevant to proactive expansion (Zhou, Wu and Luo, 2007; Nordman and Melén, 2008) and the acquisition of financial capital. In stages, the latter element is represented by bootstrapping (Ebben and Johnson, 2006; McNaughton and Pellegrino, 2014) and informal capital (Feld, 2020), which are crucial for the introduction stage, when social capital is being exchanged at a more personal level. When a BG is becoming a formal entity, BAs as stage movers prepare the BG for VC entry (Madill, Haines and Riding, 2005) to further benefit rapid development and internationalisation. All these findings are in line with BG evolutionary aspects (Cavusgil and Knight, 2015; Zander, McDougall and Rose, 2015; Øyna and Alon, 2018).

However, some elements were believed to be less critical. These potentially behave as complementarities or partial substitutes for other critical elements, but they were not as highly regarded. These common elements were intermediaries, networking services, crowdfunding, CVC and formal debt, whereas professionals were also considered non-critical and formal debt even irrelevant (Gabrielson et al., 2008; Lai and Vonortas, 2019) by Estonian BG start-ups. Although it should be emphasised that all these elements are relevant to stage-wise development, some might be less essential or even irrelevant in the beginning but could become critical when internationalisation is in full swing and the firm is becoming global.

Moreover, it became relevant to examine the stage-wise dynamics of the criticality rankings from the transnational point of view in Publication IV. Hence, it became apparent that six elements were critical for the preliminary stages of BG start-up development, namely entrepreneurial talent, knowledge, leadership, networks, worker talent and BAs. Five elements were considered less central for progress: intermediaries, networking services, crowdfunding, CVC and formal debt. However, five exhibited a stage-wise shift in terms of their criticality ranking, namely informal capital, bootstrapping, engagement events, professionals and VC. For example, informal capital was the most critical financial element in the introduction stage but then dropped significantly in the next stage. Additionally, VC was less central in the discovery stage but then became the most critical financial instrument for BG development in the validation stage. This is probably because VC is better equipped to cope with commercialisation speed and capital investment than
informal capital. In addition, VC improves BG survival by supporting founders, extending firm networks and integrating best talent (Luostarinen and Gabrielsson, 2006), similar to BAs (Kerr, Lerner and Schoar, 2014).

RQ 3.2. Which systemic elements can be considered an EE’s strengths and weaknesses? Obtaining critical elements is significant, but it does not paint the whole picture because it omits information on how well-represented these impactful elements are in the local ecosystem. Hence, by supplementing criticality rankings with this measure, I was able to create a ratio that reveals the relative performance of each element, which can then be arranged into strengths, potential strengths and weaknesses. In this regard, the Finnish ecosystem had networks, engagement events, knowledge, BAs and professionals as their strengths, while entrepreneurial talent and worker talent were potential strongpoints and VC, informal capital, leadership and bootstrapping could be considered weaknesses. Likewise, in the Estonian ecosystem, networks, engagement events and leadership were its strengths, knowledge, BAs and bootstrapping had potential, and VC, informal capital, entrepreneurial talent and worker talent were its weaknesses. It is apparent that knowledge, BAs, entrepreneurial talent and worker talent are performing relatively better in Finland in comparison to Estonia, where leadership and bootstrapping perform better. Hence, these systems are well-suited to substitute for one another and have the potential to form a transnational environment. This could lead to the necessary synergies and efficiency required to tackle both ecosystems’ weaknesses and create an attractive scenario for VC entrance and make the community more attentive and keener regarding informal capital allocations. Nevertheless, to provide a fully comprehensive response to this research question, it would be necessary to assess all the countries in the world based on their strengths and weaknesses to depict their relative uniqueness in relation to one another.

RQ 3.3. How does a set of systemic elements explain the performance of comparable ecosystems? After exploring the most critical elements for BG start-up development and assessing ecosystems’ strengths and weaknesses, it was possible to measure the performance of the ecosystem in consecutive stages and comparative contexts. Hence, using the criticality and presence-based ratio for the strongest to the weakest elements, it was clear that the Finnish ecosystem was performing at 87% of its full potential in the discovery stage and 88% in the validation stage. In comparison, the Estonian counterpart performed at 79% and 71%, respectively. According to the GEDI (Acs, Autio and Szerb, 2014), the world’s best-in-class ecosystem was the United States, with an index of 82.5 points. Thus, taking this as a basis for benchmarking, i.e. 100%, then Finland’s index of 69.3 points becomes 84.0%, while Estonia, with an index of 59.0 points, performs at 71.5%. Thus, both exhibit similar levels of effectiveness as measured by the GEDI. Likewise, the Finnish ecosystem is more efficient in building knowledge capacity and utilising resources compared to its Estonian counterpart (Lafuente, Szerb and Acs, 2016). Further, in terms of high-growth start-ups, Finland has 10.64% compared to Estonia’s 8.2% out of all the start-ups combined (Corrente et al., 2019). Even though Finland and Estonia are in the best cluster in Europe in terms of total EA and opportunity-driven EA (Content et al., 2020), Finland is
considered to have an innovation-driven national ecosystem, whilst Estonia has an efficiency-driven one (Martínez-Fierro, Biedma-Ferrer and Ruiz-Navarro, 2019). Hence, all these findings are in line with previous research comparing these ecosystems. In some sense, these results could even explain the configuration differences in criticality rankings and the variations in entrepreneurial perceptions—Finns choose professionals (innovation-driven) over Estonian bootstrapping logic (efficiency-driven). And so, from this point of view, the transnational environment would benefit both countries in terms of effectiveness and efficiency aimed at improving their competencies in nurturing BG ventures in areas where it is most imperative.

RQ 3.4. How do intra-group characteristics describe BG start-up perceptions of the EE?
After confirming that the founders of Finnish and Estonian BG start-ups perceive the same elements as critical for their development, with only one exception in the preliminary stages (as stated above), and having argued that the ecosystem context could be on the brink of transnational convergence, I decided to dig deeper to understand how these rapidly internationalising ventures perceive local elements based on their own intra-group characteristics. On the one side, discrepancies were detected regarding knowledge, informal capital, leadership, engagement events, BAs, networking services, VC, CVC and formal debt. On the other side, these disagreements were visible between ventures depicted by their organisational features of age, team size, service-product offers, revenue, as well as their international features of team allocation, the origin of the owners, internationalisation speed and market scope. However, one should note that the results clarify only differences in perceptions, not the overall criticality ranking itself.

It is apparent that younger BG start-ups (up to three years) perceive knowledge as relatively less critical for the discovery stage than older ones (four to six years) do. This could imply that even though newer firms see knowledge as a critical ingredient in establishing a business (Lai and Vonortas, 2019), other skills have become valuable as well. Also, younger BGs perceive informal capital as more critical for launching a start-up, indicating that in recent years, high-risk endeavours and raising capital from friends, family and ‘fools’ have become a social norm. This positive tendency, along with the acceptance of failure, is a building block of a resilient entrepreneurial community (Feld, 2020). Likewise, BA involvement is on the rise for validating BGs as younger firms find such consortiums a more attractive source of risk finance and support (Lai and Vonortas, 2019). Perhaps many stakeholders have become angels themselves and are investing seed capital to enable and boost local venture growth (Wong, Bhatia and Freeman, 2009; Chemmanur and Fulghieri, 2014).

Also, knowledge is more critical for BG start-ups with larger teams (more than 10 employees) in the discovery stage. BGs with a sophisticated business proposition need appropriate knowledge (Acs et al., 2016) and, in many cases, to acquire it, a substantial amount of talent is integrated, leading to larger teams. Similarly, for validating products and services, ventures with a service orientation view knowledge as more critical (Horváth and Rabetino, 2019) than do product-driven firms. Proprietary protection for services is not easy to achieve compared to products, and a higher degree of customisation
of services (Kirca, Jayachandran and Bearden, 2005) is enabled by a mix of knowledge to comply with customer needs. Hence, these firms need continuous flows of knowledge integration and revitalisation just to stay ahead of the competition. Also, to launch service BGs, time-to-market is of the essence for firm survival, and they need to be flexible to respond to fluctuating market demand promptly. Likewise, knowledge is more critical for pre-revenue BGs because, in many cases, such firms invest heavily in their science-based business (Lai and Vonortas, 2019) without any exposure to market demand, and some firms tend to validate their business proposal for free until it is proven reliable.

Similarly, engagement events are critical to finding great talent, testing and building solid business models and gaining early traction for innovation-based products and services (Burgelman and Hitt, 2007). Hence, actively participating in these activities facilitates rapid business development that might lead to early revenue streams (Auschra et al., 2019) and a more solid market presence. Another interesting find was that even though CVC is less relevant to BG development in both stages, pre-revenue BGs see it as more critical for their introductory stage than do those with revenues. The simplest explanation for its relative criticality could be that CVC firms only target ventures that can be integrated into their business ecosystems (e.g. Microsoft acquiring Skype, Facebook acquiring WhatsApp). However, this seldom happens. Another point could be that BG development incorporates high levels of uncertainty and risk (Gabrielsson et al., 2008), and having complex product-services and longer R&D time horizons, CVC involvement can have positive effects (Lai and Vonortas, 2019). From the CVC viewpoint, they only invest in BGs that make a tenured impact on their bottom line and are aligned with their long-term strategies. Hence, CVC investments might not be as contingent on achieving revenues straight away compared to, for example, VC goals of maximising returns in the short run (Cumming, Werth and Zhang, 2019).

Furthermore, although leadership skill is important for entrepreneurial motivation (Shane, Locke and Collins, 2003), firm internationalisation (Cotae, 2013; Mets, 2015) and building and maintaining a healthy ecosystem (Feldman, 2014), it might be visible and appreciated mostly in the local context. Hence, it is plausible that BGs with local teams are more reliant on the leadership element. Also, BGs with team members allocated across borders have already commenced (inward) internationalisation activities, and relative to their remote team members, the managerial leadership role and its influence are diminished by distance. Correspondingly, ventures with foreign equity investors perceive informal capital as more critical. Perhaps founders with solid business plans are sufficiently confident to utilise their personal social ties to raise financial capital from their inner circle; otherwise, they would risk harming these relationships. Thus, this degree of legitimacy and trust is built on social capital (Arregle et al., 2007; Lorenzen, 2007) which would reflect well on foreign investors who invest in teams running the start-up rather than the idea itself. You can have great ideas, but it comes down to the team to make it happen. In addition, BGs with foreign equity investors view networking services, VC and CVC more critically in comparison to local investors during the discovery stage. The main reason could be that all these elements are there to build and leverage BG networks (Gabrielsson and Kirpalani, 2004; Laanti, Gabrielsson and Gabrielsson, 2007; Ahuja,
5.2 Theoretical contributions

Soda and Zaheer, 2012) to improve their development and survival, and many BGs have managed to extend their networks to raise VC and CVC investments from foreign equity investors in the first place (Gabrielsson et al., 2008).

Lastly, the speed of internationalisation and market scope are two central criteria in defining BG firms. BG internationalisation occurs during the first three years after inception. However, I found that BA involvement and formal debt hinder rapid internationalisation during the first year of inception. This is an indication that BAs tend to constrain this aggressive scaling, which is in line with the capabilities of VC instead (Gabrielsson, Sasi and Darling, 2004). Similarly, formal debt is the least critical element for BG development and internationalisation due to the lack of collateral and a proven track record (Zott and Huy, 2007), and debt premiums on cash flow would hinder momentum and progress even if formal debt were used as risk financing (Lai and Vonortas, 2019). In addition, BGs which have entered at least 10 markets value knowledge more than BGs with less foreign market activity. One could assume that resilient international aspirations require a certain mix of knowledge and capabilities to maintain a strong market hold (Rialp, Galván-Sánchez and García, 2012), making knowledge a pre-requisite for a superior market presence.

In summary, exploring the state of the art of the EE phenomenon and mapping out the main thematic keystones have helped to prepare a solid viewpoint on where to focus the empirical examination of this dissertation. For this reason, exploring the systemic layer of structural conditions and their influence on BG development has been a source of valuable insight. These noteworthy findings can be applied to further comprehend how systems of entrepreneurship nurture ventures that, from their inception, target rapid internationalisation initiated from their home ground and continuously persist in their efforts to create value in the global context.

5.2 Theoretical contributions

The present dissertation consists of four publications divided into two areas of inquiry: state of the art to derive information from previous theoretical advances to comprehend the current knowledge of the EE phenomenon, and empirical investigations of the basis of previous advances to examine the interconnections and dynamics occurring amongst the EE systemic elements and their effect on BG start-up development during the discovery and validation stages. In this format, conducting a bibliometric inquiry into the EE literature was the first effort to elaborate the main facets of countries, institutions, journals, researchers and publications related to the EE construct, and to my knowledge, it was the first holistic attempt to do so (Velt, Torkkeli and Laine, 2020). Similarly, it became crucial to elaborate the context by focusing on the systemic elements of EE and extend and update these according to new advances in the literature, for example, by adding crowdfunding and engagement events as variables missing from previous empirical studies in the EE context, of which the latter was found to be a critical element for new venture development (Velt, Torkkeli and Saarenketo, 2018b, 2018a, 2020).
Additionally, many researchers have previously explored the EE from the practical point of view to map its structural conditions relevant to entrepreneurship development. Researchers have also assessed these complex systems and their elements through proxies and indices from a macro-perspective from the ‘top’ in order to explain things ‘down’ at the grassroots level (Acs, Autio and Szerb, 2014; Lafuente, Szerb and Acs, 2016). However, my intent was to do the opposite by addressing the complexities at the grassroots level by considering start-up founders as the source and how they perceive their surrounding environment. Arguably, the ‘top-down’ approach enables comparing EEs across the world and benchmarking their performance; instead, my interest was to appreciate the mechanisms and relations underlying the ecosystem to focus on its drivers. This ‘bottom-up’ approach is not easily scalable for comparison studies; however, it has alternative benefits in terms of learning about the essence of the EE from the perceptions of entrepreneurs who drive, manage and regulate this system. It was relevant to understand these relations and dynamics first to establish the ground and main rationale, and only then, in the following studies, dig deeper with qualitative and experimental methods.

Likewise, the consensus on what a productive and vivacious EE construct consists of has not been settled (Kshetri, 2014), mostly because researchers have focused on studying only one element of the system (Zacharakis, Shepherd and Coombs, 2003; Lincényi, 2017; Brown et al., 2019; Horváth and Rabetino, 2019; Neumeyer et al., 2019) or some of these (Qian, Acs and Stough, 2013; Brown and Mason, 2017; Schillo, 2018; Bischoff, 2019). Moreover, there are substantial differences in the division of attention within the EE-specific literature as some researchers highlight certain elements more than others do. Hence, there is a need for studies like the present one to consider all the elements relevant to systemic-level interactions under one research framework. Even though ‘top-down’ studies have made great strides and efforts in this regard, there are no ‘bottom-up’ inquiries that actually appreciate which elements constitute a healthy EE. In addition, there is no research on which elements are critical versus non-critical (Cavallo, Ghezzi and Baldacci, 2019). Thus, I evaluated these criticality aspects and their performance in start-up development to realise system-level complexities and reflect their underlying dynamic behaviour. Due to these previous misalignments, it remains imperative to acknowledge how these intricate systems encourage and enable entrepreneurial ventures during their progress (Acs et al., 2016). Consequently, on the EA level, it became vital to examine a certain type of new venture to explore these shortcomings.

Therefore, the main rationale of the EE is to focus on entrepreneurs and their efforts to introduce new value. However, not all entrepreneurial endeavours need to exploit the full potential of what the EE has to offer. For example, a new venture which, given its business potential, does not need to scale or create substantial value for the community, does not require support from BAs or VC. In light of this, it becomes relevant to concentrate on the best-performing new ventures that, from their inception, offer significant value and enter foreign markets soon after. Integrating this approach enabled me to emphasise the BG type of new venture, which, despite its smallness, newness and foreignness, rapidly achieves an international presence. Hence, it was crucial to consider how these firms are influenced by their local EE and deal with their resource constraints. Still, BGs tend to
find endowments elsewhere and extend their networks across the locality while incubating in their home environment. By taking this into account, it was necessary to assess BGs through their life cycle, where the local context has the most impact. In the EE context, previous studies have looked at the life cycle aspect from the EE point of view (Mack and Mayer, 2016; Auerswald and Dani, 2017), but there are no studies that have specifically considered BGs or any kind of new venture’s stance vis-à-vis these elements and which actually matter the most for their stage-wise development. Therefore, I included start-up focused life cycles (Marmer et al., 2012; Autio et al., 2018) to integrate EE-associated structural and processual activities with venture-level life-cycle stages to further explore BGs in their EE context. My objective was then to explore the BG start-up life cycle with its various requirements relevant to each stage in order to elaborate and elucidate local elements, their dynamic behaviour and which of these are critical for successful progress. These are all clear contributions to advance our knowledge further.

Further, previous research has focused on transnational aspects of entrepreneurship (Drori, Honig and Wright, 2009; Lundberg and Rehnfors, 2018), and specifically in the EE context, to study transnational entrepreneurial practices (Fraiberg, 2017a; Brown et al., 2019). However, no previous studies have addressed the transnational dimension from the viewpoint of potentially merging EEs. As argued, there are endowments which EEs have to share, in one way or another, and they collaborate to enable these underlying exchanges. It is not just about the transnational connections enabled by entrepreneurial practices; there is also a higher-level effect of convergence between certain regions or even countries. Thus, it is relevant to extend our current theoretical knowledge and draw attention to the potential of synergies and efficiency gains obtainable through the transnational dimension. I then introduced a ‘transnational’ component to the EE research field and focused on its potential emergence from the two-country context of Finland and Estonia by elaborating their strengths for use in tackling some of their common weaknesses. This represents a crucial advance because in this globally interconnected world where talented people can move more freely to change their start-up location, extend their networks, and operate across national boundaries, country borders for entrepreneurship are blurred. In the context of the EE, these environments compete for relevant resources around the globe to attract these endowments across borders to become efficient and effective. However, when there is resource scarcity, localities have to start to collaborate and share them. Thus, smaller countries need to align their objectives and goals to develop their entrepreneurial surroundings and subsequently converge to some degree to improve their vitality and performance outcomes. This leads me to think that even if it is only relevant to smaller countries, it is significant to test this convergence mechanism at the city, regional, and large-country levels and explore if this is a recurring trend in other EEs. Likewise, its implications for agglomeration trends and deglomeration effects in the future require investigation.

Furthermore, I explored the EE and its elements from the perspectives of founding entrepreneurs in one country context and then compared and validated these findings within another country. I discovered that the same conditions and elements indeed apply, namely those which founding entrepreneurs perceive as critical when launching and growing their
BG start-ups with the aim of successful internationalisation. This in itself is an important contribution to make as it identifies a common impression regarding a configuration of elements which enables and supports venture development and, in turn, can be reflected as a founder’s roadmap. From these findings, it is crucial to establish new theories and frameworks on how, when and where entrepreneurs should focus their efforts, depending on a venture’s stage of development, and plan strategically in accordance with its surrounding context. Moreover, even if this main setup differs in other countries, it is still relevant to acknowledge that this is an important outcome to be further validated in other EEs and investigated if inconsistencies arise.

Similarly, considering the different empirical methodologies applied to derive previous results is an important contribution of this dissertation. I employed bibliometric methods to investigate the roots of the EE concept, established its grounding through intellectual networks and an algorithmic clustering technique, and used this line of thinking continuously throughout this scholarly process to detect and review relevant works on EE advances, BG theories and life-cycle studies. In addition, I used simple statistical approaches to explore the mechanisms of the EE and its effect on BG start-up development, which led to interesting, relevant and applicable findings. Criticality rankings enabled the juxtaposition of elements vital for concurrent life-cycle stages in order to explore their dynamic behaviour in supporting BG start-up development. By introducing availability and access measures, I was able to create a ratio system to measure the performance of each of these elements in their respective stages, as well as the aggregate performance of the EE in two-country contexts from grassroots. This further opened the door to evaluate the systemic conditions and group them based on their relative strengths and weaknesses. I then validated these divisions and determined that some elements are less central for venture progress. Finally, I used new venture features to explore their differences in perception using analysis of variance to derive more relevant insights regarding their various requirements.

On the one hand, from a holistic perspective, the EE research domain focuses on the structural conditions and elements which influence EA as an output of systemic interaction (Stam, 2015). Entrepreneurial action has been depicted in a multitude of forms by concentrating on high-growth start-ups (Mason and Brown, 2014; Acs et al., 2016), various start-ups (Nylund and Cohen, 2017; Brown et al., 2019) and spinoffs (Civera, Meoli and Vismara, 2019), amongst other types in the EE domain. However, there have not been any studies focusing on the BG type of start-ups, which inherently need critical support due to their rapid progress and internationalisation. This is a critical downside because to reflect and comprehend the EE and its support function accurately, it is relevant to assess locality through a well-established concept of BG which utilises all of the aspects which the EE provides. Hence, it is vital to better establish the EE topic in the IB and strategic management literature and the role it plays for international business development. This is another of the main contributions of this dissertation work. Future studies could look closely at local environments and their resilience and sustainability mechanisms, all of which play significant roles in improving our global business setting. On the other hand,
5.3 Managerial and policy implications

we know that the IE literature, in covering the BG phenomenon, is rather scant and somewhat dispersed (Knight and Liesch, 2016; Baier-Fuentes et al., 2019) and could urgently use the integration of a framework such as the EE to move the field forward. Also, reviews on IE (Jones, Coviello and Tang, 2011; Peiris, Akoorie and Sinha, 2012; Ribau, Moreira and Raposo, 2015) do not find any work conducted on entrepreneurial or any kind of ecosystems, meaning my research is well-positioned and timely. Previous studies have discussed and elaborated EE elements in BG (Øyna and Alon, 2018) and internationalisation (Dabić et al., 2019) contexts and perspectives, so there is already a strong alignment and linkages between these theoretical bases. This makes it an essential theoretical contribution to have merged and explored these topics under a unified research framework to advance our current knowledge and yield great potential for future studies in all relevant research fields and other topics affected. Consequently, this dissertation presents a uniform basis of EE elements to explain BG behaviour and outcomes, and vice versa. To my knowledge it is the first attempt to do so.

In summary, through this dissertation process, I was able to highlight the underpinnings of the complexities which EE involves when nurturing BG start-ups on the way to achieving an international presence. Furthermore, this work established a vital research framework by extending, updating and aligning previous fields and incorporating EE elements, BGs, start-ups and life-cycle studies in this dissertation process. Moreover, this effort has become a theoretical contribution in itself that will lead the way to future discussions and research agendas regarding EEs.

5.3 Managerial and policy implications

I started this quest with one agenda in mind: to establish and reflect a founder’s roadmap. I launched my own start-up before joining academia, and I was constantly confused about from where to draw inspiration (leadership), what the most appropriate means of capital allocation was, whether I should give away equity or find collateral to borrow money (finance), whether I should invite someone to join my quest who has an appropriate skill set to benefit my business (talent), whether I had the right mindset, experience and know-how to find solutions (knowledge), who, how, when and where to access and request certain endowments (networks), whether I should apply for ‘shelter’ (intermediaries), ask for professional help and acquire market intelligence (professionals, networking services) and, finally, whether I was certain that the things I did were relevant to begin with (engagement events). It was an overwhelming puzzle, and there was no appropriate information available to guide me through the obstacles that present themselves when trying to build something new to positively impact my self-development and create value for myself and my community.

The first step was to acknowledge that ‘however’, ‘whenever’ and ‘with whomever’ I conduct my business, the ‘wherever’ aspect turns out to be the most crucial question. In other words, it is critical to comprehend the context and its facets, and one’s surrounding environment becomes the key factor in differentiating success from failure. Hence, to
become productive and effective, navigating and understanding your local EE is an essential starting point. Many entities (e.g. the OECD, governments) started to see that certain geographical regions create a great deal of global value, which pushed academia to turn its focus in the direction of the EE. In the beginning, the EE was a vague construct, but in recent years, empirical research has caught up with it to highlight how these complex systems evolve and support entrepreneurial action. From my bibliometric discoveries, I have established the foundation necessary to show what has been done ad hoc, and based on this, practitioners and researchers can visualise what else needs to be done to crack the code of success. Even though it is small and not the newest derivation of the status-quo, it nonetheless provides relevant insights regarding where we have been and where we should go to investigate the phenomenon further. Extending, updating and upgrading the EE model from the standpoint of BG start-ups and their preliminary stages would help to reflect a founder’s roadmap for navigating the stormy seas of the market economy.

In conducting my empirical investigation of the specifics of EE interrelations and dynamic behaviour, I have discovered some interesting findings to help novices and more experienced founders and managers to comprehend their surrounding environment through reflection on their models of conducting business. Further, I have tried to find answers to help them to focus on their core activities and strategically plan others. Incorporating all these elements was an effort in itself, but I will discuss the main findings, which could help in making practical decisions and enable the introduction of new policies to favour and support entrepreneurial action with the goal of recharging local economies and communities through the search for common benefits.

The current interpretation derived from this empirical investigation revealed sixteen elements incorporated in a healthy EE which require our attention, as elucidated in the theory chapter. These, however, will change in the future. For example, robotics and AI are important factors to consider for future business development; these will become additional sub-elements of talent, or perhaps Industry 4.0 will change our current understating of value chains and become an important enabler of knowledge creation and initiating structural changes in networks to redefine the systemic conditions. In any event, this is a good starting point. In reference to the results, not all EE elements are critical in the preliminary stages of new venture development. In the Estonian context, I discovered that there are seven critical elements for discovering and launching start-ups and ten for validating and growing them. I later compared the Estonian data with the Finnish ecosystem and readjusted the cut-off criterion. It then became apparent that there were, in fact, nine (i.e. entrepreneurial talent, knowledge, leadership, informal capital, networks, bootstrapping, worker talent, engagement events and BAs) and seven (i.e. entrepreneurial talent, knowledge, leadership, networks, worker talent, BAs and VC), respectively. All these elements were perceived an equally critical, regardless of the context. The only difference was in the validation stage, which seemed to indicate that Estonia is more rooted in a bootstrapping mentality, while Finland favours the services of professionals. I have lived for a substantial amount of time in both counties, and this aligns well with our national
5.3 Managerial and policy implications

attitudes: Estonians are dedicated to ‘doing it yourself’, and Finns are more inclined towards a ‘let us do it together’ attitude. These results represent the first step in developing a founder’s roadmap to allow stakeholders to visualise and prioritise which elements are relevant to their own business development and which should be left out from strategic planning from these stages and be reintroduced at later points in time.

Furthermore, the confirmation of the presence of these elements and their inclusion in the model enabled me to picture how well they performed in their respective localities. Finland is relatively better suited, compared to Estonia, to launching and growing start-ups. This discovery aligns with previous findings (e.g. Acs et al., 2014). However, in aggregate terms, these are two of the best countries for these purposes in the global arena. In addition, the Estonian EE had three elements as their strengths, three that were potential strongpoints, and four that were weaknesses of the ecosystem. In Finland, five elements were strengths, two were potential strengths, and four were weaknesses. All these findings indicate that even though these EEs perform relatively well, there are substantial effects hindering their performance. Thus, the two EEs could work together more closely to complement their respective weak points and, in the future, could possibly align their efforts to perform better. This might be a relevant implication for other interested stakeholders across the world, alerting them to value collaboration at every level of interactions.

In light of the above, I found it appropriate to test my theory by converging data sets and conceptualised the possibility of a transnational ecosystem. Even though I did not publish this data, there were implications that a combined ecosystem could lead to better performance and complementarity effects. Moreover, the bigger sample size allowed me to shed more light on the dynamic behaviour of the elements. By comparing both stages, I found that some elements raise or lose their relative importance, depending on the stage. For example, VC became the most important financial element for the validation stage, where it exhibited greater ability to support start-up growth activities when compared to other capital sources, whilst informal capital lost its value for the opposite reasons. In addition, I used the data gathered on organisational and international features to describe the variations between new ventures. These perceived variations were described in detail when I answered the research questions in the previous section. However, it is important to point out that these differences and EE weakness could determine founders’ decisions to move or establish their start-ups in another ecosystem or enable them to strategise their inward and outward internationalisation plans. For example, we now know that VC is a critical element for validation while being a weakness of the EE (irrespective of the two-country or transnational context); consequently, founders might start to look for foreign investors or move closer to them. Similarly, BAs are a strength of the EE, but it inhibits a highly rapid internationalisation process. However, their presence reflects the maturity of the EE. These are just some examples, but all the results presented herein should be considered simultaneously when founders decide which elements are appropriate to fulfil their needs—this is the essential point of reflecting a founder’s roadmap to help them navigate.
When reviewing the main findings, it is important to note that there is a wide array of policy implications, from the aggregate level to the individual level. Previous literature has highlighted the relevance of high-growth ventures like BGs, along with internationalisation in the policymaking context, and related previous policy approaches have been criticised for their lack of accurate focus (Mason and Brown, 2013). However, to initiate appropriate policies requires considering the strategic objectives and goals of the local EE and what these policies are intended to achieve. In my opinion, the primary intention should be to facilitate efficiency and self-sufficiency. The countries compared in the present study can be considered peripheral, and from the results, it is apparent that there are plenty of weaknesses on both sides. On the aggregate level, policies should be in place to make the movement of endowments much easier because for BG start-ups to conduct business on a global scale, they require access to endowments that might not always be locally present or perform well. I do not assume that every EE is able to support all variations of ventures and their requirements, but the system should be dynamic and open enough to enable the transmission of endowments and be open to co-evolution; otherwise, this system would be unable to renew itself and stakeholders would depart. This would have a huge negative trickle-down effect, as you can imagine. Hence, policies should not be restrictive, just regulative, and they should allow and sustain free movements of resources and capital, which is one of the pillars of the EU. This is by no means an easy task; however, we should not forget that there is competition between EEs. Due to the pandemic, we can see that this pillar does not always work. On the individual level, these policies can be more concrete and address relevant weaknesses. It is critical to renew and build your talent pool to create new knowledge and extend networks to acquire foreign capital (if not locally present). Governments can do a lot in this regard by specifically monitoring bottlenecks and proposing applicable legislation. Also, it is vital to build a community where entrepreneurship is supported. There should be laws and regulations that encourage risk taking and provide safety nets to tackle inevitable failures to promote entrepreneurship.

In summary, the main driving motivation of my dissertation was to reflect a practical framework in the format of a founder’s roadmap to guide entrepreneurs, founders, managers and policymakers in making sense of their local EE. It was far from easy to comprehend all the facets of these complex systems and present them within the premises of this dissertation. Nevertheless, it was vital to get the discussion going on all relevant aspects of the entrepreneurial environment and how to improve their vigour. Therefore, the examples given are just the tip of the iceberg, and I hope that everyone interested will derive their own connections and takeaways to positively impact and improve their entrepreneurial endeavours. The role of the EE community is not straightforward; however, in the current global context of shared resources, we need to give our best effort to aligning our goals at all levels of development to continue innovating by creating value for the global societies. Hence, the EE has indeed been identified as the mechanism that can support value-driven BG start-ups and EA on all relevant levels.
5.4 Limitations and future research

The limitations of the present dissertation as well as the future research avenues it suggests can be addressed from the perspectives of the EE, EA, and the methodology herein employed. From the EE viewpoint, one of the main limitations was the exclusion of framework elements (i.e., formal and informal institutions, infrastructure and market demand). Every country context is somewhat different based on its framework conditions. Hence, it is relevant to further our knowledge by investigating the dynamic relationship between the framework and the systemic elements. It is important to note that although framework elements do not directly affect EA, they still influence them indirectly through systemic conditions. Thus, it becomes important to take these into account by preparing a more comprehensive empirical investigation. Likewise, it could be insightful to take this two-layer list of elements or only systemic conditions, similar to this dissertation, and apply them to different and similar contexts to further validate my findings and benchmark EE performance within other unique localities. The context need not be exclusively countries but might also include large cities, rural or urban areas or even regions and federal states of large countries. In addition, there is a temporal dimension to be employed because EEs can be differentiated in terms of their own stage of development. Hence, a study focusing on and comparing these structural aspects based on their phase of maturity across contexts could prove an interesting investigation.

Furthermore, I introduced the transnational dimension to the framework to open the field to new research avenues. To date, this is the first study to propose doing so as it was deemed essential to show that transnationality can apply to the EE context. The main objection might be that transnationality is suitable in a small economic context where the ecosystem is more often defined on the country level. However, if we expand the focus to a large economy with federal states similar to small countries, the local EE arguably would not extend beyond national borders. However, there could still be convergence effects even if it does not extend beyond the country’s borders.

Moreover, in reflecting on this research agenda, it is relevant to acknowledge that I might have missed including some applicable systemic elements in the theoretical framework, although I added newer concepts (e.g., crowdfunding, engagement events). It is also possible that I could have added more divisions for sub-elements (e.g., support). I decided not to be too detailed by separating all these elements into sub-units because I received critical feedback from the focus group to this effect. Including too many sub-elements would have been too overwhelming and demotivational for respondents and could have provoked confusion on the practical differences. Also, some sub-elements would not have been significantly different as sources of theoretical or practical contributions (e.g., networking services). Hence, it was deemed most important to assess systemic elements and their configurational effects in new venture creation. For example, the leadership element was not divided because leadership in this context is treated as a motivational role mechanism, no matter if its effects come from the community or venture level. Tacit and explicit knowledge are intertwined, and there could not be one without the other. Social and inter-organisational networks are considered the same in practice because all networks
are established using the founder’s own social networks. Even so, there might be new upcoming additions as the field is still under development, and these would be interesting facets to consider in the future.

Similarly, there should be more information on the dynamics of and interrelations between the systemic elements and their combinational effects (e.g. new ventures with BA backing could be better at attracting VC investments). Likewise, even if some elements were deemed to be less critical for new venture development (e.g. crowdfunding, credit institutions), they might have relevance through complementary effects when joined with other elements or found relevant in different settings. These results could prove illuminating. Another interesting point would be to further explain the configurational aspects of the systemic elements and how they influence the founder’s opportunity recognition process, business model (re)configuration in different life-cycle stages and industries, the development of internal activities and dynamics across the new venture value chain and survival and default rates. The latter would involve a series of longitudinal empirical studies.

From the EA viewpoint, it was relevant to prepare a stratified sample by introducing some limitations to the empirical investigation. At the point of departure, it was imperative to exclude BG start-ups currently in their discovery (stand-up) stage because the novice entrepreneurs and founders running these new ventures would lack experience and know-how earned in the validation stage (start-up). I did not control for their background per se as serial entrepreneurs definitely would have some experience, but the information gathered would then not be directly connected to the specific new venture I was addressing. Likewise, BG start-ups which had passed through the discovery and validation stages and were in their efficiency and scale (scale-up) stages would not have been good sources to mirror EE facets due to the inappropriateness of their experience. The information would not have been up to date, the impressions would have been based on new experiences which would bias previous perceptions, and it would have been complicated to contact the original founders directly, even if they were still active. Additionally, I excluded BG start-ups from the sample which were older than seven years to align with BG theories. BGs have been demonstrated to achieve an international presence three years after their inception; however, it takes six to seven years after inception to reach higher levels of efficiency (Braunerhjelm and Halldin, 2019) and, thus, enter the third stage. These veteran companies are already well established in their international markets and have gone through many changes in their resource allocation to acquire relevant data.

Subsequently, it becomes important to extend this framework to all stages of the life cycle to map those elements which are most important in later stages. As asserted above, the first stages have the strongest impact on BG development and internationalisation; however, other potential elements could be uncovered in later stages. These elements might influence changes in strategies employed, business model innovation, productivity, liabilities endured, survival and default rates and entrepreneurial recycling activities. Hence,
5.4 Limitations and future research

a fruitful direction from which to examine BG development in the future could be a survival study to determine which start-ups ended up successfully taking a BG path, which could be considered in light of the EE configuration and its developmental status.

In addition, the state of the art analysis is based on the bibliometric technique for reviewing the previous literature, and this turned out to be an important stepping stone to a deeper dive and utilising a systematic literature review on the topic to draw attention to the underlying themes in a more precise scope. At this point, the EE is not ready for meta-analyses; however, in a couple of years, it might be if more studies on measuring the EE construct become available. The empirical investigation presented in this dissertation is exploratory in nature and remains relatively descriptive by focusing on best-in-class-type firms like BGs. Hence, other studies are called for that introduce and compare perceptions of other types of firms which are rapidly internationalising but have not reached BG status or just tend to stay local. It would be important to juxtapose these with BGs to explore more thoroughly the contextual and configurational differences that distinguish all of these various ventures.

Also in line with this perspective, the two-country context somewhat naturally limits the generalisability of the results, as does the cross-sectional survey nature of the research methodology employed. These limits could be surmounted and my findings further validated by extending similar studies to other parts of the world, using more sophisticated quantitative approaches to assess dynamic interrelations and digging deeper by preparing case studies to obtain richer data with the aim of comprehending founders’ experiences regarding why some elements are more critical than the others, how intra-group differences have played out in real-life scenarios and how this has impacted their efficiency and survivability. Hence, more research should be conducted using ‘bottom-up’ approaches; otherwise, we will be unable to consider each EE’s uniqueness and develop effective policies accordingly. Additional experimental methods would also yield new insights and provide a further point of reference for better appreciating how founders utilise their surroundings to deal with the occurrence of certain liabilities and issues when creating new value frontiers.

In conclusion, the theoretical foundations and conceptual formulation of the EE and holistic views of the ecosystem structure and its elements are converging. However, the scantiness of research on the interrelationships and dynamics between the EE and EA in new venture creation became a significant point driving the present dissertation. It is necessary to appreciate the ecosystem construct in detail and the dynamics that lie between the elements. To delimit the study, I focused on a two-country context and its systemic elements which control human interactions, defined as the central driving forces of the EA, which are the key to determining the success of an EE. The concept of the EE is critical in facilitating the international growth of new ventures and for enabling rapid and intensive foreign expansion, which is captured by the BG phenomenon. Nevertheless, to date, no other research field has integrated these two streams. The present dissertation represents one of the first exploratory steps in linking the two by outlining and extending the EE construct, its strengths and weaknesses, and the performance of its elements in
catering to the needs of ventures, which it carries out in a two-country context by comparing and merging the two in order to recognise their united potential for rapidly internationalising BG start-ups. This research presents valuable insights for all interested parties by outlining its results in a reflective format which start-up entrepreneurs could consider and utilise as a founder’s roadmap.


References


References


References


References


McAdam, M., Harrison, R. and Leitch, C.M. (2019). ‘Stories from the field: Women’s


Motoyama, Y. and Knowlton, K. (2017). ‘Examining the connections within the startup


References


References


References


Vallaster, C. et al. (2019). ‘Responsible entrepreneurship: outlining the contingencies’,
References


References


Publication I

Velt, H., Torkkeli, L., and Laine, I.
Entrepreneurial ecosystem research: Bibliometric mapping of the domain

Reprinted with permission from
Journal of Business Ecosystems
Vol. 1, pp. 48-83, 2020
© 2020, IGI Global
Entrepreneurial Ecosystem Research: Bibliometric Mapping of the Domain

Hannes Velt, LUT University, Finland
Lasse Torkkeli, LUT University, Finland
Igor Laine, LUT University, Finland

https://orcid.org/0000-0003-1965-0057

ABSTRACT

The entrepreneurial ecosystem stream of research is relatively new, yet it has started to attract the attention of scholars across a range of disciplines including international business and international entrepreneurship. Review studies are needed to consolidate the research and to illustrate the status quo and present visions for research going forward. This study aims to do so by applying bibliometric process technique. The present study summarizes the key countries and institutions, source journals, scholars and publications, and key themes encompassing the domain of entrepreneurial ecosystem research up to 2019. The findings illustrate an exponential growth of research covering a wide array of disciplines and top journals, observe several influential scholars and their collaboration networks, and find that the studies remain distinctly practitioner focused. In addition, six themes within the research domain are identified. The multilevel analysis gives a comprehensive overview of the entrepreneurial ecosystem domain.

KEYWORDS

Bibliometrics, Dimensional Entrepreneurship, Entrepreneurial Ecosystems, Visualization, VOSviewer

1. INTRODUCTION

Research on entrepreneurial ecosystems (EEs) constitutes a new-found stream of studies explaining how this complex socioeconomic system supports entrepreneurial activities and value creation for the larger community. Despite numerous definitions of EEs (Malecki, 2018), the concept is broadly defined as a ‘set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship’ (Stam, 2015, p. 1765). Over the last decade, especially the past few years, EEs have started to attract the vast interest of scholars across a range of disciplines (e.g., management, economic geography, strategy, entrepreneurship). The increased attention over time has created the need to consolidate fragmented findings across countries, institutions, journals, scholars and research avenues within this young but prolific topic (Audretsch et al., 2019).

The ecosystem concept has found its way into academia, industry and policy. Starting as an ecological metaphor (Moore, 1993) to explain the system-level complexities, the ecosystem
concept has subsequently become an attractive framework to explain different system designs (Ritala & Almpanopoulou, 2017), influencing the creation of multiple research streams. They include entrepreneurial, knowledge, business, innovation and digital platform ecosystems, among others (Aarikka-Stenroos & Ritala, 2017; de Reuver et al., 2018; Hakala et al., 2020; Jacobides et al., 2018; Scaringella & Radziwon, 2018). The EE focuses on the actor interrelations by exploring the entrepreneurship, the system infrastructure and its underlying processes (Van De Ven, 1993), with its roots derived from more established concepts of clusters, industrial districts and regional innovation systems (Acs et al., 2016; Autio et al., 2014; Spigel & Harrison, 2018). Subsequently, the EE combines a multitude of research streams, making the present study relevant to provide a timely overview of EE research.

Utilising bibliometric methods to analyse the main facets of the status quo and to present the themes derived from the literature is important since, to our knowledge, no bibliometric analysis is available to determine the countries, institutions, publication venues, scholars and central themes that are vital to advancing the EE literature. Our study therefore sheds light on the statistics, intellectual foundations and structural themes in the EE domain and highlights the current state of the research. We extract data from academic databases and apply specialised software to analyse and visualise literature. This multilevel approach benefits present and future scholars by providing a clear snapshot of existing research efforts. Although recent contributions have applied bibliometric methods in the EE context (Alvedalen & Boschma, 2017; Credit et al., 2018; Malecki, 2018), our study is distinctive and complementary, being the first full-fledged bibliometric analysis of the emerging domain.

2. METHODOLOGY

Bibliometric analysis provides an overview of the current progress in any research stream by analysing metadata derived from academic research databases (Osareh, 1996). Metadata consist of key factors, such as source titles, abstracts, keywords, authors, references and the number of times the publications have been cited. The information available in such databases can be used to develop different analyses and visualisations that offer insights into the research arena. A bibliometric study helps in understanding the current size of and advancements in any research field, via publication and citation records, as well as in identifying intellectual structures and thematic clusters, together with associated findings (Zupic & Čater, 2015).

Compared with other literature review methods, bibliometric studies are potentially more rigorous, less biased and present an aggregate view of the scientific literature in a particular field, while complementing meta-analyses and systematic literature reviews (Zupic & Čater, 2015). They have been successfully applied in organisation and management studies in general (Nerur et al., 2008; Ramos-Rodríguez & Ruiz-Navarro, 2004) and in entrepreneurship and international business in particular (Chabowski et al., 2013; Dabić et al., 2019; Jiang et al., 2020; Lampe et al., 2019; Schildt et al., 2006). Besides having limited coverage of EE research, the studies utilising bibliometric methods in the EE context (Alvedalen & Boschma, 2017; Credit et al., 2018; Malecki, 2018) do so either superficially or to serve a different purpose. As opposed to Malecki’s (2018) study, whose limited bibliometric evidence (citation data) only highlights the current prevalence of EEs over related concepts (entrepreneurial environment/infrastructure/system) and lists the most-cited works, our study utilises a broad array of bibliometric data and techniques to map the domain of EE research from various perspectives (countries, institutions, journals, articles and authors). Another bibliometric study (Credit et al., 2018) narrowly focuses on the usage of secondary data within a broader research domain of ecosystem-related topical areas, whereas only 37 out of 510 reviewed articles fall under the topical area of EE. A similar tendency can be observed until 2015, where the number of journal articles was insufficient to establish a good bibliometric overview (Alvedalen & Boschma, 2017). The research process (Figure 1) is consistent with the principles of systematic reviews (Denyer & Tranfield, 2009) and scientometrics (Ferrara & Salini, 2012; Glänzel & Thijs, 2012; Nederhof, 2006), as well as with
the recommendations for conducting bibliometric reviews in organisation and management studies (Zupic & Čater, 2015).

2.1. Research Process

The research process is divided into six steps: formulation, identification, selection, confirmation, analysis and synthesis (Figure 1). We explain each step in detail to enhance our study’s transparency and inclusivity, while maintaining its illustrative and exploratory nature (Denyer & Tranfield, 2009).

**Figure 1. Process of bibliometric analysis**

1. **Formulation**
   - **Purpose and research questions.** Our study aims to create a comprehensive representation of EE research by identifying, classifying, visualising and synthesising existing scholarly publications in the subject area. To fulfil this purpose, we formulate and address the following research questions (Nguyen et al., 2018):
     - **Who are the main scholars taking the EE research forward?**
     - **Where are they from, and what are their institutional affiliations and collaboration outcomes?**
     - **Which research themes are represented in the EE literature?**

2.1.1. Formulation

Purpose and research questions. Our study aims to create a comprehensive representation of EE research by identifying, classifying, visualising and synthesising existing scholarly publications in the subject area. To fulfil this purpose, we formulate and address the following research questions (Nguyen et al., 2018):

- **Who are the main scholars taking the EE research forward?**
- **Where are they from, and what are their institutional affiliations and collaboration outcomes?**
- **Which research themes are represented in the EE literature?**

2.1.2. Identification

To identify the most relevant publications for the bibliometric study, we focused on three aspects: first inclusion criteria, data query and second inclusion criteria.

First inclusion criteria. Following Wang and Chugh (2014), we established the search parameters for choosing an appropriate electronic database, listed a set of keywords and identified a reasonable timeframe. The most well-known academic databases are Google Scholar, Science Direct, ProQuest, EBSCO, SCOPUS and Clarivate Analytics Web of Science (WoS). The latter two databases are more quality driven but suffer from inaccuracies in citation data (N. J. van Eck & Waltman, 2019). Despite the WoS Core Collection’s comprehensive overlap with SCOPUS (Martín-Martín et al., 2018), it is still
the most widely used database for bibliometric studies in general (Zhu & Liu, 2020) and management and organisation research in particular (Zupic & Čater, 2015). Moreover, it was recently utilised for a bibliometric study in the EE domain (Credit et al., 2018), making WoS our preferred choice. We then identified a set of keywords (Müller-Seitz, 2012) that accurately captured the EE phenomenon. This entailed choosing from a comprehensive list of keyword searches unrelated to the EE topic in order to mitigate the risk of missing relevant studies. We also did not limit the start of the publication period but set the cutoff date to December 2019.

**Data query.** The title, abstract, author keywords and Keywords Plus® fields were searched in the WoS database (Danese et al., 2018). We then built the query by combining keywords in a sequence and introduced the Boolean operator ‘OR’. We also used truncation to control for keyword variations. Because the key theme was ‘entrepreneurial ecosystem’, the keyword queries were as follows: (entrepreneur* OR startup* OR start-up*) AND (ecosystem* OR system* OR communit*). The combination and choice of keywords were determined by the most common terms used by academics (‘entrepreneurial ecosystem’, ‘national system of entrepreneurship’) and practitioners (‘start-up ecosystem/community’). The search query generated 15,992 results.

**Second inclusion criteria.** Following Dada (2018) and Kauppi et al. (2018), we only considered peer-reviewed journal articles with available full texts. Book chapters, conference articles, extended abstracts, among others, were excluded. Only journal articles were chosen because they count as supported knowledge and will likely expand the field (Keupp et al., 2012). Furthermore, mainstream academic journals and common scientific knowledge are written in English. We acknowledge that this criterion might have led us to ignore some works in other languages, for example, in German (Deng, 2012). Lastly, we selected WoS categories relevant to EE research, namely management, business, economics, regional urban planning, development studies, urban studies and area studies. Other categories, such as engineering, history, agriculture, medicine and forestry, were unrelated to EE research. The refined query generated 4,156 results.

### 2.1.3. Selection

**Selection criteria.** We reviewed the titles of the papers that matched our keyword searches; where necessary, we examined the abstracts and the introduction sections to narrow down the list of sources. Papers on related topics about ecosystems, such as business, innovation, knowledge and entrepreneurial university ecosystems, were omitted. The relevant articles thus identified were added to the WoS marked list. Next, we assessed the Scimago Journal Rank (SJR) to select only high-quality academic journals acknowledged by the research community. SJR indicators use Google’s PageRank algorithm to rank the quality of the sources and thus identify the most attractive journals, without any thematic limitations (cf. Chartered Association of Business Schools ranking in business). This aided our multidisciplinary approach. The SJR has been found to be an adequate tool for bibliometric studies (Johnson et al., 2012). It compares well with alternative journal ranking criteria (Falagas et al., 2008) and has since been applied in several bibliometric studies across different research domains (e.g., Hall, 2011; Zacca-González et al., 2014). All selected papers in this study were published in the SJR in the first (Q1) and the second (Q2) quartile journals. After filtering the WoS results with the SJR, we selected 136 articles for our study.

### 2.1.4. Confirmation

**Data cleaning.** We downloaded the text corpus as a plain text format appropriate for bibliometric investigation. To explore our data and determine the cleaning needs of the text corpus, we utilised the widely recommended VOSviewer (N. J. van Eck & Waltman, 2010). We extended Sinkovic’s (2016) proposed data cleaning process to manually correct the diacritical marks in the authors’ names, cross-check their initials and correct other relevant information.

**Dataset verification.** For external assessment (Nofal et al., 2018), we sent the updated publication list to two experts with robust publication records in EEs, who verified the list and identified another
six overlooked articles. To reduce the possible omission of other relevant studies, we performed a co-citation analysis (Small, 1973) in VOSviewer to examine their collective reference lists for frequently cited articles (Dada, 2018; Vrontis & Christofi, 2019). This resulted in the addition of 11 selected articles. The confirmation process concluded with another round of data cleaning. The final list consisted of 153 journal articles.

2.1.5. Analysis

Descriptive analysis and intellectual networks. We sought to analyse the bibliometric data through analysis tools that would best fit our study’s aims and provide clear answers to our research questions. We included co-authorship and direct citations, as both are important to the aims. Co-authorship indicates how authors, organisations and countries are linked; it represents the most common social network structure (Peters & Van Raan, 1991). The direct citation-based approach is then a newer way to measure direct relatedness between publications compared with co-citation and bibliographic coupling (Boyack & Klavans, 2010; N. J. van Eck & Waltman, 2014). We also used the total link strength (TLS) as a weight attribute to map the strength of the citation links between items, as recent studies have suggested (e.g., van Eck & Waltman, 2020). The TLS accounts for how many times the links occur. For example, one author has multiple co-authors (links), while with some of them, he/she has co-authored articles multiple times. This enabled us to map the items’ density. Thus, we explored and visualised the dynamic attributes of EE research and uncovered its intellectual structures essential to those attributes. The analysis tool that would best fit these purposes was found to be in VOSviewer, which was used to obtain the results of the bibliometric analysis across five categories: countries, institutions, journals, authors and publications.

2.1.6. Thematic Synthesis

Identification of clusters and thematic synthesis. To determine the interrelatedness of the research output and identify distinctive clusters in the research domain, we used a clustering technique based on direct citations (van Eck & Waltman, 2017). Compared with other types, direct citations (also known as cross-citations) yield more accurate information (Klavans & Boyack, 2017; Waltman & van Eck, 2012). The clusters generated by VOSviewer based on direct citations were further content analysed and labelled according to the most commonly recurring or overarching themes. In the next section, we present the results of our bibliometric analysis, followed by the thematic synthesis of the articles in each cluster.

3. RESULTS OF BIBLIOMETRIC ANALYSIS

We analysed a sample of 153 articles on EE (Q1=106, Q2=47), published across 57 (Q1=34, Q2=23) journals during the period 1993–2019 (Figure 2). Our results show that EE research has been conducted in 37 countries and 232 institutions. Although the trends show only eight articles published between 1993 and 2012, the EE phenomenon has gained more traction in mainstream journals after 2013. Of the analysed studies, 90.8% (139) have been published in the last five years, with 2019 accounting for 49.7% (76) of the total.

In terms of statistics, 153 journal articles have been published by 331 scholars; of these, 30 are single-author papers, and 123 are co-authored. Overall, the 331 authors have 406 mentions (41 authors with two or more publications and 290 with only one publication each). The articles per author ratio is 0.46, the authors per article ratio is 2.16, and the publications have on average 2.65 authors per article. These figures suggest that EE research crosses different disciplines and that comprehending the complexities of the EE phenomenon requires collaborative efforts. The compounded annual growth rate of published articles in the assessed period is 36%; on average, each article has received 20.12 citations.
3.1. Countries and Institutions

Thirty-seven countries have engaged in EE research, resulting in 153 published articles with a total of 236 affiliations (Table 1). The most productive country by far is the United States (US) (72 articles), followed by the United Kingdom (UK) (36) and Germany (16), jointly representing over half of the associated publications. Overall, the 10 most productive countries account for approximately 78% (184) of the articles and drive the research agenda.

Table 1. Top 10 most impactful countries

<table>
<thead>
<tr>
<th>Countries*</th>
<th># Articles</th>
<th>% Articles</th>
<th>Total %</th>
<th>TLS</th>
<th>Countries*</th>
<th># Citations</th>
<th>% Citations</th>
<th>Total %</th>
<th>TLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>72</td>
<td>30.51%</td>
<td>30.51%</td>
<td>818</td>
<td>US</td>
<td>1,466</td>
<td>31.87%</td>
<td>31.87%</td>
<td>818</td>
</tr>
<tr>
<td>UK</td>
<td>36</td>
<td>15.25%</td>
<td>45.76%</td>
<td>765</td>
<td>UK</td>
<td>1,193</td>
<td>22.82%</td>
<td>54.69%</td>
<td>765</td>
</tr>
<tr>
<td>Germany</td>
<td>16</td>
<td>6.78%</td>
<td>52.54%</td>
<td>239</td>
<td>Netherlands</td>
<td>409</td>
<td>7.82%</td>
<td>62.51%</td>
<td>309</td>
</tr>
<tr>
<td>Spain</td>
<td>11</td>
<td>4.66%</td>
<td>57.20%</td>
<td>140</td>
<td>Hungary</td>
<td>320</td>
<td>6.12%</td>
<td>68.63%</td>
<td>152</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10</td>
<td>4.24%</td>
<td>61.44%</td>
<td>309</td>
<td>Finland</td>
<td>288</td>
<td>5.13%</td>
<td>73.76%</td>
<td>123</td>
</tr>
<tr>
<td>Canada</td>
<td>9</td>
<td>3.81%</td>
<td>65.25%</td>
<td>114</td>
<td>France</td>
<td>262</td>
<td>5.01%</td>
<td>78.77%</td>
<td>68</td>
</tr>
<tr>
<td>Italy</td>
<td>9</td>
<td>3.81%</td>
<td>69.07%</td>
<td>134</td>
<td>Belgium</td>
<td>236</td>
<td>4.51%</td>
<td>83.28%</td>
<td>56</td>
</tr>
<tr>
<td>China</td>
<td>9</td>
<td>3.81%</td>
<td>72.88%</td>
<td>89</td>
<td>Canada</td>
<td>169</td>
<td>3.23%</td>
<td>86.51%</td>
<td>114</td>
</tr>
<tr>
<td>Hungary</td>
<td>6</td>
<td>2.54%</td>
<td>75.42%</td>
<td>152</td>
<td>Switzerland</td>
<td>130</td>
<td>2.49%</td>
<td>89.00%</td>
<td>109</td>
</tr>
<tr>
<td>Finland</td>
<td>6</td>
<td>2.54%</td>
<td>77.97%</td>
<td>123</td>
<td>Germany</td>
<td>101</td>
<td>1.93%</td>
<td>90.93%</td>
<td>239</td>
</tr>
<tr>
<td>Others (27)</td>
<td>52</td>
<td>22.03%</td>
<td>100.00%</td>
<td>474</td>
<td>Others (27)</td>
<td>474</td>
<td>9.07%</td>
<td>100.00%</td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td>236</td>
<td>100.00%</td>
<td></td>
<td>5,228</td>
<td>Total:</td>
<td>5,228</td>
<td>100.00%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * all affiliations
Unsurprisingly, the US and the UK have received the maximum traction in terms of citations (1,666 and 1,193, respectively). This may be due to the following reasons: (1) Overall, more articles produce more citations. (2) The institutions in these countries are frontrunners in funding EE research. (3) Works published in the initial years receive more citations. Our TLS results confirm this; both the US and the UK are highly cross-cited by other countries and by each other. The 10 most cited countries account for 91% (4,754 citations) of the research traction, clearly indicating where scientific knowledge on EE is created and sourced.

Furthermore, countries and research institutions are aligned, arguably because country-level publication and citation counts are indicative of the research institutions’ locations and agglomeration. Hence, in terms of linked productivity (323 articles), the top 10 institutions are distributed as follows: 6 in the US (40 articles), 2 in the UK (6 articles) and 1 each in the Netherlands and Hungary (6 articles each). These universities account for 18% (58 articles) of the publications. Although 37 countries have produced EE research, many institutions seem to have undertaken collaborative projects.

Regarding the citation count by university, the field is more level: the US with 2 organisations (981 citations), the UK with 2 (762), and 1 each from the Netherlands (353), Hungary (320), Finland (258), Switzerland (236) and France (236). These top universities account for 47% (3,146) of all citations. This strong citation count is supported by the TLS, which shows all top institutions as highly cross-cited by other institutions and by one another, making them central to the research field.

Although not entirely clear, country-level and institutional-level indicators are worth exploring. The country account is an aggregate representation of the geographical allocation of institutions, whereas the institutional level highlights researchers’ affiliations and co-authorship patterns. For example, Zoltan J. Acs is affiliated with George Mason University (US), Imperial College London (UK) and the University of Pécs (Hungary) and has published 8 articles with 13 co-authors. His collaborative productivity and citation accounts are concurrently reflected in multiple countries and

<table>
<thead>
<tr>
<th>Institutions*</th>
<th># Articles</th>
<th>% Articles</th>
<th>Total %</th>
<th>TLS</th>
<th>Institutions*</th>
<th># Citations</th>
<th>% Citations</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>George Mason University</td>
<td>9</td>
<td>2.79%</td>
<td>2.79%</td>
<td>361</td>
<td>George Mason University</td>
<td>509</td>
<td>7.61%</td>
<td>7.61%</td>
</tr>
<tr>
<td>University of Tennessee</td>
<td>9</td>
<td>2.79%</td>
<td>5.57%</td>
<td>196</td>
<td>Imperial College London</td>
<td>508</td>
<td>7.59%</td>
<td>15.20%</td>
</tr>
<tr>
<td>Indiana University</td>
<td>8</td>
<td>2.48%</td>
<td>8.05%</td>
<td>235</td>
<td>Utrecht University</td>
<td>353</td>
<td>5.28%</td>
<td>20.48%</td>
</tr>
<tr>
<td>University of North Carolina</td>
<td>7</td>
<td>2.17%</td>
<td>10.22%</td>
<td>94</td>
<td>University of Pécs</td>
<td>320</td>
<td>4.79%</td>
<td>25.26%</td>
</tr>
<tr>
<td>Utrecht University</td>
<td>6</td>
<td>1.86%</td>
<td>12.07%</td>
<td>201</td>
<td>Aalto University</td>
<td>258</td>
<td>3.86%</td>
<td>29.11%</td>
</tr>
<tr>
<td>University of Pécs</td>
<td>6</td>
<td>1.86%</td>
<td>13.93%</td>
<td>337</td>
<td>University of Edinburgh</td>
<td>254</td>
<td>3.80%</td>
<td>32.91%</td>
</tr>
<tr>
<td>George Washington University</td>
<td>4</td>
<td>1.24%</td>
<td>15.17%</td>
<td>51</td>
<td>Ghent University</td>
<td>236</td>
<td>3.53%</td>
<td>36.44%</td>
</tr>
<tr>
<td>University of Edinburgh</td>
<td>3</td>
<td>0.93%</td>
<td>16.10%</td>
<td>218</td>
<td>University of California</td>
<td>236</td>
<td>3.53%</td>
<td>39.96%</td>
</tr>
<tr>
<td>Imperial College London</td>
<td>3</td>
<td>0.93%</td>
<td>17.03%</td>
<td>196</td>
<td>University of Albany</td>
<td>236</td>
<td>3.53%</td>
<td>43.49%</td>
</tr>
<tr>
<td>Babson College</td>
<td>3</td>
<td>0.93%</td>
<td>17.96%</td>
<td>129</td>
<td>Mines ParisTech</td>
<td>236</td>
<td>3.53%</td>
<td>47.02%</td>
</tr>
<tr>
<td>Others (222)</td>
<td>265</td>
<td>82.04%</td>
<td>100.00%</td>
<td></td>
<td>Others (222)</td>
<td>3,545</td>
<td>52.98%</td>
<td>100.00%</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>323</strong></td>
<td><strong>100.00%</strong></td>
<td></td>
<td></td>
<td><strong>Total:</strong></td>
<td><strong>6,691</strong></td>
<td><strong>100.00%</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: * all affiliations
3.2. Source Journals

The assessment of journal sources clarifies key topics of interest in EE research and the progress within them. In total, 69 journals from multiple disciplines, beyond business and management, have published papers on EE. The SJR shows that 57 of these journals are ranked as Q1 and Q2, 5 as Q3 and Q4, while 7 are missing from the SJR system. Applying the SJR classification to the WoS results, we find that WoS has included lower-quality journals, many of which belong to the bottom half of the SJR list; some are not even indexed. We consequently exclude those. In the top quartile of the journals, 40 belong to the business and management fields; 12 also cover economics and entrepreneurship; 9 address innovation, knowledge and policy; 2 belong to the field of computer sciences; 5 focus exclusively on economics and entrepreneurship (including finance); 7 specialise in social sciences; and 3 cover the economics and entrepreneurship and social sciences. Ten journals focus on economic geography and regional planning, which emphasise the geographical foundations of the EE phenomenon.

Tables 3 and 4 show the impact of the journals in terms of published articles and the number of citations, respectively. Regarding productivity, EE research is pursued at both Q1 (7 journals) and Q2 (3 journals) levels, and the top journals account for 54.25% of the total research output. Most of these journals have published special issues and special sections addressing the phenomenon. By far, the most important knowledge-building journal is *Small Business Economics* (31 articles), followed by the *Journal of Enterprising Communities* (8 articles) and the *Journal of Technology Transfer* (7 articles). The h-index score (Hirsch, 2005) and TLS weights suggest that these lower-ranked journals are not at the core of the EE knowledge body although their interest is focused on the topic.

Table 3. Top 10 most productive journals

<table>
<thead>
<tr>
<th>Title of the Journal</th>
<th>SJR</th>
<th>h-Index</th>
<th># Articles</th>
<th>% Articles</th>
<th>Total %</th>
<th>TLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Business Economics</td>
<td>Q1</td>
<td>108</td>
<td>31</td>
<td>20.26%</td>
<td>20.26%</td>
<td>227</td>
</tr>
<tr>
<td>Journal of Enterprising Communities</td>
<td>Q2</td>
<td>19</td>
<td>8</td>
<td>5.23%</td>
<td>25.49%</td>
<td>85</td>
</tr>
<tr>
<td>Journal of Technology Transfer</td>
<td>Q1</td>
<td>66</td>
<td>7</td>
<td>4.58%</td>
<td>30.07%</td>
<td>108</td>
</tr>
<tr>
<td>European Planning Studies</td>
<td>Q1</td>
<td>69</td>
<td>7</td>
<td>4.58%</td>
<td>34.64%</td>
<td>32</td>
</tr>
<tr>
<td>Industrial and Corporate Change</td>
<td>Q1</td>
<td>95</td>
<td>6</td>
<td>3.92%</td>
<td>38.56%</td>
<td>56</td>
</tr>
<tr>
<td>Intern. Entrepreneurship and Management Journal</td>
<td>Q1</td>
<td>41</td>
<td>6</td>
<td>3.92%</td>
<td>42.48%</td>
<td>65</td>
</tr>
<tr>
<td>Journal of Entrepreneurship and Public Policy</td>
<td>Q2</td>
<td>9</td>
<td>5</td>
<td>3.27%</td>
<td>45.75%</td>
<td>44</td>
</tr>
<tr>
<td>The German Journal of Economic Geography</td>
<td>Q2</td>
<td>14</td>
<td>5</td>
<td>3.27%</td>
<td>49.02%</td>
<td>62</td>
</tr>
<tr>
<td>Strategic Entrepreneurship Journal</td>
<td>Q1</td>
<td>31</td>
<td>4</td>
<td>2.61%</td>
<td>51.63%</td>
<td>73</td>
</tr>
<tr>
<td>Entrepreneurship and Sustainability Issues</td>
<td>Q1</td>
<td>12</td>
<td>4</td>
<td>2.61%</td>
<td>54.25%</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td>70</td>
<td>45.75%</td>
<td>100.00%</td>
<td></td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td></td>
<td><strong>153</strong></td>
<td><strong>100.00%</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In terms of citations, *Research Policy* (494 citations) has had the greatest impact on guiding EE literature, followed by *Small Business Economics* (396), *European Planning Studies* (289) and the *Journal of Business Venturing* (227). These journals cover the main themes of innovation, entrepreneurship and regional development, which constitute the pillars of EE. The next in line, *Harvard Business Review* (HBR), is not an academic journal per se but an industry-led influencer of
academic research. We include it because Isenberg’s (2010) (Q1) ‘the big idea’, published in HBR, introduced EE into the main discourse of business studies, and HBR has remained a high-impact journal despite using mostly non-citable documents for academic inquiry (ranked Q3 in 2018).

Journals from various research disciplines have taken an interest in EE. It can be argued that the research community has accepted EE as a separate field from clusters and innovation systems, papers on which have been published in higher-ranked journals. A recent bibliometric review of clusters and industrial districts (García-Lillo et al., 2018) identifies Industrial and Corporate Change, Research Policy and the Journal of Economic Geography as the top three subject-specific journals, pointing to shared readership with EE research. Interestingly, a recent bibliometric review of innovation systems and ecosystems (Suominen et al., 2019) shows Research Policy and European Planning Studies as the two most highly cited outlets publishing on the topic, completely mirroring our results on EE research. The top 10 most cited journals on our list account for 76.06% (2,342) of all citations, with the articles in the remaining 47 journals accounting for 23.94% (737). For researchers, these results illustrate which journals publish on the topic and which journals receive the highest number of citations.

3.3. Authors

EE authors belong to a variety of disciplines, ranging from international business and entrepreneurship to strategy and economic geography. We use the count numbers of articles and citations in full and fractional counting (Egghe, 2008; Waltman & van Eck, 2015) as metrics to evaluate the scholarly output and impact of individual authors to the current status of EE research (Table 5).

In terms of the publication count, the top 10 most productive authors are Roundy (9 articles), Acs (6), Audretsch (6), Szerb (5), Autio (4) and Wright (4), followed by Stam, Qian, Feldman and Brown (3 each). Interestingly, only five authors are visible in both columns. This suggests that Autio, Acs, Szerb, Wright and Stam have continuously published in high-ranking journals and created meaningful knowledge to advance the field. Others have relatively few publications, have recently started publishing in the field or target lower-level journals for their output, thus reducing their citation counts.

As our dataset comprises 30 single-author and 123 multi-author articles, in addition to full counting of authorship and citations, for better representation of individual contributions to the

### Table 4. Top 10 most cited journals

<table>
<thead>
<tr>
<th>Title of the Journal</th>
<th>SRJ</th>
<th>h-Index</th>
<th># Citations</th>
<th>% Citations</th>
<th>Total %</th>
<th>TLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Policy</td>
<td>Q1</td>
<td>206</td>
<td>494</td>
<td>16.04%</td>
<td>16.04%</td>
<td>89</td>
</tr>
<tr>
<td>Small Business Economics</td>
<td>Q1</td>
<td>108</td>
<td>396</td>
<td>12.86%</td>
<td>28.91%</td>
<td>227</td>
</tr>
<tr>
<td>European Planning Studies</td>
<td>Q1</td>
<td>69</td>
<td>289</td>
<td>9.39%</td>
<td>38.29%</td>
<td>108</td>
</tr>
<tr>
<td>Journal of Business Venturing</td>
<td>Q1</td>
<td>154</td>
<td>227</td>
<td>7.37%</td>
<td>45.66%</td>
<td>34</td>
</tr>
<tr>
<td>Harvard Business Review</td>
<td>Q3*</td>
<td>161</td>
<td>203</td>
<td>6.59%</td>
<td>52.26%</td>
<td>62</td>
</tr>
<tr>
<td>Entrepreneurship Theory and Practice</td>
<td>Q1</td>
<td>121</td>
<td>200</td>
<td>6.50%</td>
<td>58.75%</td>
<td>75</td>
</tr>
<tr>
<td>Journal of Technology Transfer</td>
<td>Q1</td>
<td>66</td>
<td>140</td>
<td>4.55%</td>
<td>63.30%</td>
<td>85</td>
</tr>
<tr>
<td>Strategic Entrepreneurship Journal</td>
<td>Q1</td>
<td>31</td>
<td>132</td>
<td>4.29%</td>
<td>67.59%</td>
<td>73</td>
</tr>
<tr>
<td>Journal of Small Business Management</td>
<td>Q1</td>
<td>94</td>
<td>131</td>
<td>4.25%</td>
<td>71.84%</td>
<td>41</td>
</tr>
<tr>
<td>Journal of Business Research</td>
<td>Q1</td>
<td>158</td>
<td>130</td>
<td>4.22%</td>
<td>76.06%</td>
<td>47</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>737</td>
<td></td>
<td>23.94%</td>
<td>100.00%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3079</td>
<td></td>
<td>100.00%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *cited article in journal is from Q1 era.
field we have analysed fractional counting whereas in multi-authored articles each co-author is credited with an equal proportion of output in terms of publications and citations (Egghe, 2008; Waltman & van Eck, 2015).

Regarding productivity adjusted for co-authorship (Fractional authorship), Roundy (6.83), Audretsch (2.70) and Acs (2.58) top the list. Arguably, the first is more of a solo author, whereas the latter two have extensive collaboration networks. The other mostly solo writers are Stam (1.75), Feldman (1.50) and Spigel (1.50), whereas Qian (2.33), Szerb (1.50), Schillo (1.33) and Brown (1.25) have typically cooperated with their peers.

Regarding the total number of citations, we consider the most prominent researchers and the traction rate of their intellectual work. The most cited scholar in the EE research context are Autio (561 citations), followed by his co-authors Acs (513), Szerb (314) and Wright (291). From the top 10, Siegel (236 citations), Mustar (236) and Kenney (236) are all Autio’s co-authors. Other colleagues, Stam (287 citations), Spigel (248) and Van de Ven (220), have also found their rightful place among the most cited authors. Application of fractional counting method to the number of citations (Fractional citations) provides somewhat different ranking, with Stam (233.75 citations), Spigel (224.00) and Van de Ven (220.00), Isenberg (203.00) and Acs (164.33) being the top contributors, followed by Autio (151.11), Szerb (102.41), Spilling (90.00), Feldman (75.17) and Pitelis (72.00).

Regardless of the counting method applied the same group of authors is found to be the most prolific and influential contributors shaping the development of EE research. However, because most of the work has been done in recent years, the rankings would change once the more recently published works start to attract interest.

In addition to the analysis of the numbers of publications and citations, to shed more light on the EE research community, we visualise these valuable scholars’ co-authorship networks (Figure 3). Isenberg, Pitelis and Spilling have been solo authors, and Spigel has only collaborated with Harrison; therefore, their networks cannot be further depicted. However, all the other scholars are connected through their co-authorship linkages. Overall, there are 8 clusters of 44 authors within the collaboration network. Based on the number of linkages (L) to other authors and the TLS of co-authors per article, the most centrally networked scholar is Acs (L=13; TLS =18), followed by his direct connections Audretsch (L=10; TLS=12), Autio (L=8; TLS=11), Szerb (L=7; TLS=12) and Stam (L=4; TLS=4) and his indirect connections Wright (L=9; TLS=11) and Van de Ven (L=8; TLS=1). These extensive cooperation networks identify the most prolific authors in the EE field.
3.4. Journal Articles

In this section, we identify the most influential articles in EE research, who has written them, where they are published and how often they are cited (Table 6). Accordingly, the most influential work has been published in Research Policy by Acs, Autio and Szerb (2014) (258 citations), focusing on the measurement and policies sustaining EE. The other seminal work has been published by Autio, Kenney, Mustar, Siegel, and Wright (2014) (236 citations), who discuss the role of entrepreneurial innovation in the ecosystem context. The next in line is Van De Ven’s (1993) (220 citations) article in the Journal of Business Venturing, which provides a perspective on building an entrepreneurship infrastructure by setting the direction for EE inquiry. It is followed by his co-author’s work, decades later in European Planning Studies, on the framework and systemic elements influencing entrepreneurial activities and the consequent value creation (Stam, 2015) (216 citations). One of the conceptual pieces that has intensified EE research is Isenberg’s (2010) (203 citation) work, published in HBR, which identifies nine key principles that should be focused on to turbocharge venture creation.

The other most influential articles have been case studies focused on demystifying the essence of the EE phenomenon (Bahrami & Evans, 1995; Neck et al., 2004; Spigel, 2017; Spilling, 1996) and its regional resources (Qian et al., 2013).

In sum, the results of the bibliometric analysis lead to several conclusions. First, we predict that the average rate of 20 citations per EE article will grow due to the majority of the research in the domain having been conducted only in recent years. Overall, the trends suggest that EE is an emerging field, and EE themes have gradually found their way into the mainstream research agenda. Second, the results from the analysis of the main countries and institutions from which EE research has originated point to the dominance of US scholarship, which is understandable because Silicon Valley is widely known as the ‘golden standard’ for EE in practice. Policymakers worldwide have attempted to duplicate the entrepreneurial model of Silicon Valley for a long time, and we consider these efforts to be linked to the research initiatives and the rising publication rates in the EE domain in some European countries, such as Spain, the Netherlands, Italy, Hungary and Finland. Canada and
China have also shown some interest in the phenomenon. Third, the analysis results indicate that the authorship and the productivity in EE scholarship centre on several key individuals and articles that are heavily cited, seemingly serving as foundational studies from which the burgeoning research in the EE domain is drawn.

However, to clarify which articles and authors serve as foundational constituents in specific types of EE research and which research streams comprise the EE domain, the EE research corpus should first be clustered into themes and their key presumption and contributions be more comprehensively discussed. We therefore extend our analysis into cluster analysis and then elaborate on the thematic underpinnings, relevant sub-themes and the main findings of representative articles from each type of extant EE research (cluster).

### 4. THEMATIC SYNTHESIS

Using the direct citation method (cross-citations), we identify 139 journal articles with at least one direct citation in common – an indication of their thematic relatedness. This analysis yields six thematic clusters relevant to EE research (Figure 4). Each cluster contains a comparable number of journal articles (from 29 to 19), respectively depicted as red (29; Q1=17, Q2=12), green (26; Q1=21, Q2=5), blue (24; Q1=22, Q2=2), yellow (21; Q1=14, Q2=7), purple (20; Q1=13, Q2=7) and teal (19; Q1=9, Q2=10). Based on our review of the clustered articles, several sub-themes are identified in each cluster, while clusters are subsequently labelled according to overarching themes (perspectives).

Table 7 outlines the sub-themes prevalent in each clustered thematic perspective, the main articles and their shares in each theme, the summary of the articles’ main findings under each theme.
and consequently, each theme’s title as drawn from the articles’ findings, sub-themes and contents. Next, we discuss each cluster in more detail.

4.1. Cluster 1: Complexity Perspective

The unifying theme of the articles in the red cluster is EE complexity, which they address by discussing the phenomenon’s ‘emergence’, ‘formation’ and ‘micro-foundations’. Emergence examines the historical presence of EEs. Van De Ven (1993) has studied the infrastructure of entrepreneurship, not as an individual endeavour but as a collective effort of numerous entrepreneurs from public and private sectors, who become the system’s driving force. The dynamic relations of their resource endowments, proprietary functions and institutional arrangements shape the entrepreneurial system. Van de Ven’s study includes observations of new environments that focus on entrepreneurial action, and the model’s prime template is evidenced in Silicon Valley in the US. Bahrami and Evans (1995) focus on the system’s antecedents, constituents and flexibility in entrepreneurial recycling. They explain that these entrepreneurial events interact with their environmental factors in creating new ventures – a symbiosis observed in other locations as well (Neck et al., 2004; Spilling, 1996).

The papers on formation draw our attention to the creation of these complex adaptive systems, which are influenced by the ‘intentionality of entrepreneurs, coherence of entrepreneurial activities, and injections of resources’, situated at the cross-section of entrepreneurial and organisational actions (Roundy et al., 2018, p. 1). This form of entrepreneurial capital creation is shaped by its community and involves a set of hybrid support organisations (e.g., development centres) that regulates the diversity and the cultural values of entrepreneurship. The creation shapes and is shaped by the surrounding ecosystem (McMullen, 2018; Roundy, 2017b). The ecosystem’s lifecycle has also been examined by scholars of this cluster. They emphasise how cultural and institutional settings affect the ecosystem’s evolution, its critical elements and their dynamic interdependencies (Mack & Mayer, 2016). They also assess the system’s vibrancy, diversity and trajectory (Auerswald & Dani, 2017) and the various governance configurations relevant to the ecosystem’s growth (Colombelli et al., 2019).
Table 7. Main research themes

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Theme</th>
<th>Sub-Themes</th>
<th>Articles</th>
<th>Share %</th>
<th>Main Findings</th>
</tr>
</thead>
</table>
| 1       | Complexity Perspective | “emergence”; “formation”; “micro-foundations” | (Auerwald & Dani, 2017; Bahrami & Evans, 1995; Berger & Kuckertz, 2016; Brush et al., 2019; Colombelli et al., 2019; Hechavarria & Ingram, 2019; Liguori et al., 2019; Mack & Mayer, 2016; McMullen, 2018; Neck et al., 2004; Nyland & Cohen, 2017; Roundy, 2017, 2019; Roundy et al., 2018; Spender & Linder, 2019; Spilling, 1996; Van De Ven, 1993) | 29 / 20.9% 793 citat. | Need for infrastructure of entrepreneurship.  
The Silicon Valley model as the prime.  
Symbiosis of the environment and new venture creation.  
Complex adaptive systems.  
Hybrid meta- and support organizations.  
Ecosystem life-cycle, mechanics and measuring.  
Regional narrative reflecting configurations.  
Gender equality and support. |
| 2       | Context Perspective | “genesis”; “policy”; “dimension”; “actor” | (Alvedalen & Boschma, 2017; Autio et al., 2014, 2018; Brown et al., 2019; Brown & Mason, 2019; DiVito & Ingen-Housz, 2019; Donegan et al., 2019; Feldman et al., 2019; Fraiberg, 2017; Goswami et al., 2016; Lai & Vonortas, 2019; McAdam et al., 2019; O’Shea et al., 2019; Pugh et al., 2019; Qiu et al., 2019; Radung-Perr et al., 2018; Schafke & Hons, 2018; Spigel & Harrison, 2018; Theodoraki et al., 2018; Thompson et al., 2018; Vedula & Kim, 2019) | 26 / 18.7% 475 citat. | Emphasis on entrepreneurial innovation.  
Distinctions of EE in comparison to clusters, districts, innovation systems.  
Utilization of various policy mixes aligned with goals.  
Interplay between digital and spatial dimensions.  
Intermediary actors initiating and accelerating entrepreneurship.  
Human and financial actors influencing entrepreneurial activity. |
| 3       | Governance Perspective | “lineages”; “institutions”; “knowledge”; “culture” | (Acs et al., 2014, 2016, 2017, 2018; Audretsch, 2019; Audretsch et al., 2019; Barbá-Sánchez et al., 2019; Bhane & Zahra, 2019; Boschhoff, 2019; Colombino et al., 2019; Cumming et al., 2019; Gho et al., 2019; Hervás & Rabeño, 2019; Karakou et al., 2017; Lafuentes et al., 2016; Schillo, 2018; Schillo et al., 2016; Simms et al., 2019; Song, 2019; Xie et al., 2019; Yan & Guan, 2019) | 24 / 17.3% 481 citat. | Ecosystem as an effective resource allocation in a confined space to exploit innovations.  
Multidisciplinary digital platform facilitating entrepreneurial action.  
Appropriate governance choices to regulate internal and external factors.  
Institutions have positive influence towards entrepreneurial action and rate.  
Knowledge spillovers as a fuel of the ecosystem.  
Business failures as acceptable part of an entrepreneurial culture. |
| 4       | Geography Perspective | “location”; “elements” | (Audretsch & Blettis, 2017; Audretsch & Link, 2019; Brown & Mason, 2017; Bruns et al., 2017; Content et al., 2019; Credit et al., 2018; Feldman, 2014; Lichtenstein & Lyons, 2001; Muleki, 2018; Martínez-Fierro et al., 2019; Qian, 2017; Qian et al., 2013; Stam & van den Broek, 2019; Szerb et al., 2019) | 21 / 15.1% 428 citat. | Entrepreneurial ecosystems need to be studied as a locational phenomenon, separating between urban and rural contexts.  
Enterprising activity can impact ecosystems regionally, and the regional development can result in differing regional performance and developments. |

continued on following page
The EE ‘micro-foundations’ are examined by debating how the ecosystem narratives are created, developed and promoted and by comparing them with other regional narratives (Roundy, 2016, 2019a). The narratives also address how the ecosystem is able to gain attention, influence cognitive reasoning and create value for its audience (Roundy & Bayer, 2019b). Each narrative reflects a different configuration of the micro-foundations and subsequently its resource dependency and resilience. Hence, appropriate strategies should be employed to mitigate risks, promote entrepreneurial activities (Roundy, 2019b; Roundy & Bayer, 2019a) and thus strengthen the connections between entrepreneurs and their surrounding meta-organisations and support organisations (Harper-Anderson, 2018; Motoyama & Knowlton, 2017; Roundy, 2017a). Perceptual techniques (Liguori et al., 2019) have been proposed to measure the micro-foundations and elaborate on which of these mechanisms (Roundy & Fayard, 2019; Villegas Mateos & Amorós, 2019) influences entrepreneurship and fosters startup development (Manimala et al., 2019; Nylund & Cohen, 2017; Salamzadeh & Kesim, 2017; Velt et al., 2018). Lastly, in line with venture development, the gender construct has become a relevant topic to EE. It is essential to recognise the factors in the ecosystem that influence or are influenced by women entrepreneurs (Brush et al., 2019) and which configurations can encourage a high proportion of female founders in successful ecosystems (Berger & Kuckertz, 2016). Strategic choices and perceptions of the support available to both genders should also be compared when initiating and sustaining new ventures (Hechavarria & Ingram, 2019; Sperber & Linder, 2019). In sum, the studies in this first cluster comprise foundations of the initial conceptualization and framing of limits within the EE domain, conceptualizing the idea of ecosystems through distinctive theoretical lenses such as complex systems, life-cycle, or microfoundation-based perspectives.

4.2. Cluster 2: Context Perspective

The green cluster focuses on the EE context by exploring the sub-themes of ‘genesis’, ‘policy’, ‘dimension’ and ‘actor’. Autio et al. (2014) discuss the levels of interrelated contexts and emphasise that the policies directed towards entrepreneurial innovation should foster EE development. This is followed by the focus on EE genesis and how it differs from previous perspectives on similar systems, such as industrial districts, knowledge clusters and regional innovation systems and clusters. The main aspects of the difference are linked to the assistance and the support offered to entrepreneurs and new venture development, the relevance of knowledge spillovers, business model innovation, opportunity capture and exploitation of digital affordances (Autio et al., 2018; Spigel & Harrison, 2018). However, further investigations are needed, not only into the location-specific institutional
changes in the system, but also into the inner configurations and the cause–effects shaping the system (Alvedalen & Boschma, 2017). These shortcomings suggest that the current uniform policies do not work and that various policy mixes should be used (Szerb et al., 2013), depending on the system’s uniqueness. Recent research has highlighted the difficulties in implementing policies in practice, especially the coordination challenges and the appropriateness of the policies (Bramwell et al., 2019; Brooks et al., 2019). Public policies promoting entrepreneurial action are conceptually confusing, misinterpreted and misused as they tend to focus on entrepreneurship quantity rather than quality (Brown & Mawson, 2019). These drawbacks stem from not recognising the ecosystems’ uniqueness, their contextual limitations, their development status and the public policy’s aims.

Furthermore, the EE concept is widely considered spatially limited, with many works focusing on the regional dimension of entrepreneurship. However, attention should also be directed to the rapidly growing digital fields to signify the interplay between digital and spatial affordances (Autio et al., 2018) and to amplify the learning and knowledge spillovers from the digital domain. This shared knowledge enables entrepreneurial actors to improve their business models and technological competencies by tapping into resources external to the region (Kuebart & Ibert, 2019). Thus, digitalisation empowers horizontal knowledge sharing, in turn trickling down to the strengthening of the local community.

Such proactive learning further assists entrepreneurs in exploiting cross-regional value chains (Auschra, Schmidt, et al., 2019; Pugh et al., 2019) that may possibly generate opportunities for establishing contemporary sustainable EEs (DiVito & Ingen-Housz, 2019; O’Shea et al., 2019; Thompson et al., 2018). Recently, scholars have drawn attention to intermediary actors who initiate and accelerate entrepreneurship by endorsing knowledge transfer and the long-term sustainability of the ecosystems’ vigour and quality (Theodoraki et al., 2018; Vedula & Kim, 2019). Such actors help build community commitment, validate the venture’s viability (Goswami et al., 2018) and extend and expand the strategic networks of startups (Brown et al., 2019; Qin et al., 2019). These mediators also facilitate other factors for ecosystem success, such as funding and human capital, which directly affect local entrepreneurial activity (Feldman et al., 2019; Lai & Vonortas, 2019). The funding is strongly linked to the presence of high-growth startups and an ecosystem framework (Lai & Vonortas, 2019; Radinger-Peer et al., 2018). As entrepreneurs and founders, human actors rely on their knowhow and experience gained across spatial and digital dimensions to foster entrepreneurial activities and build multicultural communities and EEs (Fraiberg, 2017; McAdam et al., 2019; Schäfer & Henn, 2018). Taken together, the studies in this second cluster provide, in comparison to the first cluster above, a comparatively theoretically tighter and conceptually more advanced development of understanding on the EE domain: the distinctive feature of this second cluster can be seen to be developing the conceptual distinctiveness of the entrepreneurial ecosystem concept when compared to other types of ecosystems in business and management research literature. Thus, whereas cluster 1 includes studies exploring the different lenses through which EE can be understood, cluster 2 focuses on contextual boundaries and limits framing the EE domain of study.

4.3. Cluster 3: Governance Perspective

The blue cluster focuses on the governance aspect by exploring the sub-themes of ‘lineages’, ‘institutions’, ‘knowledge’ and ‘culture’. While the ecosystem construct has been extensively used in a variety of contexts, its lineages are seldom known. The concept has been derived from oikos (Greek), which refers to an effective way of resource allocation in a confined space to exploit technological innovations from which novel products and services create new value and prosperity for the world (Audretsch et al., 2019; Colombo et al., 2019). This system is driven by an entrepreneurial entity (Acs et al., 2017), while its legitimacy is continuously challenged (Kuratko et al., 2017). Nonetheless, this baseline description of an EE has been extended by its digital dimension, as explained in the previous cluster. Thus, the essence of the current EE situation is an integration of digital multisided platforms, which facilitate digital technology entrepreneurs’ knowledge sharing and utilise innovations with digital citizens as their consumers and producers, while institutions govern the whole digital
infrastructure (Song, 2019; Sussan & Acs, 2017). This integration has led to a dynamic and digitally open system, shaped by numerous internal and external factors (Xie et al., 2019) that seek EE governance (Colombo et al., 2019). Governance can be understood as involving large multinational enterprises, venture capitalists and technology parks, universities and cooperative banks, and governmental institutions that encourage new venture development, provide access to networks and finance, and improve effective managerial control (Bhawe & Zahra, 2019; Cumming et al., 2019; Ghio et al., 2019; Leceta & Könölä, 2019).

Furthermore, ecosystem-specific institutions regulate and positively influence individual actions and entrepreneurial rates (Acs et al., 2014, 2016; Yan & Guan, 2019). Through their dynamic interdependencies, they enhance value creation and the subsequent economic growth (Acs et al., 2018). Good governing institutions enable knowledge creation and spillovers that improve system-level efficiency (Lafuente et al., 2016), as observed in the Silicon Valley model, whose recurring process of knowledge creation and commercialisation translate into profitable innovations (Audretsch, 2019). However, this is not the case for many other locations, where the model is challenging to apply and may thus lead to societal deficiencies. Nonetheless, these challenges can be overcome by other formations of entrepreneurship. For example, knowledge-intensive business services (Horváth & Rabetino, 2019), research-based spinoff companies (Schillo, 2018) and smart society models (Barba-Sánchez et al., 2019) all lead to spillovers of knowledge and human capital development and thus promote entrepreneurial readiness (Schillo et al., 2016). Hence, each location should build a sustainably customised community that promotes knowledge creation and opportunities as part of its entrepreneurial culture to boost social connectedness and buffer business failures (Bischoff, 2019; Simmons et al., 2019). In sum, this third cluster is distinguished from the previous two by its decidedly more normative lens: Whereas studies in cluster 1 started with considering different ways in which EEs could be conceptualized, and studies cluster 2 continued by framing the EE as a concept more distinctly, the studies in this cluster 3 comprise an attempt to respond to an underlying question of who manages the EE and how should EEs be governed within societies and regions.

4.4. Cluster 4: Geography Perspective

The yellow cluster is characterised by the dynamic elements of EEs, especially their location-specific advantages (LSAs), and encompasses studies on regional and locational elements. A common aspect of this stream of studies is how they seek to develop the EE concept with a meso view of cities and specific regions and locations, assuming that LSAs of particular geographic areas can be developed to attract and effectively suit firm-specific advantages (FSAs) of entrepreneurial ventures. This cluster’s earliest contribution dates back to Lichtenstein and Lyons’ (2001) conceptualisation of entrepreneurial development systems across different regions in the US. To ‘significantly increase the rate of formation, development, and success of new enterprises within a region in a way that creates individual and community wealth’, Lichtenstein & Lyons (2001, p. 4) suggest an operating programme focused on two LSAs, namely the development of entrepreneurial talent and assistance providers around them (Lichtenstein & Lyons, 2001). A special role in the LSA–FSA dynamics is devoted to knowledge as a source of entrepreneurial opportunities within the ecosystem (Feldman, 2014; Qian, 2017, 2018; Qian et al., 2013). This so-called knowledge-based regional development (Qian, 2018) view suggests that entrepreneurship may serve as a mechanism of geographically mediated knowledge spillovers, while this mechanism’s effectiveness is contingent on other factors in the regional EE (including knowledge bases, absorptive capacity, competition, networks, diversity and culture). In line with this view, the dynamic and interactive processes of the provision of knowledge-intensive services through business incubation within EEs are perceived as having a positive impact on EE development (Fernández Fernández et al., 2015). Further research may address LSA–FSA configurations in EEs from a holistic perspective, whereas fuzzy-set qualitative comparative analysis (Ragin, 2008) seems to be a particularly appealing approach for this purpose.
While ecosystem studies are often empirical and thus include a regional context in most cases, the studies in this cluster incorporate the regional aspect as a theoretical basis and a conceptual part of their argument. For example, Audretsch and Belitski’s (2017) study of urban EEs uses the city as the unit of analysis. The distinct nature of such choice is emphasised by Bruns et al. (2017), who find that challenges in measuring EEs can stem from the studies’ tendency to combine rural and urban regions in the same research although the resulting context can be too large to measure as an EE. This argument is linked to Brown and Mason’s (2017) contention that globally, economic activity is concentrated on a small number of key cities. Accordingly, they present an archetype of ecosystems in their study. Some studies in this cluster have framed their arguments on the broader concept of ‘urban centres’ rather than individual cities. Qian (2017) classifies urban knowledge bases into several types and subsequently finds that certain types of knowledge can be more important in cities. Other studies in this cluster discuss contextual disadvantages pertinent to particular locations, such as peripheral position (Xu & Dobson, 2019), small size (Reidolf et al., 2019) and inadequate basic requirements (Sheriff & Muffatto, 2015), and suggest specific ways to overcome these challenges of building EEs in such locations.

Adopting an even broader perspective by assessing entire regions, some studies in this cluster find that a region’s economic potential has an impact on its EE (Martínez‐Fierro et al., 2019) and that the prevalence of high-growth firms in a region has a positive relationship with that region’s EE (Stam & van de Ven, 2019). Such studies are based on the seminal work of Feldman (2014), who introduced a two-way relationship between entrepreneurs as key agents of change in communities and how they benefit from the communities. The LSAs of EEs explain how entrepreneurial activity is strengthened by the region and how the impact of that activity adds overall value to the region (Content et al., 2019). These studies also outline how regional EEs can influence the success (regional performance) of individual regions (Szerb et al., 2019). Taken together, the studies in this cluster introduce plurality into the EE domain by changing geography-related elements from mere empirics to vital ingredients of conceptual and theoretical development.

4.5. Cluster 5: Agency Perspective

The purple cluster discusses both intended and unintended agencies of individual and collective actors, resulting in EE emergence and development. The early papers in this cluster have considered the role of individual entrepreneurs’ strategic choices of location (Pitelis, 2012) and the role of governmental policies (Kshetri, 2014) in EE development. While individual entrepreneurial agency has been further advanced by Spigel (2017) and Basole et al. (2019), the discussion on national authorities in EE development has been extended by two other articles in this cluster (Cicchiello, 2019; Jung et al., 2017).

Spigel (2017) proposes a theoretical model of EEs, comprising 10 cultural, social and material attributes, whose different configurations create various sets of benefits and resources for entrepreneurship. The distinctiveness of these benefits and resources in turn enables and facilitates entrepreneurial agency, contributing to the development and the reproduction of heterogeneous EEs. Building on Spigel’s (2017) model of EEs’ relational organisation, Basole et al. (2019) examine strategic positioning statements of 24,068 ventures to depict the structures of 35 EEs. Their study showcases the formative nature of a situated entrepreneurial agency and the respective agentic tradeoffs between legitimation and differentiation in the development of heterogenous EEs in terms of size, structure and composition (Basole et al., 2019).

Regard the government’s role in EE development, a comparison of Estonian and South Korean cases reveals possible multiple paths to success (Kshetri, 2014). A more recent study on the assessment of various stakeholders’ views about South Korea’s current government-driven EEs reveals the prevalence of a less optimistic outlook on overall EE development and prospects. It outlines several critical obstacles, such as an inappropriate joint surety system, an unfair competition ecosystem from large conglomerate companies and ‘unstable political agenda without durable institutional settings’
Another critical study, this time in the European context, evaluates national regulatory frameworks for crowdfunding. It finds that ‘European countries have approached crowdfunding regulation very differently creating sometimes barriers to the development of their own national crowdfunding markets’ (Cicchiello, 2019, p. 304). The study argues that the imposed local regulatory frameworks, related to new forms of entrepreneurial finance (e.g., equity crowdfunding), inhibit access to financial resources, which constitute the key element of a vibrant EE. Moreover, heterogenous policies among European countries prevent cross-border crowdfunding schemes in the European market, thus limiting the scaling up of crowdfunding platforms (Cicchiello, 2019). Overall, the government’s role in promoting EEs seems very challenging and problematic, whereas an intended developmental agency might lead to unintended detrimental consequences.

In addition to these two sub-themes, another dominant idea in this cluster involves the drivers of agentic actions that result in EE emergence and development, including the facilitating roles of trust (Muldoon et al., 2018) and sociocultural capital (Pillai & Ahamat, 2018) or the impact of national differences in EE formation (Hemmert et al., 2019). Building on earlier views on EE development focusing on individual entrepreneurs and governments, some works have adopted more holistic approaches towards considering the collective agency within various multi-agentic systems, such as smart-city (Sarma & Sunny, 2017), technopolis (Levenda & Tretter, 2019), meta-organisation (Du et al., 2018), helix (Carayannis et al., 2018; Dubina et al., 2017; Erina et al., 2017) or project-based/like organising (Auschra, Braun, et al., 2019; Cunningham et al., 2019). In a nutshell, this cluster emphasises the role of agency as a foundational principle for the effective development of an EE as a self-regulating, multi-agentic symbiotic system.

4.6. Cluster 6: Network Perspective

The teal cluster focuses on networks. Using the lens of networks of interacting actors, the studies in this cluster explain the development and the evaluation of regional and national EE frameworks. These studies clearly link to Isenberg’s (2010) foundational work, which emphasises the interconnectedness of individual elements, elaborates on the key principles influencing the system and notes that the ecosystem should include a sufficient number of non-profit and industry associations to facilitate entrepreneurial networking and investments. Another pivotal study on the ecosystem domain (Stam, 2015) outlines the main elements, outputs and outcomes of the EE concept, including ‘networks’, which address the ecosystem’s network density.

More recent studies in this cluster have examined other issues, such as how social capital promotes knowledge acquisition of ventures (Carayannis et al., 2016) and what is the social network connectivity of ventures with different types of business models (Neumeyer & Santos, 2018). Nicotra et al. (2018) incorporate social capital as one of the sub-elements in their framework for EE cause–effect relations, following it up with an ecosystem comparison (Corrente et al., 2019). Interestingly, Corrente et al. (2019, p. 488) indirectly criticise the presumed prominent role of networks in EE research: ‘... the concept of the ecosystem applied to entrepreneurship relates to the capacity of a territory to create a system of actors and infrastructures supporting the creation and development of innovative business projects, beyond the mere construction of a network structure between companies ...’. Neumeyer et al. (2019) counter this view by not only applying the social network theory to the conceptualisation of EEs as ‘complex social constructs’ but also modelling ecosystems precisely through networks of individuals.

Overall, while the inclusion of Isenberg’s (2010) and Stam’s (2015) seminal studies in this cluster may suggest that network-based research on EE is theoretically sound and unanimous, the opposite seems to be the case. Nonetheless, a common thread running through the studies in this cluster is their attempt to explain EE development via interactions among actors, who can be individual entrepreneurs (Neumeyer et al., 2019), their ventures (Carayannis et al., 2016), regions or even entire ecosystems (Corrente et al., 2019). Thus, while networks and social capital are the unifying themes
of the studies in this cluster, their presumptions, units of analysis and consequently, their findings and implications vary considerably.

5. DISCUSSION AND CONCLUSION

In this study, our objective was to summarise the extant EE literature and to consolidate several disciplines that are gradually being permeated by EE research (e.g., international business, entrepreneurship, and regional studies). We have applied bibliometric methods because of their rigour, relative objectiveness (Zupic & Čater, 2015) and the recent emphasis on bibliometric studies about entrepreneurship in general (Lampe et al., 2019) and EE research in particular (Credit et al., 2018; Malecki, 2018). Compared with other bibliometric studies in the EE context (Alvedalen & Boschma, 2017; Credit et al., 2018; Malecki, 2018), our study is favourably distinct and to our knowledge, appears to be the first full-fledged bibliometric analysis of the emerging domain. By utilising a broad array of bibliometric data and techniques, we provide comprehensive mapping of the EE research domain and the synthesis further extends our contribution to the substance of the subject.

Our study’s findings offer several insights into the status quo of the EE domain. Recent years have witnessed an exponential growth in EE studies, which can be characterised as an explosion of research attention. This trend is particularly evident in comparison to more mature fields of clusters and innovation systems (García-Lillo et al., 2018; Suominen et al., 2019). Since 2016, scholars of economic geography, as well as entrepreneurship, strategic management and international business, have increasingly contributed to EE research.

This proliferation is also reflected in publication outlets, where our analysis shows a heterogeneous dispersion of studies across various disciplines. Notably, despite the relatively nascent stage of EE research, between 1993 and 2019, over 100 articles were published in journals classified in the top quartile (Q1) per the SJR. These recent developments indicate the surge in the topic’s relevance and popularity in the business literature.

Our study’s findings also highlight the clear authority of several influential scholars representing the domain’s significant generative mechanisms, also known as invisible colleges (Crane, 1969; Vogel, 2012). Notably, these scholars have not only published articles and been cited widely but have also opened new avenues of research in the domain and have triggered the emergence of particular perspectives, with their contributions being pivotal to the thematic clusters. In addition, the presence of other esteemed generalist scholars further contributes to the legitimisation of the domain outside the field’s immediate circle of authors. For the field to progress, it is important to have diverse authors working along the periphery, as well as new and independent authors infusing fresh ideas that are not bound by existing intellectual structures or network dynamics.

In sum, while recently on the rise in academia, the EE remains a largely practitioner-centred topic with limited empirical, conceptual and theoretical grounds (Autio et al., 2018; Colombo et al., 2019). Thus, a long but promising path must be traversed to further develop the EE research agenda. Drawing on this study’s results, it would be of significant interest to observe whether and how the research domain progresses through development stages towards maturity and the so-called normal science or otherwise burnout as yet another rapidly emerging academic hotspot (Audretsch et al., 2019). So far, our study reveals that the EE scholarly community’s attempts seem notably structured and cumulative. Our analysis of the clusters shows that more recent contributions tend to follow research avenues chartered by earlier works within a particular cluster. On the other hand, our analysis also reveals substantial linkages between the clusters. As we believe that some of the key unanswered questions in EE research can only be solved having a systematic understanding of the entire domain and advancements in all of its knowledge clusters. For instance, in order to address the burning issue of governance, integration of knowledge from other clusters within EE research might be found valuable. As intervention in an ecosystem is considered potentially hazardous (Stam, 2015) and violates the self-regulating principles of ecosystems, serious concerns have been raised
about whether and how EEs are governed in theory and practice and the effectiveness of applying the main tenets of the governance literature to EEs. To address this open question within governance perspective researchers may draw from the agency cluster where EE is seen a self-regulating, multi-agentic symbiotic system. In particular, the governance of EEs might be considered through the prism of adjustments in incentives for agency. To identify the agency of which particular actor within emerging ecosystem is under incentivised and thus inhibiting a desired development of EE, the geography perspective seems particularly useful with the analysis of interrelationships between locational advantages and resources required by ecosystem actors. The complexity perspective in turn outlines the dynamics between interrelated elements and actors involved in the ecosystem development, whereas the context perspective allows for heterogeneity of various contextual forces affecting entrepreneurial ecosystems. Thus, our study may help researchers to grasp and connect the complex, interdisciplinary and fragmented knowledge on entrepreneurial ecosystems and trigger further research on the topic.

In conclusion, we recognise that bibliometric research warrants technological choices and delimitations, both of which impose some limitations. For instance, the WoS database does not index all relevant publications in the EE field; thus, certain publications relevant to the research corpus have possibly been overlooked. However, Scopus and Google Scholar have similar drawbacks, with some missing listings and metadata. Thus, it is necessary to also focus on peer-reviewed studies published in reputable academic journals. Nevertheless, the initially omitted publications impacting other EE publications have further been supplemented via the co-citation analysis on the cited reference lists. These limitations point to the need for a systematic literature review by mining publications from multiple academic databases. Similarly, we have tracked the patterns between country-level activity and thematic clusters from our analysis outputs but have not obtained interesting results, most likely because most EE research is international and collaborative. More narrowly focused future research on patterns of country-level activity in the domain might examine this issue more closely. Furthermore, while most EE studies have been published in the last couple of years, nearly in each of the six clusters, the possibility to analyse the domain’s evolution dynamically represents another prospective opportunity.
REFERENCES


ENDNOTES

1 Authors can be affiliated with multiple institutions in different countries, while co-authoring with others.

2 Defined based on the journal’s h papers published which each have been cited at least h times.
Hannes Velt (M.Sc. Econ. & Bus. Adm.) is a Junior Researcher at LUT University School of Business and Management. His doctoral dissertation deals with entrepreneurial ecosystems and their influence on venture development and internationalization. He has published research articles in both conferences and international academic scientific journals, such as Journal of Enterprising Communities, and Journal of Export Marketing.

Lasse Torkkeli (D.Sc. Econ. & Bus. Adm.) is an Associate Professor at LUT School of Business and Management. His areas of expertise are related especially to the internationalization of SMEs, their networks and partnerships, as well as the role of dynamic skills and culture in international business. He has published research articles in both conferences and international academic scientific journals, such as Journal of International Entrepreneurship, European Management Journal and International Marketing Review, among others.

Igor Laine (D.Sc. Econ. & Bus. Adm.) is a Post-Doctoral Researcher at LUT University School of Business and Management. His area of expertise spans international business and entrepreneurship domains with particular focus on internationalization of entrepreneurial ventures, their decision-making logics, networking and legitimation activities. He has published research articles in both conferences and international academic scientific journals, such as International Entrepreneurship and Management Journal and Journal of East-West Business.
Publication II

Velt, H., Torkkeli, L., and Saarenketo, S.
The entrepreneurial ecosystem and born globals: The Estonian context

Reprinted with permission from
Journal of Enterprising Communities: People and Places in the Global Economy
Vol. 12, pp. 117–138, 2018
© 2018, Emerald Publishing
The entrepreneurial ecosystem and born globals: the Estonian context

Hannes Velt, Lasse Torkkeli and Sami Saarenketo

School of Business and Management, Lappeenrannan Teknillinen Yliopisto, Lappeenranta, Finland

Abstract

Purpose – The purpose of this study is to develop a framework of the elements of the entrepreneurial ecosystem in the context of born global start-ups. The study also applies this framework to uncover the ecosystem elements that impact start-ups during their initial phases of discovery and validation.

Design/methodology/approach – The authors used an online survey questionnaire sent out to several Estonian start-ups. Based on the responses, a dataset was developed and analysed using STATA and t test methodology.

Findings – The analysis resulted in the identification of seven systemic ecosystem elements as the main factors impacting the launch and ten elements impacting the growth of born global start-ups. The systemic elements that comprise the ecosystem’s strengths and weaknesses were also identified.

Research limitations/implications – The cross-sectional nature of the survey method and the single-country context are noted as limitations of the study and offer future research potential for longitudinal settings, for mixed method studies and for comparative country data.

Practical implications – The study suggests that start-ups should function in a more collective manner to create platforms, promote one another’s products and services where possible and launch collective initiatives to enhance their visibility in the global context. Born globals should engage with their local entrepreneurial ecosystem, while remaining aware of its relative strengths and weaknesses for supporting internationalisation.

Social implications – Although the local ecosystem involves many stakeholders, this study helps identify key stakeholders that should be focused on by the government. Doing so will help create an increasingly comprehensive ecosystem at the national level – one that functions efficiently in supporting growth-seeking enterprises such as born globals.

Originality/value – This study combines the two research streams of the entrepreneurial ecosystem and born globals by directly connecting them with systemic elements. This study is, to our knowledge, the first to combine the two, thus making an added contribution by highlighting macro- and micro-viewpoints, with the former lacking in research on born globals and the latter in research on ecosystems. Thus, the present study helps in bringing venture creation and local ecosystem development research closer to each other.

Keywords Born globals, Entrepreneurial ecosystems, Estonian entrepreneurship

Paper type Research paper

Introduction

Initiatives intended to assist the development of entrepreneurship mainly focus on the entrepreneurial ecosystem (Isenberg, 2014) and its role in enabling and constraining entrepreneurial activities (Stam, 2014). The entrepreneurial ecosystem as a concept is still in

JEL classification – F60, L25, L29, M13, O62
its early stages of research and has yet to become a common term in the literature on entrepreneurship. Van de Ven (1993) suggested that a historical focus on individual entrepreneurs has enabled the creation of successful entrepreneurial ecosystems that evolve through a set of interdependent elements, which cooperate with one another to generate and support the establishment of new ventures over time.

There is currently limited evidence and lack of causal depth in research on ecosystem elements that facilitate entrepreneurial activities to create innovation and contribute to the vibrancy of the entrepreneurial environment. Research on the individual elements of the ecosystem has gained momentum, but there are substantial differences in their focus, with authors highlighting some actors (e.g. networks and knowledge) more than others (e.g. talent and leadership). This choice of focus in turn tends to overemphasise the relative importance of certain elements and their role in the overall structure. Thus, research concentrating on and assessing the underlying dynamism, relational strength, influence and performance of the ecosystem could be inherently misleading. This is why Mack and Mayer (2016) noted that many studies focusing on the elements are often inflexible, retrospective in nature and concentrate on already successful ecosystems. In sum, more integrated and explicit studies are needed to further understand the phenomenon. This study aims at responding to this gap by outlining the connections between the entrepreneurial ecosystem and the successful launch and growth of start-ups at a national level.

Moreover, the entrepreneurial ecosystem directly influences the activities entrepreneurs undertake to initiate start-ups in their search for novel ideas, leading to innovations and the creation of value for society as a whole. The structural formation of an entrepreneurial ecosystem consists of elements that have different features and capabilities, all of which directly affect the livelihoods of start-ups and their founding entrepreneurs. Therefore, to be able to thrive, certain combinations of resources, abilities and support are required. The cause and effect of the relationships and the dynamic interactions among the actors in the ecosystem influencing new venture creation do not entirely answer the fundamental theoretical and empirical questions on how overall value is created (Spiggle, 2015; Stam, 2015), while taking into account that not all new ventures survive and fruitfully create synergies with the other elements of the ecosystem (Boullier et al., 2016). Also, there is a lack of knowledge on how to develop entrepreneurially successful environments (Kohrt, 2014) that inherently determine the type of ventures launched and the velocity of their growth (Acs et al., 2016).

One type of new venture for which the role of the entrepreneurial ecosystem is particularly critical is the born globals. The term “born global” was first introduced by Remme (1993) and by Oviatt and McDougall (1994, p. 69), who defined it as follows:

A business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries.” It refers to the concept of "young, entrepreneurial start-ups that initiate international business soon after their inception (Cavusgil and Knight, 2015, p. 3).

Past literature on international entrepreneurship and born globals has highlighted the importance of network relationships as crucial facilitators of successful entrepreneurial internationalisation (e.g. Covinello and Manro, 1997, 1995; Covinello, 2006; Torkkeli et al., 2012). However, they are mostly related to industrial (business-to-business) network relationships, organisational network capabilities or the network relationships of the individual entrepreneur. To our knowledge, there are no prior studies that help explain the role of the entrepreneurial ecosystem in entrepreneurial internationalisation or, indeed, in
the born global phenomenon. This is despite the fact that several scholars (Zander et al., 2015) have suggested that the ecosystem view is a relevant lens through which to assess born globals. Thus, the research questions we are seeking to answer through this study, while examining the entrepreneurial ecosystem in the context of born globals, are as follows:

RQ1. Which systemic elements represent a healthy entrepreneurial ecosystem?

RQ2. What is the role of the entrepreneurial ecosystem in launching and growing born global start-ups?

RQ3. Which systemic elements can be considered an ecosystem’s strengths and weaknesses?

The remainder of the study is structured as follows: in the next section, we provide a review of the literature underlying the concept and operationalisation of the entrepreneurial ecosystem in the context of start-ups. Section 3 outlines the research methodology, followed by the results in Section 4, after which we discuss them in more detail in Section 5. The study concludes by outlining the theoretical and managerial implications of our results, the limitations of this study and potential avenues for future research.

Literature review

Conceptual ideas about the entrepreneurial ecosystem have existed for the past 20 years (Bahrami and Evans, 1995; Moore, 1993; Spilling, 1996; Van de Ven, 1993), but the growing focus on this field of research has recently given it some added momentum (Acs et al., 2014; Autio and Levie, 2015; Feld, 2012; Foster et al., 2013; Mack and Mayer, 2016; Mason and Brown, 2014; Napier and Hansen, 2011; Stor, 2014; Saeb et al., 2013). On the one hand, “entrepreneurship” is defined as a process that includes the discovery, enactment, evaluation and exploitation of opportunities to create future goods and services (Oviatt and McDougall, 2005; Shane and Venkataraman, 2000). In general, it includes the process by which individuals exploit opportunities for innovation (Schumpeter, 1934). These entrepreneurial individuals tend to be good at identifying new business opportunities and usually display positive biases in their perception and a pro-risk-taking attitude, making them more likely to exploit these opportunities (Zhang, 2015). The entrepreneurial ecosystem approach regularly constructs this entrepreneurship to high-growth ventures, which are considered a vital source of innovation, productivity, growth and employment (Foster et al., 2013; Mason and Brown, 2014).

On the other hand, the term “ecosystem” as used by scholars and business practitioners has its roots in biology; yet, some researchers began to use the term in the context of business. The use of the term ecosystem in a business context was formally proposed by Moore (1993) to explore and explain the co-effect and co-evolution of firms and their external environment. In general, an ecosystem can be considered to include the community of organisations, institutions and individuals that impact the focal organisation. These are customers, competitors, complementors, suppliers, regulatory authorities, standard-setting bodies, the judiciary and educational and research institutions (Teece, 2007).

According to Acs et al. (2014), the ecosystem is “a dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures” – this is also the view of the only peer-reviewed definition of entrepreneurial ecosystems (Autio and Leve, 2015). Based on insights from the most influential works of past scholars and practitioners (Bahrami and Evans, 1995; Cohen, 2006; Foster et al., 2014, 2013; Isenberg, 2011; Neck et al., 2004; Stor (2015) devised a constructive synthesis and developed a new

Ecosystem and born globals

119
model. The importance of the new model was its holistic view, which introduced
entrepreneurial activity as the output, and aggregate value creation as the combinational
outcome. Stamat et al. (2015, 2014) approach uncovered important aspects of the causal
relationships in the system and considered the entrepreneur as the focal point and creator
of the ecosystem.

Likewise, the theoretical foundations and concept formulation of the entrepreneurial
ecosystem and the holistic views of the ecosystem’s structure and elements are converging.
As research on the causal relationships between the entrepreneurial ecosystem and
entrepreneurial activity is still relatively scarce, this study intends to consider it as a focal
point. Furthermore, it is necessary to understand the ecosystem construct in detail and
the dynamics that lie between them. To delimit the study, we focus only on the local systemic
elements of the ecosystem that control human interactions, as they are defined as the central
driving forces of entrepreneurial activity, and their interaction is key to determining the
success of the ecosystem. We next outline the individual features of these elements.

Leadership
Isenberg (2011) argued that every fruitful entrepreneurial ecosystem tends to have at least
one or more successful entrepreneurial leader who becomes a powerful source of inspiration
in the eyes of his or her peers. Successful entrepreneurs with a proven track record and
economic independence can continue their entrepreneurial activities by inspiring and
advising others based on their expertise and by investing their time and money. These
“venture junkies” can become serial entrepreneurs, mentors, board members, angel
investors (AIs) and venture capitalists (VCs). This cyclical process is called “entrepreneurial
recycling” (Bairam and Evans, 1995; Mason and Harrison, 2006).

Finance
Entrepreneurial finance is an area of research that focuses on new ventures and how they
obtain and allocate financial capital. Taking into account the causal relationships within the
entrepreneurial ecosystem (Stam, 2015), it is known that entrepreneurs recognize
opportunities, leading to value creation. Entrepreneurs also discover and generate
inventions that need to be transformed into marketable products and services (Burgelman
and Hitt, 2007). This process of commercialization is constrained by time (Suddaby et al.,
2013) and requires the allocation of vast amounts of financial resources (Ebben and Johnson,
2006), making financial capital a foundational resource for entrepreneurs’ success in
pursuing value creation. Therefore, this is arguably a crucial part of a strong and supportive
entrepreneurial community (Feld, 2012).

In their research, Wu et al. (2016) divided entrepreneurial finance as coming from four
main sources: formal debt and equity and informal debt and equity. The main difference
between the two is that formal lenders and investors require a high-quality business plan
with all the necessary content (e.g. planning, budgeting and strategies) before reaching a
decision (Mason and Harrison, 1996). Also, how they perceive and assess risks and draw
provisions in the contracts to reduce risks (Chenmanur and Fulghieri, 2014) varies. However,
they still face issues around imperfect information and enforcement (Zhang, 2015). Thus, Lam
(2016) argued that formal funding is central to launching, developing and
building new entrepreneurial firms.

Most of the newly established growth firms do not have sufficient funds to
independently open up shop, and they are too risky for formal lenders, so the only capital
they can access is from family, friends, relatives and other informal sources within their
community (Chua et al., 2011; Sauer et al., 2013). Wu et al. (2016) stated that informal debt
has a much lower transaction cost compared to formal debt, i.e. lower initial transaction fees, capital decisions are made faster, as there is less bureaucracy and there are usually no collateral or guarantor requirements.

Conversely, formal equity represents finance sourced from VCs, AIs and corporate venture capitalists (CVCs). Investors use their extensive networks to help new ventures gain market access, contacts and credibility with potential partners and customers, both outside and inside the entrepreneurial ecosystem. (Chemmanur and Fulghieri, 2014; Denis, 2004; Napier and Hansen, 2011; Saerb et al., 2013. Wong et al’s (2006) study further showed that AIs do not rely on the same control mechanisms as VCs but rather use methods that are more informal. AIs seem to provide bridge investments until the organisation is ready for VCs. Other aspects of crowdfunding (Mollick, 2014) and bootstrapping (Harrison et al., 2004) are also considered relevant.

**Talent**

Access to talent is vital in the launch of a new venture and its chances of success; therefore, talent impacts the wider entrepreneurial ecosystem as well (Cohen, 2006; Neck et al., 2004; Stam, 2014). Moreover, Lee et al. (2004) argued that talented people are a fundamental force behind entrepreneurial action and are highly visible in more diverse and welcoming regions. Regions with high levels of talent further attract other highly qualified workers to pursue new challenges and wealth (Bahrami and Evans, 1985; Cohen, 2006). This leads to a "broad, deep talent pool for all levels of employees in all sectors and areas of expertise" (Feld, 2012, p. 188) in the community. A well-endowed and open environment is principal to improve the launching and scaling of new ventures (Thomas et al., 2015), as without the availability of such a workforce, potential entrepreneurs would move on to other more attractive regions to establish their companies (Neck et al., 2004). Therefore, the availability of talent has a direct impact on the entrepreneurial ecosystem and the development of new ventures (Foster et al., 2014).

**Knowledge**

Access to knowledge has become a fairly important endowment for innovative ventures that are strapped for resources from their very inception (Oviatt and McDougall, 1994) and cannot by themselves develop essential new knowledge (Huggins and Thompson, 2019). Thus, new ventures capture knowledge spillovers by externally screening for innovations (Katila, 2002). From the entrepreneurial perspective, entrepreneurs recognise the opportunities for exploiting spillovers and thus create new ventures to convert this exposed knowledge into economic knowledge. This, in turn, enables entry into new markets and creates value for the entire economy in the long run (Acs et al., 2013).

**Networks**

An entrepreneurial ecosystem consists of layers of networks, so for a better understanding of relations between the actors, the structure should be elaborated. Ahuja et al. (2012, p. 435) defined network structures as “the nodes that comprise the network, the ties that connect the nodes and the patterns or structures that result from these connections.” In the context of entrepreneurial networks, each node represents an actor, an individual and an organisation in the network.
Support systems
Entrepeneurs need abundant resources to launch and grow new ventures; however, as early stage companies are usually resource constrained (Knight and Cavusgil, 2004), they require support to gain access to the necessary inputs. Hence, new ventures have a tendency to accumulate in a certain location where such resources are readily available and relatively inexpensive because of a large user base (Feld, 2012). Researchers have mainly studied service providers (e.g. legal and accounting) and intermediaries (e.g. incubators and accelerators) but have focused less on networking (e.g. trade associations and alumni) and engagement services (e.g. boot camps and hackathons). All of the above-mentioned actors help to lower the barriers to launching new venture start-ups and speed up their time-to-market processes and growth (Zhang and Li, 2010).

Bahrami and Evans (1996) noted that service infrastructure allows start-ups to focus on their chosen field of expertise rather than expend their energy across a broad range of activities. This means that entrepreneurs should stick to their core activities and outsource the rest to professional service providers. Furthermore, Zhang and Li (2010, p. 105) validated that new venture innovation capabilities are directly related to service providers who can inform new ventures about available information, knowledge and innovations, as they interact with other industries and organisations in the ecosystem (Wolpert, 2002), while also reducing the cost of such efforts (McEvily and Zaheer, 1999) and mitigating the risk of interruptions in the innovation process (Saxenian, 1990).

In addition, many researchers and practitioners have found that intermediaries play an important role by incubating and supporting entrepreneurs and their new ventures from their inception to later stages (Barbero et al., 2013; Cohen and Hochberg, 2014; Isbelle, 2013; Pauwels et al., 2016; Spigel, 2015; Staggs, 2015). Thus, a healthy entrepreneurial ecosystem has “a solid presence of effective, visible, well-integrated accelerators and incubators” (Feld, 2012, p. 187), which provides “support to start-ups to improve the probability of survival of the portfolio companies and accelerate their development” (Pauwels et al., 2016, p. 14).

Saxenian (1990) also pointed out that regional institutions provide networking services that help to gather the necessary resources needed for new venture development. They serve as network intermediaries that facilitate information exchange and other interactions (Howells, 2006; McEvily and Zaheer, 1999). These institutions also provide networking support and are commonly instituted as trade and industry associations, supply chain networks, alumni associations and online social networks (Saxenian, 1990; Suresh and Ramraj, 2012). Feld (2012, p. 186), in turn, emphasised that engagement services also play an important role in the launch and development of new ventures. These engagement events can play a crucial preliminary role in the launch of new start-ups and their acceptance into incubators and accelerators.

In summary, the construct of the entrepreneurial ecosystem has been an interesting topic of research for the past few decades as many academics and researchers have concentrated on a set of vibrant environments that sustain entrepreneurship to create innovation frontiers. Over a period of time, many authors have investigated the various elements of the ecosystem and their relationships with each other, which has allowed us to frame the construct of this system. The ecosystem components vary from six to ten elements that have recently been divided into systemic and framework conditions (Starm, 2014). They all play an important role in developing a sustainable ecosystem, but systemic elements directly control human interaction and nurture entrepreneurial activities, thereby playing a central role. These driving forces display the ecosystem’s moral and motivational aspects (leadership) and show the availability and quality of the required resources (finance and talent), which are essential in developing and growing businesses based on innovation and technological
advancements (knowledge). All of these elements are interrelated (networks) and embraced (support systems) by the ecosystem.

Research method
We chose to conduct the empirical part of the study in Estonia, as it provides an interesting national environment where research on entrepreneurial ecosystems has been lacking. Specifically, Estonia has a high density of start-ups per capita basis, with a history of launching and growing born global enterprises (e.g. KaZaa, Skype and Transferwise). On the other hand, Estonia is also quite distinct in terms of its socio-economic and political status from the rest of Eastern Europe (EE) and the Commonwealth of Independent States (CIS) countries, both of which fall mostly within the Slavic cultural sphere. Historically, Estonia has been culturally influenced by the Nordic countries (mostly Sweden and Denmark) and Germany (Hanseatic League), further distinguishing it from most of the former eastern bloc. For all these reasons, we considered Estonia as a good context in which to illustrate how start-ups (born globals) interact with their local ecosystems.

First, we extracted and combined available lists of start-ups from secondary sources Startup Estonia, FunderBeam and Garage48. The lists contained approximately 400 start-ups in total, the majority of which were in the discovery and validation stages. The focus of the present study is to enhance our understanding of how entrepreneurial ecosystems influence start-ups’ development in their initial stages; therefore, it was important to delimit the population in an adequate manner. Hence, we applied stratified random sampling (Neyman, 1934) to concentrate on the focal subgroup, which left us with 143 start-ups that were all contacted directly. Of these, 62 (43.4 per cent) of the respondents started the survey and 34 (23.8 per cent) completed it, making the response rate adequate to represent the population.

Based on the responses, we first calculated the mean averages of the perceived importance of each of the systemic elements in both stages. These averages were ranked to detect which of them are the most important for the discovery and validation of start-ups. Second, the systemic elements’ average levels of presence in the ecosystem were calculated. Introducing such a dimension allowed us to develop a ratio system. Hence, a set of relativity ratios were calculated by dividing the average from the perceived availability (and access) level with the average level of perceived importance. These relativity ratios indicated how well the elements were performing. Finally, to confirm which elements represented strengths and weaknesses of the ecosystem, the connections between the systemic elements were tested with STATA by using a paired samples t-test between the systemic elements in both stages. The data met the following assumptions of the paired samples t-test:

- The dependent variable was continuous (measured from 0 to 100).
- The independent variable consisted of two categorically related groups.
- There were no significant outliers in the differences between the two related groups.
- The dependent variable was approximately normally distributed.

Results
Table 1 presents the importance of the elements in the discovery stage, starting from 13.68 up to 88.76 points, while in the validation stage, it is from 29.26 up to 91.21 points. Availability and access are valued from 21.60 to 68.15 points. This could be further looked at from the aggregate average perspective, showing that systemic elements play a more crucial
role in the validation stage (60.24) compared to the discovery (51.22) stage, but their average availability is relatively scarce (44.72).

Furthermore, the most important element in the discovery stage was talent—specifically, entrepreneurial talent (88.76; 1st). This indicates that founding entrepreneurs themselves directly affect the firm’s preliminary processes and define their subsequent success. The second most important element is finance, i.e. informal capital acquired from family, friends and relatives (70.24; 2nd) and bootstrapping (71.74; 3rd). This shows that entrepreneurs should have strong trust-based relationships to accumulate the necessary capital or should be able to use their own resources because of their lack of credibility in the eyes of other lenders. The other most influential elements were leadership (69.41; 4th), knowledge (69.12; 5th), engagement services (66.29; 6th) and networks (60.85; 7th), indicating their substantial importance in the development phase.

In the second stage of validation, talent was still the most influential element, including both entrepreneurial talent (91.21; 1st) and worker talent (75.85; 4th). Hence, it is not only about founding entrepreneurs themselves but also about integrating key employees to create a dynamic team and appropriate working environment. The knowledge element (82.12; 2nd) has also gained more importance, indicating that team composition enables higher levels of learning and knowledge acquisition. Similarly, network (75.88; 3th), which facilitates access to knowledge and talent acquisition, has gained more importance. Other important elements were venture capital (68.41; 5th), angel investors (62.47; 6th), bootstrapping (61.68; 8th), leadership (61.71; 7th), professional services (60.24; 9th) and intermediaries (60.03; 10th).

Thereafter, a set of relative ratios was calculated by dividing each element’s availability mean values with the mean values of perceived importance (Table 1). These ratios show which elements’ average levels have the highest discrepancy. In other words, a high importance relative to the level of availability suggests how well the element performs compared to its position. The lowest ratios refer to impeding tendencies of the elements in constraining the development processes occurring in the ecosystem. For instance, in the
Table II. Variable means and concurrent ratios

<table>
<thead>
<tr>
<th>Variable</th>
<th>Discovery Mean</th>
<th>Discovery Ratio</th>
<th>Validation Mean</th>
<th>Validation Ratio</th>
<th>Availability Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurial Talent&quot;</td>
<td>89.76</td>
<td>0.61</td>
<td>92.28</td>
<td>0.59</td>
<td>54.12</td>
</tr>
<tr>
<td>Informal Loans</td>
<td>79.24</td>
<td>0.76</td>
<td>76.62</td>
<td>0.82</td>
<td>43.68</td>
</tr>
<tr>
<td>Bootstrapping</td>
<td>71.74</td>
<td>0.83</td>
<td>69.08</td>
<td>0.89</td>
<td>54.59</td>
</tr>
<tr>
<td>Leadership</td>
<td>69.43</td>
<td>0.94</td>
<td>65.71</td>
<td>0.96</td>
<td>58.53</td>
</tr>
<tr>
<td>Knowledge&quot;</td>
<td>69.12</td>
<td>0.98</td>
<td>82.12</td>
<td>0.88</td>
<td>55.85</td>
</tr>
<tr>
<td>Engagement Services</td>
<td>60.29</td>
<td>1.03</td>
<td>46.15</td>
<td>1.48</td>
<td>68.35</td>
</tr>
<tr>
<td>Networks&quot;</td>
<td>60.85</td>
<td>0.88</td>
<td>75.86</td>
<td>0.70</td>
<td>53.41</td>
</tr>
<tr>
<td>Angel Investor</td>
<td>59.56</td>
<td>0.74</td>
<td>62.47</td>
<td>0.70</td>
<td>44.03</td>
</tr>
<tr>
<td>Worker Talent</td>
<td>59.29</td>
<td>0.86</td>
<td>75.65</td>
<td>0.64</td>
<td>48.74</td>
</tr>
<tr>
<td>Intermediaries</td>
<td>47.68</td>
<td>1.27</td>
<td>60.05</td>
<td>0.85</td>
<td>50.82</td>
</tr>
<tr>
<td>Professional Services</td>
<td>38.82</td>
<td>1.37</td>
<td>60.24</td>
<td>0.88</td>
<td>53.29</td>
</tr>
<tr>
<td>Venture-Capital</td>
<td>32.91</td>
<td>1.59</td>
<td>68.41</td>
<td>0.52</td>
<td>35.76</td>
</tr>
</tbody>
</table>

Note: "Most important factors overall

In the discovery stage, ratios of entrepreneurial talent and informal loans are 0.61 and 0.55, respectively, indicating that the two most important elements in that stage have relatively low levels of availability compared to their position of influence. As these elements are fundamental in their nature, their corresponding levels are a serious indication of development constraints in the ecosystem and its inherent weaknesses. Less drastic but comparable signs can be seen in case of the other essential elements of bootstrapping (0.76), leadership (0.84), knowledge (0.83) and network (0.88). Engagement services is the only element (1.03) that has a balanced level of relative abundance compared to its role, indicating that this is a valid measure of the strength of the local ecosystem.

Likewise, in the validation stage, entrepreneurial talent and venture capital show the lowest ratios – 0.59 and 0.52, respectively – indicating their restrictive propensities towards venture development. Also, elements of knowledge (0.68), network (0.70), worker talent (0.64) and angel investors (0.70) play their relative constraining roles in determining the success of the ecosystem. Furthermore, leadership (0.95), bootstrapping (0.89), professional services (0.88) and intermediaries (0.89) as important elements have fairly balanced levels, indicating their slight strength in the validation processes. All other excluded elements – bank loans, CVC, crowdfunding and networking services – in both stages are much less important in their overall status, so their ratios are ineligible and were excluded.

According to the theory, there are many elements deemed to be important for the ecosystem to fulfill its obligations in developing new ventures. Hence, all systemic elements should be present for the entrepreneurial ecosystem to function properly. However, not all of the sub-elements might play a significant role in the development process. To determine which elements are essential, each stage should be analyzed using a paired samples, mean-comparison t-test.

Table III shows the pairs of elements with the closest averages in the discovery stage, ranked by importance. Most of the pairs show no statistical difference between their averages, indicating their relevance in the system. However, on the lower tail, CVC and formal debt are statistically different and disconnected from the others, making them insignificant to the development process.

Table IV shows the comparative closest pairs in the validation stage. As in the first phase, most of the pairs are interconnected and show no statistical difference in their averages. Nevertheless, on the lower side, formal debt is statistically different from all the
other systemic elements and, hence, could be considered as an element with no significant value for venture development in this phase.

In summary, the statistical differences between the mean averages of the systemic elements make their connections observable. The results indicate that the elements are not just strengths and weaknesses but could also be in between, less central or even irrelevant for the system to function properly.

Discussion

Leadership

Entrepreneurial leadership in the discovery stage plays an important role in encouraging other entrepreneurs to pursue start-up initiatives. This motivational effect helps to self-

<table>
<thead>
<tr>
<th>Table III. Paired t-test summary in the discovery stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table IV. Paired t-test summary in the validation stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
</tbody>
</table>
determine business efforts and emphasises the importance of having sufficient knowledge to start and develop a healthy business. Furthermore, in the validation stage, the leadership’s importance deteriorates. It is still quite influential in helping start-ups to grow and validate their business models. This relevance indicates that the value proposition of leadership has changed from trailblazers and role models to a direct stimulus for start-up development through mentoring services (intermediaries) and raising capital (e.g. VCs and AIS). Hence, it can be argued that leadership is not losing its value but has partly transitioned to other elements. Moreover, taking into account the availability level and relativity ratios, leadership is readily available and performs well; therefore, it can be considered as a strength of the local entrepreneurial ecosystem.

**Funding**
In the discovery stage, bootstrapping was perceived as one of the most essential elements of the Estonian start-up ecosystem. However, in the context of entrepreneurship, bootstrapping has a constraining effect on development by making entrepreneurs use their own limited resources, and it has a sustaining effect by making entrepreneurs more persistent and calculative.

In the validation stage, bootstrapping has lost its influence, giving way to other sources of finance (i.e. VCs and AIS). As the need for capital grows, bootstrapping can no longer provide sufficient resources; therefore, other more prolific entities need to be included. Considering the level of availability and access and relativity ratios, bootstrapping has a strong presence in the local context and is seen as a suitable method to develop and grow one’s firm, thus representing value for the local ecosystem.

Regarding formal debt, in the discovery stage, loans and credit from the banking system are the least important element of them all, implying that formal loans are not an influential factor in the first phase. Also, the t-test confirmed that bank loans were excluded from the main set of elements, rendering them non-essential. This can be based on the assumption that banks target companies with proven track records, which indicate that they can handle the collateral requirements. In the validation stage, loans and credit from formal lenders are still regarded as the lowest in terms of importance. Their average assessment level has risen more than two-fold, but, according to the t-test, they are still regarded as disconnected from the rest. Also, in terms of the level of availability and access, formal lending institutions are neither considered valuable elements in the initial stages nor are they considered accessible. Hence, formal debt is disregarded as a fundamental element in launching and growing start-ups.

With informal debt, in the discovery stage, informal sources are a critical element and the most important financial instrument. This shows that informal sources are an essential part of the ecosystem, as they come with much lower transaction fees, far lesser bureaucracy and without any formal collateral requirements. In the validation stage, the importance of informal loans is diminished. The main implication is that as start-ups reach a certain level of growth, the higher-interest, short-term lending horizon and smaller amounts would start to restrain their development. Therefore, it can become too expensive and time-consuming. In addition, as start-ups become clearer and formally validate their value propositions, loans from informal sources become officially visible and considerably more structured.

Considering the level of availability and access and relativity ratios, seeking an informal loan as a source of capital is relatively rare in the Estonian start-up context. As a result, it seems that, theoretically, informal debt can be a good alternative to other methods of raising capital and can help new ventures launch and validate their business proposals. However, in
practice, it is the worst performing element in the discovery stage; therefore, informal debt represents a weakness of the local ecosystem.

Further, VCs are not an important source of capital in the discovery stage, which can validate the perception that VCs do not target start-ups in their initial phases, as the firms are not established enough for them to take under consideration. In the validation stage, however, VCs have become quite indispensable for start-ups. This shows that capital support combined with VCs’ experiential knowledge and extended networks are essential in validating business propositions. Above all, considering the level of availability and access and relativity ratios, the element of VCs is by far the worst performing element in the validation stage, making it a major weakness of the local entrepreneurial ecosystem.

In the discovery stage, AIs are perceived as more important than VCs. Overall, AIs still represent an influential element in the initial phase, indicating their contribution to seed capital investments. In addition, AIs complement and take over some of the responsibilities and tasks of the leadership element, thereby fortifying the argument of leadership’s transformative capabilities. As AIs are considered an influential element in both the stages, and because they are leading sources of start-up finance along with VCs in the growth phase, it can be argued that AIs are mediators that somewhat soften a start-up’s financial risks from one stage to the other. Yet, it is still a borderline strength for the local ecosystem.

CVC is the second least important element in the discovery stage. Although its importance has grown in the validation stage, it is still second from the bottom. The t-test showed that the element has some properties that would be beneficial for a start-up in its validation processes, but it is still viewed as a relatively less important source of financial capital. Seeing that the level of availability and access is the lowest in the ecosystem, it is quite clear that CVC is neither considered a valuable element in the preliminary stages nor is it considered readily available in the local context.

Crowdfunding is also not an important source of capital in the discovery stage. This could be based on the fact that start-ups that are still being launched and by being just concepts, they are hard to sell to the high number of potential investors needed to reach the funding target. Only top-notch business propositions would attract such large masses. As early-stage start-ups need monitoring and advisory services, not just money, crowdfunding should be the last option to consider. Only the elements of availability and access show good results, indicating a good level of presence. However, taking into account the perceived importance of the stages, crowdfunding is not regarded as a fundamental element in the Estonian ecosystem, despite having tremendous potential.

**Entrepreneurial and worker talent**

The analysis shows that entrepreneurial talent is by far the most important element in both the discovery and validation stages. This suggests that entrepreneurial talent and founders bear the responsibility of validating business propositions. Further, as the responsibilities, risks and turbulence of their businesses grow, knowledge and learning capabilities become key to assist the entrepreneurs in making the right decisions. In addition, entrepreneurs are strongly supported by the rest of their team members (i.e. worker talent) who play increasingly important roles in piloting the start-up.

Considering the level of availability and relativity ratios, it can be stated that even though it has a relatively high level of availability, entrepreneurial talent is seriously underperforming. As it is the most important element in both stages, it is a major weakness and impeding factor of progress for the whole ecosystem.

In the discovery stage, worker talent does not stand above the cut-off line, indicating its slightly lower level of importance. Hence, it is less vital for founders to add employees to
their team during the initial phase, as most of the development tasks can be handled without them. Most often, start-up founders handle core development processes themselves, so as not to risk leaking out proprietary assets and knowledge. Usually, when there is no formal judicial body or patent protection, founders do not employ non-owner employees. When these processes are completed, however, the early and key employees would first be sought out largely within the founder’s network. In the validation stage, the role of worker talent strongly moves upwards. This is an indicator that newcomers start to take over some of the responsibility delegated by the entrepreneurial talent. This dynamic process helps start-ups to effectively begin to validate their business propositions. In addition, as the processes need continuous development, more suitable worker talent is headhunted to create a well-structured team with the appropriate qualities (e.g. skillset, experience and knowledge). Employees are attracted from the founders’ key employees and VCs’ social and inter-organisational networks. Considering the availability and access level and relativity ratios, it can be seen that the element of worker talent is strongly underperforming in the validation stage – it is not above average in the initial stage and had one of the lowest relativity ratios in the second stage. Thus, it can be confirmed that worker talent is a weak point of the local ecosystem.

Knowledge
Knowledge is one of the most important elements in the discovery stage for entrepreneurs to accumulate information through learning and, thereby, recognize new business opportunities. Knowledge is partly provided to novice entrepreneurs by existing leadership, who demonstrate how to develop learning skills and where to gain new knowledge. In the validation stage, knowledge as an ingredient for successful development is perceived to be important. This makes sense, as the business proposition under validation is derived and transformed on the basis of certain information. We suggest that internal knowledge is complemented by other types of knowledge obtained from external sources. These internal and external dynamics would make a business proposition more visible and help further validate it. Additionally, considering the availability and access level and relativity ratios, knowledge is performing well in the first phase, but, as its importance grows, the ratio drops, thus showing it has a constraining effect in the second phase. Considering that start-ups evolve between stages, other types of knowledge (and qualities) should be obtained to successfully develop. However, knowledge also has an overall positive perception in the local ecosystem, and it performs well in the discovery stage; yet, perception might be biased and the element is already underperforming in the validation stage, suggesting that the element of knowledge is a borderline strength of the ecosystem.

Networks
In the discovery stage, networks have an above-average level of importance for development. This level of importance in the initial stage suggests that the development process does not require substantial amounts of resources but rather the appropriate levels of resources, information and capabilities to assemble a potential business proposal. This is an indication that the founder’s social ties are the main source of interaction, but certain inter-organisational networks are becoming available to reinforce social networks. Thus, it can be stated that social capital plays a far more important role than network capital.

Moreover, in the validation stage, networks are one of the most influential elements for start-up development. As ventures start to grow and innovate, more resources are needed, increasing the reliance on inter-organisational networks, which are crucial to help facilitate these essential resources. It can be argued that inter-organisational networks enable access
to resources, learning and knowledge generation, information exchange and the appropriate human capital – all of these resources contribute to the creation of innovation and growth.

Furthermore, the level of presence indicates that networks are locally available but need to be further developed to benefit the development process. The relativity ratios show that the element of network is performing well in the discovery stage but less so in the validation stage. There is a visible network effect in the system as more start-ups enhance the quality of the networks for the new ventures added. Also visible is an agglomeration effect because the more nodes the network element includes, the more accessible and valuable it becomes for all of the ecosystem’s participants. As networks can be the difference between survival and defunct, underperformance in the growth stage makes it a borderline strength.

Support systems
Professional services represent a less influential element in the discovery stage for start-up development. In the first phase, these services are associated with the need for legal services such as drafting the company’s ownership structure, making patent applications, providing preliminary consultation and advice for more efficient development and helping locate office space, among others. Since start-ups require only a few such services in the discovery stage, they are considered to be less important. In the validation stage, however, their importance grows and crosses the cut-off line, indicating their above-average importance in this phase. Professional services handle a lot of the bureaucracy that start-ups would otherwise have to endure, and they therefore help start-up teams concentrate on their essential activities. The presence and relativity ratios show that professional services are readily accessible and perform well in both phases. The level could be significantly higher if some of the services were specifically tailored for the start-up community, combined with affordable prices. It is a good indicator that there are many professional firms available to cater to the needs of young start-ups. Hence, professional services represent a strength of the ecosystem.

Intermediaries represent an element with a mediocre influence in the discovery stage. Intermediaries act somewhat like networks, assisting start-ups in finding like-minded people and acquiring some of the resources necessary for further progress. In the initial phase, incubators take the lead and support entrepreneurs and their teams in idea conceptualisation, whereas accelerators invite only high-growth potential start-ups that have a good business proposition and require assistance to excel. In the validation stage, the element of intermediaries has retained its rank and reached the cut-off line. Accelerators are more attractive in this stage and start to become more important to support validation and growth; they also become mediators for essential services and resources between portfolio start-ups and professionals. Moreover, considering the level of availability and access and relativity ratios, it can be seen that the element of intermediaries is readily available and easily accessible in the local context and also performs well in both phases. It can thus be stated that intermediaries represent a strength of the local ecosystem.

Networking services are, in the discovery stage, less influential, as they are not essential in the formation stage. Even still, they do support entrepreneurs in identifying business opportunities, new customers and suppliers, co-founders and key employees. Networking services may have similar features as intermediaries, especially in facilitating specific resources, information and knowledge, but networking services can also serve as extensions to intermediaries to unite successfully graduated start-ups. In the validation stage, these services are still undervalued. However, as start-ups begin to validate their businesses, networking becomes more essential as its nodes create opportunities. As networking services are assessed below the cut-off point, their relativity ratios are disregarded, but their
presence is relatively satisfactory. Hence, networking services are not fundamental for development in the ecosystem.

Again, engagement services are, in the discovery stage, an important element for launching start-ups. Thus, successful start-ups represent an entrepreneurial ecosystem that manages to unite its people to collectively create long-term value. Engagement events can also serve as growing networking events, where various entities interact with each other to grow their respective networks. In the validation stage, however, there is a significant drop between the stages, indicating that engagement services are particularly important in launching new ventures and less so as tools of validation. Considering the level of presence and the relative ratios, engagement services provide start-ups access to a large number of relevant events, and functions as a key strength of the local ecosystem.

Conclusion

Answering the research questions

In this study, using data from Estonian start-ups, we aimed to illustrate the role of the entrepreneurial ecosystem in launching and growing born global start-ups. Based on an extensive review of past literature on the entrepreneurial ecosystem, we identified 16 systemic elements that are essential to create a healthy and sustainable environment. These are leadership, bootstrapping, formal debt, informal debt, VCs, AIs, CVCs, crowdfunding, entrepreneurial talent, worker talent, knowledge, networks, professional services, intermediaries, networking services and engagement services.

In addition, the analysis revealed seven systemic ecosystem elements that are key factors in launching born global start-ups. Ordered by rank, these elements are entrepreneurial talent, informal loans, bootstrapping, leadership, knowledge, engagement services and networks. For their growth, correspondingly, there are ten important ecosystem elements: entrepreneurial talent, knowledge, networks, worker talent, VCs, AIs, leadership, bootstrapping, professional services and intermediaries.

We then further outlined the systemic elements that can be considered as an ecosystem’s strengths and weaknesses by calculating a set of ratios to measure their relative performance. Based on these ratios, the ecosystem elements could be divided into five groups:

1. Elements representing relative strengths are engagement services, professional services, intermediaries, leadership and bootstrapping. These elements describe the local start-up community and its mentality. The results show that the ecosystem’s main strength is to nurture and motivate its potential entrepreneurs to organise, generate ideas and take risks by launching start-ups. Bootstrapping is the accepted way to govern those risks by including personal resources.

2. Elements representing borderline strengths are AIs, knowledge and networks. Borderline strengths describe the elements that represent the potential of the ecosystem. Hence, local entrepreneurs need to gain experience through learning, and the circle will evolve without assistance.

3. Elements representing relative weaknesses are informal debt, VCs, entrepreneurial talent and worker talent. Weaknesses highlight drawbacks in exploiting the full potential of the local community. They represent the main reasons behind low-quality ideas, business failures and the abandonment of the local ecosystem. Human capital is one such reason, indicating that there are not enough talented people freely available to develop start-ups. This issue further constrains others in supporting their loved ones in becoming entrepreneurs.

Ecosystem and born globals
(4) Less central elements include networking services, crowdfunding and CVC. The first two are readily available but less valuable for development, while the third is scarce and partially irrelevant, but, like VCs, becomes available when a start-up’s quality improves. They can all behave as complementarities or partial substitutes but will not be valued in the same way as the other elements.

(5) An element that is irrelevant is formal debt, i.e. debt from banking institutions. This was found to be irrelevant and can thus be excluded as a factor of importance in the initial phases of a start-up’s progress.

Theoretical contribution
The theoretical contributions of this study directly benefit the streams of research on the entrepreneurial ecosystem and on born global start-ups. Research on the entrepreneurial ecosystem is still theoretically immature and needs more contributions to further knowledge in this regard. This study directly involves new evidence and causal depth into the research arena to capture the essence of how entrepreneurial activity is assisted by systemic elements so as to create value in the ecosystem.

Specifically, this study contributes to theory by extending the literature on the systemic elements of the start-up ecosystem (Stam, 2015) in the born global context. The six systemic elements present in their original form were, in the present study, divided into sixteen elements. Three of them – leadership, knowledge and networks – were adapted to fit the context, and the element of networks was not extended because of the study’s focus on the initial stages. The others – finance, talent and support services – were adapted and sub-divided into thirteen elements. Differentiation helped to uncover the dynamics of and other connections between the elements (in each stage), enhancing the explanatory power. It also helped to concentrate on the hindering aspects of the elements and to take the necessary steps to improve the situation.

Moreover, by elaborating on the context, it can be verified that the framework includes all recent advancements and integrates new elements like crowdfunding and engagement services, which are usually left out of studies on entrepreneurial ecosystems, as they are too new or not evident enough to be included. Hence, engagement services was verified to be the best performing element in the Estonian ecosystem and quite vital as well. Providing more verified choices for the respondents to consider also makes the decisions more objective and up-to-date (Mack and Mayer, 2016), thus helping to create a better dataset and end results. In addition, it enhances our knowledge of the elements and thus helps update, upgrade, transform and apply model flexibly to other ecosystems differentiated by their uniqueness.

In addition, as most of the research has been conducted in the context of developed Western countries (Feldt, 2012; Foster et al., 2013; Mack and Mayer, 2016; Mason and Brown, 2014), it is important to contribute to other avenues. As Estonia is a transitional country with an open economy that is only 25 years old, these results provide rich insights into how one country has made such notable progress in such a short period of time. This also indicates that Estonia is no longer the “west of the east” but rather the “east of the west”; thus, further references could be made when making comparisons to Western countries.

Additionally, though some researchers have focused on the framework elements (Boutilier et al., 2016), none have dealt with the systemic elements (Spigel, 2015; Stam, 2015) that directly influence entrepreneurial activities and their subsequent value creation. We did not find any academic advancement in this regard, because of which this study also contributes to the literature on entrepreneurial ecosystems.
Furthermore, past literature has pointed out a lack of knowledge on entrepreneurially successful environments (Kohieti, 2014) that inherently determine the type of ventures launched and the magnitude of their growth (Acch et al., 2016). This study contributes to fill this gap by developing a ratio-based system to detect an ecosystem’s strengths and weaknesses. Complementing it with the Paired Samples t-test, borderline strengths, less central and irrelevant categories were incorporated through this system. These extra categories can help guide stakeholders in targeting the appropriate elements needed to develop a better ecosystem while enhancing the success rate of start-ups.

Past macro-level studies on the entrepreneurial profile of countries (Acch et al., 2016; Sazb et al., 2013) are an important stepping stone for this study, but they have been reluctant to take into account the entrepreneurial perspective and have tended not to expose the dynamics between entrepreneurial internationalisation at the firm level (e.g. born globals) and the entrepreneurial ecosystem. Thus, the comparison and assessment of entrepreneurship at the national level is based on a combination of indices derived from local statistical indicators. The findings of these studies are suited to provide policy suggestions to improve resource allocation, benchmarking and to show the overall development differences; however, they have been reluctant to take into account individual-level activities and entrepreneurial processes and concentrate on framework conditions rather than systemic conditions. This study provides an empirical view into this gap in the research.

Finally, the present study combines the research streams of the entrepreneurial ecosystem and born global start-ups by directly relating the latter to systemic elements.

To our knowledge, there is no similar study incorporating these two phenomena. This, therefore, represents an added contribution by helping bring together venture creation and development with advancements on local ecosystems. Thus, the present study builds on past research by highlighting the role of business networks (Covello and Munro, 1997, 1995; Covello, 2006) and organisational network capabilities (Torkkeli et al., 2012; Weerawardena et al., 2007) in entrepreneurial internationalisation. It does so particularly by helping widen the lens of the empirical examination of the phenomenon, accounting for the entrepreneurial ecosystem in which born globals operate today.

**Managerial implications**

The local ecosystem contains many stakeholders but, as seen through this study, the key stakeholders are on the government’s side. For instance, legislation should be more start-up friendly, as a lot of entrepreneurial resources are invested in the first stages, making direct and indirect support a prerequisite. The focus should be not only on finances, special visas and tax exemptions but on creating the overall mentality that entrepreneurs do not only exist for the purpose of taxing but that these tax revenues should be visibly employed for further growth and value creation. The ability to create an attractive playground for everyone to thrive is in the hands of legislators. At the moment, the success of the system is largely based on the sheer lack and hard work of entrepreneurs, not the government’s actions. Playing the “number of start-ups per capita” card is also not sustainable, as it is a measure merely of quantity and not quality, and it is only quality that will open the doors to smart capital and talent. To raise the bar, various direct incentives should be introduced to promote entrepreneurship by tolerating failures and enabling the community to take risks, as values are made by the grassroots (not by politicians).

On their side, born global start-ups should work together to create platforms, promote one another’s products and services where possible and launch collective initiatives to become more visible to outsiders in the global context. Hence, as Estonia is a small country, start-ups should be more interconnected and supportive towards one another to gain more
attention and create a united front, so that the Estonian start-up ecosystem can be used as a marketing tool. This would attract new talent, knowledge, capital, extend current networks and develop more services that would benefit local development. Accounting for the higher agglomeration effect, this would be beneficial not just for the start-ups but for everyone connected to them in one way or another. Such a collectivist approach would enable higher quality start-ups to launch as born globals and become international unicorns, promoting and representing the Estonian entrepreneurial ecosystem.

More togetherness, mutual motivation and assistance would be a good starting point for start-ups to take advantage of entrepreneurial recycling, which is currently hobbling in the local context and will not be able to grow full throttle and raise quality without cooperation. Under the current circumstances, the value created and knowledge gained does not spill over and enable others to jump on the bandwagon. Exchanging experience and knowledge solely to gain irrational levels of equity cannot be a goal in itself. Trust and helpfulness are the keys to building, facilitating and boosting a thriving start-up community.

Limitations and future research
In this study, it was imperative to exclude start-ups that were still in their initial stages of discovery, as most of the entrepreneurs and founders running these companies – barring some serial entrepreneurs – lacked the experience needed from the second stage of validation. Also, start-ups older than seven years and established before 2010 were excluded from the population, primarily because the veteran companies were already well established in international markets and had undergone many staff changes. Some companies were excluded simply because their contact information was unavailable, owing to the fact that they were going out of business or were on hold, waiting for better market and business circumstances.

The single country context of this study represents another limitation as it naturally limits the generalisability of the results, as does the cross-sectional survey nature of the research methodology. However, since research on the entrepreneurial ecosystem is still theoretically immature, it is important to continue to conduct studies that specifically target the dynamic relationship between the framework and systemic elements. It is important to understand that although framework elements do not directly affect entrepreneurial activities, they do influence them indirectly through systemic elements. Hence, it is important to take these into account and conduct a more comprehensive statistical study. Another recommendation is to apply the extended framework model to other similar countries or different regions/cities of a larger country. Indeed, it is imperative to further validate the model and benchmark entrepreneurial ecosystems, given their contextual uniqueness.

We also note another potential limitation pertaining to the phenomenon of born globals: there has been a lack of definitional clarity on these start-ups compared with new international ventures (Coviello, 2015) as well as other types of rapidly internationalising companies, including those that start out as non-born globals but start to resemble them over time (Bell et al., 2001). The empirical context selected for this study was specifically born globals and not other types of internationalised enterprises or new ventures. To maximise generalisability, future studies could extend the scope of this empirical focus.

It is important to extend this framework to all stages of the lifecycle so as to map which elements are most important in later phases. We have argued that the initial phases have the most impact on the development and internationalisation of born globals – similarly, a study of later phases could uncover other potential elements that influence entrepreneurial recycling activities. In addition, a fruitful direction for research in the future could be a
survival study to determine which start-ups ended up taking the born global pathway. Finally, the methodological approach of this study naturally places some limitations on the level of richness of the data and its descriptive analysis. Extending this research to include a qualitative interpretive methodology, such as case studies of selected start-ups, would help make the results more comprehensive through an analysis of richer organisation-level data. Future research could thus consider adopting a qualitative or mixed-methods approach to further study the phenomenon of ecosystem-driven entrepreneurial internationalisation. In conclusion, extending and updating the previous frameworks and matching the entrepreneurial ecosystem with theories on born globals were the cornerstone contributions of this study to the theory and future research.

References


Publication III

Velt, H., Torkkeli, L., and Saarenketo, S.  
Uncovering new value frontiers: The role of the entrepreneurial ecosystem in nurturing born globals

Reprinted with permission from  
*International Journal of Export Marketing*  
Vol. 2, pp. 316–342, 2018  
© 2018, Inderscience Publishers
Uncovering New Value Frontiers: The Role of the Entrepreneurial Ecosystem in Nurturing Born Globals

ABSTRACT

The concept of the entrepreneurial ecosystem has recently started gaining renewed attention among entrepreneurship scholars. However, the research on international business and entrepreneurship has stayed notably silent on the role that entrepreneurial ecosystems can have in driving the growth and internationalisation processes. This is a crucial omission, as all enterprises are part of their local entrepreneurial ecosystem and thus their international growth can also be impacted by the strengths and weaknesses of the local ecosystem.

In this exploratory study, we seek to open up a discussion on the role that the entrepreneurial ecosystem can have in research on international entrepreneurship. We assess the entrepreneurial ecosystems from the point of view of born globals and do so comparatively across two countries: Finland and Estonia. Through a survey and data analysis with STATA and t tests, this study contributes to the literature on international entrepreneurship by 1) outlining the entrepreneurial ecosystem elements that are the most and least critical for the development of born global start-ups and 2) comparing the performance of ecosystems between different countries as seen by born globals. Thus, the study helps in applying a neglected concept and level of analysis to the international entrepreneurship field.

Keywords: Entrepreneurial ecosystems, born globals, start-ups, leadership, bootstrapping, informal debt, credit institutions, venture capital, angel investors, crowdfunding, knowledge, networks, incubators, industry associations.

JEL subject code: F60, L25, L26, M13, O52

INTRODUCTION

Although there is some evidence that the concept of an entrepreneurial ecosystem is not a new phenomenon (cf. Van de Ven, 1993), entrepreneurial ecosystems have only lately received renewed attention from scholars (Isenberg, 2014; Stam, 2014). Until recently, the literature on entrepreneurship in general and international entrepreneurship (IE) in particular has remained notably silent on the impact of entrepreneurial ecosystems on the growth and internationalisation of enterprises. The same is mostly the case for the domain of international business (IB), in which the ecosystem concept has only lately started to make its way into the literature and is mostly referred to when discussing MNE-driven business networks (Zander et al., 2015), not entrepreneurial ecosystems per se. However, it is clear that ecosystem-like entrepreneurial environments also have a future in the IB domain: For example, Blackburne and Buckley (2017) have proposed that business incubators constitute new ways for a business to enter foreign markets.

Nevertheless, neither the IE nor IB literature has provided much clarification on what actually constitutes an entrepreneurial ecosystem and the elements that facilitate its functions. Previous
research has concentrated on the industrial districts, clusters and innovation systems, which are all business environments, but an entrepreneurial ecosystem focuses on the entrepreneurs who co-create such environments and develop new ventures in them (Pitelis, 2012; Spigel and Harrison, 2018; Autio et al., 2018). Hence, there is a need for clearer frameworks that can be used to analyse the entrepreneurial ecosystems by focusing on the comparative and multiscalar perspectives (Alvedalen and Boschma, 2017; Malecki, 2018). In addition, Mack and Mayer (2016) note that the current attempts to describe the elements of entrepreneurial ecosystems have tended to be inflexible and purely retrospective, resulting in – among other issues – survivor bias, here highlighting the general characteristics of the most successful ecosystems instead of providing a balanced view of the phenomenon. Thus, these attempts are missing out on newer concepts, for example, crowdfunding (Maroufkhani et al., 2018).

Hence, there is a large gap in the research regarding the ways in which successful entrepreneurial environments can be created (Kshetri, 2014), even though these environments can go a long way towards determining the type and growth of new ventures (Acs et al., 2016). One type of new venture for which the role of the entrepreneurial ecosystem is particularly critical is born globals (Rennie, 1993). When discussing born globals, we refer to Cavusgil and Knight [(2015), p.3], who define them as 'young, entrepreneurial start-ups that initiate international business soon after their inception’. The entrepreneurial ecosystem and its supportive role towards entrepreneurial activities regarding the formation of born global start-ups extend themselves quite quickly to enterprises seeking to grow rapidly within international markets; thus, understanding the composition of entrepreneurial ecosystems is also imperative in IE.

It is notable, then, that the concept of the entrepreneurial ecosystem is conspicuously absent from the literature on IE. For instance, reviews of IE (Jones et al., 2011; Peiris et al., 2012a) do not include the concept, and similarly, a more recent review of the internationalisation of small- and medium-sized enterprises (Ribau et al., 2015) finds no studies conducted on entrepreneurial (or indeed, any kind of) ecosystems. Thus, there is a clear omission in knowledge regarding how an entrepreneurial ecosystem can facilitate the international growth of enterprises. This is notable in the literature because research on born globals indicates that the core concepts – such as instance knowledge (Nordman and Melén, 2008) and different types of financing (e.g., Gabrielsson et al., 2004) – in many of the elements of an entrepreneurial ecosystem are individually important for these types of companies. Accordingly, these systemic elements attending to the firm development and internationalization success vary across regional geographies (Zander et al., 2015) creating a demand for studies integrating venture creation and regional context (Borissenko and Boschma, 2017; Cavusgil and Knight, 2015). Therefore, new theoretical frameworks and perspectives are essential to advance the current understanding about the ecosystems’ structural dynamics and its effect on firm development.

Subsequently, it is important to investigate how born global start-ups grow in the entrepreneurial ecosystem and which subelements are critical and noncritical when it comes to catering to the needs of these new ventures (Cavallo et al., 2018). Likewise, it is necessary to choose comparable ecosystems as case studies. Comparative studies are also called for in IE research (Jones et al., 2011), and this is especially true for entrepreneurial ecosystems, in which an emphasis is placed on local entrepreneurs and how they perceive their environments. In the current exploratory study, we aim to specifically evaluate the respective elements of entrepreneurial ecosystems in a two-country context from the standpoint of born globals. We have chosen Finland and Estonia as the focal empirical contexts in which to base the study. These two countries making for a relevant comparison from the point of view of advancing the
literature on this topic, based on their close geographic and linguistic proximity yet simultaneously providing market environments that are rather distinct from each other in many ways - for instance, on corporate taxation and their history of entrepreneurship development. Moreover, Finland and Estonia have been considered a cross-border region with a strong human capital concentration in their key city areas (Sergeevich and Alekseevna, 2015), making these regional environments share their resources (e.g., talent). This, in turn, enables them to collaborate and create economic synergies (Nauwelaers et al., 2013). In addition, both countries are start-up-intensive, are well-known for nurturing ‘unicorn’ (i.e., firms valued over 1 billion dollars) born globals (e.g., Rovio, Supercell, Skype and TransferWise). Hence, it is important to compare these nations to determine how fate has shaped their entrepreneurial environments and, in particular, how they support born global development while coopeting (Nalebuff and Brandenburger, 1997) side by side.

The small domestic markets have traditionally made rapid internationalization a necessity for growth-seeking enterprises: As Luostarinen and Gabrielsson (2006, p.796) note, that in 1960’s the slogan in Finland was “Export or die”, in 1970’s and 1980’s “Internationalise or die” and in 1990’s and 2000 “Globalise or die”. Thus, it is not surprising that the literature on born globals has found Finland to be a particularly apt country context in which to explore the phenomenon. Similarly, Estonia has gained a lot of attention during the last decades after its re-independence by becoming a “Baltic tiger” in terms of entrepreneurship (Kshetri, 2014). However, despite the prevalence of studies illustrating born global -type internationalization originating from Finland (e.g., Gabrielsson et al., 2004; Luostarinen and Gabrielsson, 2006; Laanti et a., 2007; Kuivalainen et al., 2012; Nummela et al., 2016) and from Estonia (e.g., Mets, 2016; Elenurm, 2004, 2007; Vissak, 2007; Vissak and Masso, 2015), none of the studies have included the wider ecosystem into their analysis. Thus, Finland and Estonia provide a context very conducive to necessity of rapid internationalization, yet it has not been known until now how the wider ecosystem impacts the enterprises trying to do so. This gap in research is highlighted even more by the fact that the studies have tended to examine the born global phenomenon through individual concepts that could be considered subelements of an ecosystem (e.g., networks, see Gabrielsson and Kirpalani, 2004 and Vissak, 2003; or different type of financing, see Gabrielsson et al., 2008), yet again only as separate studies. We argue that the entrepreneurial ecosystem provides a lens through which a wider understanding of the elements on born globals can be reached.

The following are the corresponding research questions we seek to answer:

- Which elements of the entrepreneurial ecosystem are critical and noncritical for the development of born global start-ups in the discovery and validation stages?
- How do ecosystems in different countries perform against each other from the point of view of born global start-ups?

The remainder of the present study is organised as follows: In the following section, we provide a review of the literature underlying the concept and operationalisation of the entrepreneurial ecosystem and born globals. Section 3 outlines the research methodology, and this is followed by Section 4, which examines findings. We then discuss these findings in more detail in Section 5. The study concludes by outlining the theoretical contributions and practical implications of our results, the accompanying limitations of the study and potential future research avenues.
ELEMENTS OF THE ENTREPRENEURIAL ECOSYSTEM

In the literature, the entrepreneurial ecosystem concept was first mentioned in the 1990s (e.g., Bahrami and Evans, 1995; Moore, 1993; Spilling, 1996; Van de Ven, 1993); however, renewed academic focus on the concept has a more recent origin (Acs et al., 2017; Autio and Levie, 2015; Jacobides et al., 2018; Mack and Mayer, 2016; Stam, 2014). Entrepreneurship, whether domestic or international, is a process that includes the discovery, enactment, evaluation and exploitation of opportunities to create future goods and services (Oviatt and McDougall, 2005; Shane and Venkataraman, 2000); it also includes the process by which individuals exploit opportunities for innovation (Schumpeter, 1934).

Moore (1993) was one of the first scholars to apply the ecosystem in a business context while looking to explain the coevolution of companies. Over the past 25 years, the concept of the entrepreneurial ecosystem has been defined in multiple ways. Acs et al. (2014, p. 479) capture the main essence of the concept by stating that it is ‘a dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures’. Further, Jacobides et al. (2018, p. 2257) have made an effort to distinguish between different types of ecosystems and argue that this type of an ecosystem “focuses on an individual firm or new venture”. This indicates that there is an environment where entrepreneurs can thrive and create new ventures within and then – by following opportunities – move these activities across a country’s borders. Hence, the focus is on the entrepreneurial ecosystem in creating a suitable ground for the internationalisation processes of new ventures.

In line with Teece (2007), an ecosystem includes the community of organisations, institutions and individuals that impact the focal organisation, including customers, competitors, complementors, suppliers, regulatory authorities, standard-setting bodies, the judiciary and educational and research institutions. Stam (2014) suggests that an entrepreneurial ecosystem can consist of 10 elements in total (four framework elements and six systemic elements). The six systemic elements in his model are leadership, finance, talent, knowledge, networks and support services, and they are thought to have a direct impact on the entrepreneurial activities occurring within the ecosystem. However, we use an extended (Velt et al., 2018) version to control for the differences among some diverse types of subelements. Next, we discuss these elements in detail and how they fit into the entrepreneurship context.

**Leadership** includes entrepreneurial leaders who recognise the importance of individuals in entrepreneurial processes and that their success depends on the interactions between leaders, followers and the setting (Renko et al., 2015). It is fundamentally important for entrepreneurs to behave and act as leaders when launching and developing new ventures (Baumol, 1968).

**Financial bootstrapping** means acquiring financial resources creatively without raising capital from collateral and equity-based sources, which is in line with the overall logic of minimising the need for resources (Harrison et al., 2004).

**The banking institution** represents the mainstream institutional lenders that monitor violations, performance fluxes and collateral value changes (Winton and Yerramilli, 2008). The loan processes are multifaceted, and during the application assessment, risks are addressed to help entrepreneurs become aware of potential drawbacks and defaults (Wu et al., 2016).
Informal debt results when the capital supply is raised from family, friends, relatives and other informal sources in the community (Szerb et al., 2013). Wu et al. (2016) note that informal debt has a much lower transaction cost than formal debt—that is, it has lower initial transaction fees and faster capital decisions because of less bureaucracy, and (usually) there is no collateral or guarantor requirements.

Venture capital (VC) is financing by investors who use their extensive networks to help new ventures gain market access, knowledge, contacts and credibility with potential partners and customers both outside and inside the entrepreneurial ecosystem (Chemmanur and Fulghieri, 2014; Denis, 2004).

Angel investors (AIs) are a small network of high-net-worth individuals who risk only their own money when investing ‘seed capital’ in new growth companies in the early stages (Chemmanur and Fulghieri, 2014; Wong et al., 2009) to improve the latter’s likelihood of survival (Kerr et al., 2014).

Corporate venture capital (CVC) refers to financing provided by investors with long-term investment plans who are seeking high returns aligned with their corporate-level strategies and financial objectives. However, the absence of a clearly stated mission and a lack of commitment might lead to potential conflicts with the focal company (Chemmanur and Fulghieri, 2014; Wu et al., 2016).

Crowdfunding involves raising capital from the wider community by making small investments via online platforms without the interference of standard institutions (Mollick, 2014). However, these investors are relatively underinformed and can easily lose their investments in high-risk endeavours (Chemmanur and Fulghieri, 2014).

Entrepreneurial and worker talent is composed of skilled individuals who make up the talent pool of the local region, and access to this crucial resource plays a vital role in the launching of new ventures and their imminent success, in turn affecting the wider entrepreneurial ecosystem (Cohen, 2006; Stam, 2014). Regions with high levels of talent (e.g., Silicon Valley) further attract other highly qualified workers who pursue new challenges and wealth (Bahrami and Evans, 1995; Cohen, 2006). A well-endowed and open environment is the key to improving the launching and scaling of new ventures (Thomas et al., 2015), and the availability of talent has direct repercussions on the entrepreneurial ecosystem and the development of new ventures (Foster et al., 2014).

Knowledge—more specifically, the ability to access it—is an important endowment for innovative ventures, which cannot develop such essential new knowledge on their own (Huggins and Thompson, 2015). Thus, entrepreneurs recognise the opportunity for spillovers and create new ventures to convert this exposed knowledge into economic knowledge, creating value for the entire economy in the long run (Acs et al., 2013).

Networks refer to the multifaceted relationships existing between the groups, organisations and individuals participating in the complex set of linkages (Weber and Khademian, 2008). Entrepreneurs and other ecosystem participants collaborate through networks by linking and sharing information, resources, activities and capabilities.

Professionals are a support mechanism that enable talent to concentrate on core activities while outsourcing the assistance from professional service providers (Bahrami and Evans, 1995).
Zhang and Li (2010) validate that new venture innovation capability is directly related to service providers that can inform new ventures about available information, knowledge and innovations as they interact with other industries and organisations in the ecosystem.

**Intermediaries** support entrepreneurs and their new ventures from inception to the later stages (Barbero et al., 2013; Pauwels et al., 2016; Stagars, 2015). Thus, a healthy entrepreneurial ecosystem has 'a solid presence of effective, visible, well-integrated accelerators and incubators' [Feld, (2012), p.187] that provides 'support to start-ups to improve the probability of survival of the portfolio companies and accelerate their development' [Pauwels et al., (2016), p.14].

**Networking services**, according to Saxenian (1990), are provided by regional institutions to help gather the necessary resources used in the development of new ventures; they act as network intermediaries that facilitate information exchange and other interactions (Howells, 2006). These services provide networking support and are commonly represented as trade and industry associations, supply chain networks, alumni associations and online social networks (Saxenian, 1990; Suresh and Ramraj, 2012).

**Engagement events**, as Feld [(2012), p.186] emphasises, comprise services that play an important role in the launch and development of new ventures. He defines these services as events where local entrepreneurs and community members meet and collaborate by initiating, pursuing and combining new innovations. These events could be meet-ups, start-up weekends and boot camps or hackathons, among others; they play a preliminary and crucial role in the launching of new start-ups and their acceptance into incubators and accelerators (Harrington, 2017).

In sum, the components of the ecosystem reflect the moral and motivational aspects (leadership) and illustrate the availability and quality of the required resources (finance and talent) that are needed to develop and grow businesses based on innovation and the newest technological advancements (knowledge). These forces are accessed, enhanced, maintained and facilitated through the relationships (networks) between the stakeholders, which have been supported (by intermediaries) early on to enable them to achieve sustainable growth and international development.

**BORN GLOBALS AND THEIR LIFE CYCLE STAGES**

The IE research domain has become an important stream of research when it comes to comprehending a new breed of ventures, which from their inception follow a pattern of rapid growth and internationalise soon after (Oviatt and McDougall, 1994). Research on IE arose because the traditional internationalisation frameworks were unable to explain this new phenomenon and its rapid development practices. Therefore, IE was defined as ‘the cognitive and behavioural processes associated with the creation and exchange of value through the identification and exploitation of opportunities that cross national borders’ [Peiris et al., (2012), p.296]. Peiris et al.’s (2012) holistic view opened the way for a variety of firms to be introduced into the research field, regardless of their size, type or stage they were in. Hence, some of those firms were called ‘born globals’. Knight and Cavusgil [(2004), p.135] argue that these ventures have a strong willpower to innovate and note that this type of a firm develops ‘particular types of knowledge, which drives the development of organisational capabilities
that support early internationalisation and superior performance in diverse international markets’.

In particular, the main essence in focusing on born global ventures is that these firms are highly dependent on the home ground conditions and institutional environment due to their rapid progress (Nummela et al. 2016). Mutual interactions and relations between the ecosystem elements and the firm determine the success and failure (Cardon et al. 2011) of internationalization activities (Vissak and Francioni, 2013). Therefore, it is central to nurture and support these firms to mitigate risks and shortcomings rising from their rapid growth and internationalization processes in the local entrepreneurial environment.

Furthermore, Miller and Friesen (1984) conclude that certain firms can skip stages in their life cycle. This finding is in line with Freeman and Cavusgil (2007) and Hedlund and Kverneland (1985), who term the phenomenon ‘leapfrogging’ for these companies. This led research to bring together the organisational life cycle, internationalisation and born global studies to further understand the aspects of development challenges and corresponding activities of these firms (Gabrielson and Gabrielson, 2014; Laanti et al., 2007; Luostarinen and Gabrielson, 2006). In life cycle research, there are a variety of studies focusing on the stage perspective (e.g., Gabrielson and Gabrielson, 2010; Kazanjian and Drazin, 1989; Marmer et al., 2011). Fortunately, the underlying notions tend to be comparable and thus generally divide life cycles into four key development stages. Hence, we chose the titles of the ‘Marmer stages’ because these were most concise and well representative of born global start-up development. In addition, it was necessary to focus on the first two stages of discovery and validation because the local entrepreneurial ecosystem has the strongest influence on creating an atmosphere for born globals to thrive in and to execute their internationalisation objectives within (Velt et al., 2018).

**RESEARCH METHODOLOGY**

*Data collection*

Data were extracted and combined from online start-up listings using the following secondary sources: FunderBeam, Crunchbase, Startup100 and ArcticStartup. After validating their information via the ORBIS database, we used a stratified sampling method (cf. Neyman, 1934). Therefore, only the firms that had reached the validation stage were included, providing us with information regarding the systemic elements in two stages. The list provided 347 potential born global start-ups from Finland and 143 from Estonia. Furthermore, an online survey method for data collection was applied. The survey method allowed us to gather data from the grassroots level to accurately comprehend the perceptions and opinions of the local firms and develop a dataset for descriptive analysis. The data were gathered in 2017 directly from the founders of the firms. We received responses from 51 (14%) entrepreneurs in Finland and 33 (24%) in Estonia and verified that only born global qualified firms were considered by inspecting their speed of internationalisation, export extent and market scope (Kuivalainen et al., 2012). However, we were less strict in terms of market scope and did not account for the number of continents. There are multiple studies that have been similarly lenient to determine “born globals” in that sense (cf. Knight et al., 2004; Luostarinen and Gabrielson, 2006; Nummela et al., 2014) and even argued that this is relevant in larger countries with superior trade allies and slight concern in smaller ones (Choquette et al., 2017).
Moreover, because we were using a survey method, it was vital to control for the presence of common method bias (Podsakoff et al., 2003). A priori, half of the entrepreneurial ecosystem systemic elements (i.e., financial capital, talent and support systems) were separated into multiple subelements. This enabled the responders to make a clear difference between dissimilar types of subelements and on their impact on firm development. The other three elements (i.e., leadership, knowledge and networks) were not separated because their main essence remained the same and would not have benefitted the current study framework. Hence, we elaborated on the elements in one section so that the respondents would clearly see the differences and similarities between the elements and could then make an objective assessment based on their own experience. This direct comparison mitigated common method bias. Nevertheless, Harman’s single-factor test was conducted post hoc, and no single factors among the dataset that would have affected the analysis were found. Taken together, all of the measures above suggest no issues with common method bias.

Measure development

Following Audretsch and Belitski’s (2017) call for measurements, we developed a set of metrics, measured from 0 to 100, to determine the criticality of the systemic elements for the discovery and validation stages and their presence in creating ratios to compare the performance of the two ecosystems. First, all mean values were depicted to calculate the aggregate averages for each stage in both countries. These averages were used as cut-off points to distinguish the critical elements from the noncritical ones when it comes to firm development. Second, these critical elements were then juxtaposed with their respective levels of presence in the system. Hence, a series of performance ratios were computed. These ratios designated the discrepancies between the levels by suggesting how well the element performs compared with its influence for the firm progress. The lowest ratios focused on impeding propensities because these elements would likely constrain firm development in the ecosystem. Thus, this enabled group elements to be a strength, potential strength and weakness of the local environment. Third, the paired samples t test was implemented to detect if there were any elements deemed irrelevant for the born global start-up development in the discovery and validation stages. Fourth, the ratios were used to calculate the overall performance rates of the two ecosystems in respective stages.

FINDINGS

The elements of the ecosystem play different roles in the development of born globals; thus, we can see the importance of understanding which ones have the greatest impact in terms of nurturing these firms and their presence in a local setting. It is crucial to emphasise that all elements in the system are required to sustain a healthy environment, but not all of these play a decisive role in each phase of the life cycle. It should be noted that the cumulative critical elements were entrepreneurial talent and knowledge; comparatively, for Finns, worker talent was the third, whereas Estonians were more network dependent.

Furthermore, the most important element in the discovery stage for both countries’ born global start-ups was talent—particularly entrepreneurial talent (FIN 83.57 1st; EST 88.76 1st). This indicates that founders directly affect the firms’ introductory procedures and success rates. The second most important element for Finns was knowledge (FIN 83.47 2nd; EST 69.12; 5th), indicating that appropriate information was the key to discovering potential value, whereas Estonians believed that it was finance—that is, informal debt invested by family, friends and
relatives (FIN 75.69 4th; 79.24 2nd) and financial bootstrapping (FIN 72.08 6th; EST 71.74 3rd). This shows that entrepreneurs should have strong trust-based relationships that can enable them to accumulate the needed capital or should use their own resources because of their lack of credibility in the eyes of other lenders. For Finns, the third factor was leadership (FIN 75.76 3rd; EST 69.41 4th), arguably because it motivates others to take the initiative and instills a ‘can do’ attitude in novice entrepreneurs. The other most influential elements were networks (FIN 72.98 5th; EST 60.85 7th), worker talent (FIN 69.45 7th; EST 57.29 9th), engagement services (FIN 62.92 8th; EST 66.29 6th) and AI (FIN 61.76 9th; EST 59.56 8th), indicating their substantial importance in the development phase.

(Insert table 1 here)

Moreover, in the validation stage, Estonians considered entrepreneurial talent (FIN 80.37 3rd; EST 91.21 1st) to be the most important, unlike Finns, for whom worker talent (FIN 85.53 1st; EST 75.85 4th) was the most critical. Hence, integrating new associates for further development could be regarded as an important entrepreneurial contribution. The knowledge element (FIN 83.69 2nd; EST 82.12 2nd) was important for Estonians, illustrating that both nations understand that team alignment supports higher levels of learning and knowledge acquisition. Similarly, networks (FIN 76.35 4th; EST 75.88 3rd) facilitating knowledge and talent acquisition made a leap towards becoming more critical at this stage. Other elements perceived as important were VC (FIN 76.27 5th; EST 68.41 5th), leadership (FIN 72.80 6th; EST 61.71 7th), professionals (FIN 62.71 7th; EST 60.24 9th), AI (FIN 62.61 8th; EST 62.47 6th) and bootstrapping (FIN 51.43 12th; EST 61.68 8th).

As previously stated, all elements need to be present for the entire system to function. By assessing their performance ratios together in both stages, the critical elements were divided into groups, thus reflecting an ecosystem’s strength, potential strength and weakness. The strengths describe the local start-up community and its mentality. In both ecosystems, the networks and engagement events were common for Finnish and Estonian environments, but also knowledge, AI and professionals and leadership, respectively. The potential strengths describe the elements that need some help to become full-fledged strong points; these were entrepreneurial and worker talent for the Finns and knowledge, AI and financial bootstrapping for the Estonians. Likewise, the elements representing weaknesses highlight drawbacks in exploiting the full potential of the local community and reflect the main reasons behind low-quality business models, commercial failures and abandoning the local ecosystem. These elements were VC and informal debt for both systems, leadership and bootstrapping for Finns and entrepreneurial and worker talent for the Estonians.

Some elements were deemed to be less critical for the entrepreneurial ecosystem in cultivating rapidly growing firms in their preliminary stages. These systemic conditions could all behave as complementarities or partial substitutes to other critical ones but were not valued as highly because of their shortcomings. Based on the cut-off points and ratios, the common elements were intermediaries, networking services, crowdfunding, CVC and banking institutions, whereas for Estonians professionals were considered noncritical.

However, by running a t test, it became clear that some elements might be irrelevant in the preliminary stages of development. For the Finnish ecosystem, the t test shows that crowdfunding, CVC and banking institutions had a statistically significant disconnection from the main group of elements making them not essential for the firm development. Similarly, for the Estonian ecosystem, most of the pairs showed no statistical difference between their averages, indicating their cohesiveness for the system. Still, on the lower tail, CVC and banking
institutions were statistically different and, thus, disconnected from the others. Additionally, in the validation stage of the Finnish ecosystem, there was no significant difference in the lower tail, meaning that all the elements played their part. Yet Estonians felt that banking institutions were not just less critical but irrelevant for the born global’s early progress.

Furthermore, based on the performance ratio, Finnish entrepreneurs perceived nine systemic elements as critical to the launch of their enterprises (in ascending order): bootstrapping (0.69), informal debt (0.76), leadership (0.77), entrepreneurial talent (0.83), knowledge (0.90), AI (0.93), networks (0.96), worker talent (0.98) and engagement events (1.04). Taking the Estonian ecosystem as a reference point, all of these elements corresponded to the Finnish context in full but in a different order: informal debt (0.55), entrepreneurial talent (0.61), AI (0.74), bootstrapping (0.76), knowledge (0.81), leadership (0.84), worker talent (0.85), networks (0.88) and engagement events (1.03). However, for start-up validation, Finnish born globals perceived eight crucial elements: VC (0.76), leadership (0.80), worker talent (0.80), entrepreneurial talent (0.87), knowledge (0.90), networks (0.92), AI (0.92) and professionals (1.12). Comparing this to the Estonian ecosystem, there were also eight crucial elements ranked as VC (0.52), entrepreneurial talent (0.59), worker talent (0.64), knowledge (0.68), networks (0.70), AI (0.70), bootstrapping (0.89) and leadership (0.95).

Conversely, the data enabled the determination of how well both entrepreneurial ecosystems performed. Elements seen as critical for both systems were taken into account because other elements would have distorted the results and would have restricted a reciprocal comparison. On the one hand, there were nine elements that both sides considered relevant for the first phase of launching born global start-ups. On the other hand, seven elements were commonly regarded as critical for the second phase of validation. Plus, there was one which Finns regarded professionals as having an above-average influence on growth, whereas Estonians viewed financial bootstrapping as being that vital. Thus, because the latter elements partly reflect the unique difference of the two ecosystems, we excluded those and calculated the aggregate performance ratios for both countries for each phase. Hence, we saw that the Finnish ecosystem performed at the 87% level in the first phase and 88% in the second phase, compared with the Estonian levels of 79% and 71%, respectively. This is a strong indication for the elements deemed the most critical for determining the success of the whole ecosystem, and if these elements were incapable of meeting the expectations, this would have a direct constraining effect on nurturing firms in the local ecosystem.

**DISCUSSION**

Entrepreneurial ecosystems are full of complexities, and when exploring them, different methods should be employed to uncover and understand them in more detail. One way to do this is to implement different measures to try to reflect their unique contexts. Hence, applying mean average calculations, performance ratios and t tests give another view of the underlying concepts. Based on the above findings, all elements play a certain role, but not all of these roles are equally critical nor perform sufficiently well to accommodate the needs of a born global firm. Below, we discuss the elements based on the results and do it in the IE standpoint.

**Leadership**

For both nations, leadership plays a key role in discovering new opportunities, but its criticality deteriorates in the validation stage. Its influence lies in its support for growth and its validation of business models. This decline, which was perceived by both groups, could suggest that the
value proposal of leaders has changed from pioneers and role models into a direct stimulus to start-up progress via mentoring and capital allocations (e.g., intermediaries, VC and AI). Thus, it is argued that leadership is not losing its value proposition; rather, its effect transfers to other elements. Also, performance ratios indicate that the leadership element is working well in the Estonian ecosystem and could be reflected as a strength of this system. On the opposite side, Finns envision its importance as even higher, but because its presence is at a similar level, it becomes their weakness. These results align with those of Gabrielsson et al. (2008), who propose that inspirational leadership is key in the market strategy development of born globals, as well as other results linking successful entrepreneurial internationalisation to the mindset of visionary entrepreneurs (e.g., Johnson, 2004; Torkkeli et al., 2018).

**Financial backing**

In the stage view, bootstrapping is regarded as a critical element for both systems. However, between the stages, it loses its influence as other sources of capital become more attractive. As the capital needs overwhelm the processes, bootstrapping is not sufficient enough to extinguish these needs, so other, wiser capital sources should be considered. The importance of bootstrapping has been noted before as a way in which born globals manage their international expansion (cf. McNaughton and Pellegrino, 2014); however, the current study’s setting also highlights the important role of the home country’s ecosystem, illustrating the differences in the role of bootstrapping between the Finnish and Estonian contexts.

Specifically, according to the performance ratios outlined in the empirical analysis, bootstrapping is seen as a suitable method of boosting a start-up and an acceptable risk for both nations, but it is more common for Estonians to take this risk since they perceive it as relevant for progress or are just unable to attract other forms of capital. Because Estonians are more prone than Finns to put their own assets on the line or create business with less resources, this can be considered their potential strength but a weakness of Finns.

Furthermore, informal debt is a critical form of capital and the most important financial instrument in the discovery stage. This illustrates that close relationships are essential to progress. It might be attractive because of its lower transaction costs (e.g., less bureaucracy and no formal collateral requirements). However, its relevance diminishes in the second phase because it starts to restrain development (e.g., high interest rate, short-term lending horizon and small amounts). Therefore, it becomes too expensive and time-consuming to acquire. Considering the performance ratios, involving informal debt to raise capital from the inner circle is not as common in the community, even though it can be a practical alternative. Thus, it can be considered a weakness for both ecosystems. This is notable because of the fact that the role of informal debt in entrepreneurship has been found to be contingent on the level of institutional development in the home country (Wu et al., 2016). These results contrarily point towards the similar role of informal debt across contexts, to the extent that the institutional development of Finland and Estonia is distinct.

Moreover, banking institution is the least important element, suggesting that formal loans do not influence venture development in the first phase. The t test confirmed that bank loans are irrelevant to both ecosystems. This is centred on the idea that banks concentrate on proven track records and require collateral. In the second phase, banks are seen as the least critical element again. Gabrielsson et al. (2008) find that born globals may not need as much finance from banks thanks to their niche orientation and distinct products, which together may help the firms build up their financial resources. Therefore, to an extent, the results at the ecosystem level confirm these claims at the firm level. However, the t test shows that Finnish born globals consider this
element more during validation. Hence, taking both perceptions into account, it can be considered noncritical for Finns and irrelevant for Estonians.

Furthermore, VC was perceived as a key source of funding in the discovery stage. This confirms that these investors do not target born globals early in their growth process or that VC seeding funds are uncommon in these two regions. In the validation stage, VC has become quite crucial for the enterprises, indicating that financial support pooled with strategic investors’ first-hand knowledge and extended networks are essential in validating business propositions. This finding indicates that the proposition by Gabrielsson et al. (2008) that sustainable born globals tend to seek VC financing is supported at the ecosystem level. Namely, the VC element is by far the worst-performing element in the validation stage when considering the ratios. It is a major weakness for both local entrepreneurial ecosystems, which might be because of their periphery locations or the fact that the level of startups is not attracting sufficient VC attention.

Additionally, both groups view AI as more influential than VC in the first phase, indicating their involvement in seed investment rounds. Arguably, AI complements leadership and takes over some of its tasks by supporting the argument that leadership has transformative capabilities. In addition, both groups perceived the role of AI as slightly more influential in the second phase. Hence, we argue that AI acts as a mediator between stages to mitigate risks for the born global and prepare them for VC entry. This would extend the results by Madill et al. (2005), who find AI to be an antecedent of future VC investments in technology-oriented SMEs. The results of the present study on AI further highlight that possibility in the context of entrepreneurial internationalisation at the level of the ecosystem. Accounting for the performance ratios, Finnish entrepreneurs are in a better position than their Estonian counterparts because they see a substantial AI presence in their ecosystem, thereby making it a strength. However, for the Estonian entrepreneurs, relatively less sufficient level of presence make it only a potential strength of the ecosystem.

Likewise, CVC is the second least important element in the discovery stage for both ecosystems. Thus, it is considered insignificant in the first phase. Nevertheless, its relevance doubles in the validation stage, but it still remains one of the least influential financial elements; it has some beneficial properties for a start-up, but it is fair to say that it could be considered a noncrucial element for start-up development. This element may simply not be common in the regions. We also note that studies linking VC to entrepreneurial internationalisation find that both entrepreneurs and venture capitalists can contribute international knowledge that facilitates internationalisation (Park et al., 2015) and that different types of VC investment methods can have differing impacts on the growth and internationalisation of small enterprises (Smolarski and Kut, 2011). Thus, we suggest that it may not simply be the availability of CVC in the ecosystem for born globals in general but rather some specific types of CVC funding structures that can help the companies during their validation. This would explain the rather low importance of CVC generally in the results.

Finally, crowdfunding is not an important source of capital in the discovery stage. This is arguably because it is complicated to sell the idea to many potential investors when the execution is vague and when the firm is still being launched. In addition, the business proposition should be one of a kind to attract large audiences, which is seldom the case. Because young firms need constant counselling and monitoring, not just capital, crowdfunding would be the least beneficial. Overall, crowdfunding is a noncritical (for now) element. Nevertheless, because previous studies have often excluded many types of crowdfunding as a main source for entrepreneurial ecosystem success (Maroufkhani et al., 2018), it is necessary to emphasise that
it still entails strong potential in becoming a core source for capital financing for future generations of entrepreneurs.

Taken together, the findings on the role of different types of financing in the ecosystems provide an interesting juxtaposition, for instance, because of the fact that born global investors differ from other informal investors in their origin and investment behaviour (Moen et al., 2008). Thus, in particular, the weaknesses in the respective elements might suggest that the same approaches taken to promote the informal financing of start-ups in general may not be generalisable when aiming to promote born global financing at the ecosystem level.

**Entrepreneurial and worker talent**

On the one hand, the analysis shows that entrepreneurial talent is by far the most important element in the discovery stage for both ecosystems. However, for Finnish born globals, the most important element is replaced by worker talent when entering the validation stage. Unquestionably, the entrepreneurial founders are obligated to seize the business opportunity in the first place and thereafter begin to validate commercial propositions. With growing risks and commotion, entrepreneurs use their knowledge and learning skills to make the right decisions. Nonetheless, entrepreneurs must be supported by the expanding role of the rest of the team (i.e., worker talent). Arguably, the difference between the perceptions of the validation stage might be based on the Estonian ‘individualistic’ approach and/or the Finnish ‘collective’ approach that is supported by a strong union presence. A further examination of the ratios reveals that this element is slightly underperforming in the Finnish ecosystem but greatly in the Estonian one. Hence, because it has a relatively critical role in both stages, it can be considered a potential strength for the Finnish ecosystem and a weakness and a major impeding factor for the Estonian one. Consequently, it is quite clear that a country with a smaller population would have more difficulties sourcing such talent.

On the other hand, the role of worker talent is rather insignificant in the beginning because it is not always wise to employ new team members during the first phase because most of the relevant processes can be handled without extra help. Entrepreneurs often handle core tasks themselves to mitigate the risks of proprietary asset and knowledge leakage. Typically, when no juridical factors or patents are involved, nonowner employees are still hired. When needed, employees are commonly sourced from the founders’ network. However, the role of worker talent increases significantly in relative importance for both ecosystems and becomes the most influential element for Finns. This is a strong indication that in the second stage, the recruits assume most of the responsibilities that were previously handled by the founders. These results further detail the point made by Karra et al. (2008) on the importance of attracting and retaining talent from within the local labour force.

However, the findings of the current study further outline how the dynamic transition from utilising entrepreneurial talent towards worker talent helps ventures effectively validate their business proposals. In addition, because the processes require constant improvements, certain talent is headhunted from social and interorganisational networks to match the appropriate skill sets, experiences and knowledge. Similarly, the performance ratios show that the element of worker talent is underperforming in the validation stages. However, because Finns perceive a higher availability of this talent, it can be considered a potential strength for them and a weakness for the Estonian ecosystem. Most likely, the issue is that not all talented workers are willing to take risks to join start-ups, which are surrounded by uncertainty; otherwise, the boldest of these workers would take the risk and become entrepreneurs themselves. Nevertheless, there is a scarcity of such talent at the aggregate level.
Knowledge

Knowledge is one of the most critical elements in the discovery stage. Through constant learning, one accumulates certain information enabling one to recognise opportunities. This is also guided by the leadership element, motivating like-minded individuals to enhance their learning abilities to uncover new knowledge. In the second phase, knowledge gains a greater influence because certain information is derived and transformed to validate firms’ business proposals. This finding adds an ecosystemic-level view to the results of the study by Nordman and Melén (2008), who link technological and international knowledge to proactive foreign market expansion in born globals.

However, we suggest that in addition to the type of knowledge itself, internal knowledge should be complemented by other appropriate knowledge obtained from external sources. This dynamic knowledge generation would make validation more vigorous. In addition, looking at the performance ratios, knowledge is working well in the Finnish ecosystem and showing its overall strength. Conversely, its presence in the Estonian ecosystem indicates that appropriate knowledge is more difficult to come by; it may be suppressed by smaller networks and populations. Hence, knowledge can be considered a borderline strength.

Networks

Based on the results, Finnish born globals regard networks as more essential to their development. One might argue that this is because the Finnish population is four times larger, making Finnish society more conducive to searching for the right combinations of factors. In addition, being smaller, Estonia has relatively smaller social networks, and there might be trust issues that make entrepreneurs more careful and protective towards their businesses. Moreover, in the validation stage, as the firms become more tangible, interorganisational networks can be exploited. Hence, more resources are needed to facilitate essential growth and innovation. We suggest that these networks facilitate information exchange, leverage resources, enable learning and knowledge generation and provide the appropriate worker talent. Undoubtedly, entrepreneurs in both nations perceive networks as one of the most important elements during the validation stage. Thus, the important role of networks in the international growth of born globals at the organisational unit of analysis (e.g., Sharma and Blomstermo, 2003; Mort and Weerawardena, 2006) is also evident at the ecosystem scale.

Additionally, there is an agglomeration effect because the more nodes the network contains, the more available and valuable the network becomes for all ecosystem participants; there is also a network effect because more born globals augment the quality of the networks for each additional new venture. The presence of these networks is evident in both ecosystems, and based on the ratios, they perform relatively well. Therefore, networks can be considered a top-tier element and strength of both the Finnish and Estonian entrepreneurial ecosystems.

Support systems

Professionals constitute a less influential element in the discovery stage of born globals’ development in both ecosystems. These services are needed for drafting contracts and applications, providing consultation and advisory services and finding office spaces, among other tasks. Because these support specialists are less critical in the first phase, they are not hired. In the validation stage, their importance grows because professionals begin to assume a significant proportion of the bureaucracy that hinders start-up development. The performance ratios show that professional services are readily available and work well in the Finnish ecosystem, thereby making it the system’s strength. Nevertheless, tailoring these services specifically to the start-up’s needs with subtle price tags would make them even more attractive.
For Estonian entrepreneurs, professionals are less critical for development. Professionals, indeed, are a separate element in the present study because of the multifaceted services they provide, which mostly overlap with the support provided by other elements (e.g., VC, intermediaries). Thus, there are no specific studies concentrating the influence of professional services as a separate topic.

Likewise, intermediaries are of average importance for firms in the discovery stage; this element acts as a network while helping start-ups to connect with the right people and resources. In addition, incubators, one type of intermediary, are more effective in the first round, supporting the born globals with idea conceptualisation, while accelerators offer support to high-growth ventures, boosting them out of the system. Hence, accelerators are more useful than incubators in supporting validation and progress by becoming mediators between start-ups and professionals. Moreover, looking at their performance, intermediaries have some influence, but because their presence is subtle, they are not considered critical for start-up development in either local contexts. It should also be acknowledged that these intermediaries make an impact by supporting firm development (Chandra and Fealey, 2009); however, this has still been overlooked in the literature and considered a missing link in previous studies (Maroufkhani et al., 2018).

Similarly, networking services support entrepreneurs in their efforts to find business prospects, new clients and contractors, cofounders and team members. Similarities exist between networking services and intermediaries: Both open access to certain resources, information and knowledge. For example, networking services can help intermediaries stay connected with their graduates (i.e., alumni), who could become future investors. Nevertheless, they are considered less prominent in the first phase than in the second because start-ups validate their offers, allowing networking services to create more opportunities. Unfortunately, their criticality and presence in both ecosystems indicate that networking services are not fundamental to development. Hence, we could argue that in previous research, networking services have not been considered a separate element; rather, the role has been complementary and a part of the other elements, such as VC, intermediaries and professionals.

Finally, engagement events are considered an essential element for discovering and launching new ventures because these preliminary processes are enabled by collective efforts that allow the born global to pursue value in the local community. The aim of these events is to expand and extend networks. During the validation stage, engagement events are less attractive as a confirmation tool, making it a booster element for the launching stage. By observing the performance ratios, it could be confirmed that engagement events are in abundance in both ecosystems and thus reflect their strengths. Nevertheless, most of the current research has neglected the criticality of such events, but it should be thoroughly investigated because their influence on founders when it comes to searching for opportunities and value creation is extensive (Feld, 2012; Harrington, 2017; Velt et al., 2018).

In the current investigative study, we looked at the entrepreneurial ecosystem concept in mostly the IE context by addressing the born global phenomenon. While comparing this phenomenon with previous research efforts, our multiscalar study elaborated on the ecosystem from another viewpoint: Namely, we took the micro-level entrepreneurial perspective when reflecting on the macro-level ecosystem and focused on the preliminary development stages where the local ecosystem has the strongest influence. In addition, we used a straightforward framework with descriptive statistics to create simple measures and metrics to comprehend the criticality of the structural elements and their performance levels while trying to appreciate their structural
relevance in a two-country context. Including all the systemic subelements, the present study was well balanced and up-to-date, concentrating on the less-established entrepreneurial ecosystems.

CONCLUSION

For decades, the concept of the entrepreneurial ecosystem has been an interesting topic, one where academics and researchers have concentrated on a set of vibrant environments that sustain entrepreneurship and create innovation frontiers. During this time, numerous authors have investigated the elements of this ecosystem and their relationships, enabling a framework of the system’s construct. The components of the ecosystem have been found to vary between 6 and 10 elements.

In the current exploratory study, we aimed to examine the entrepreneurial ecosystem from the point of view of internationalising start-ups by using comparative data gathered from Finnish and Estonian born globals to demonstrate and verify which systemic elements of the ecosystem are the most critical for born global start-up development and how these elements perform in their respective ecosystems. In doing so, we applied Velt et al.’s (2018) extended model of an ecosystem’s systemic subelements as our reference point, and we integrated the data collected from the Finnish and Estonian contexts. During the process, we measured a total of 16 underlying elements in the respective entrepreneurial ecosystems: networks, leadership, bootstrapping, banking institution, informal debt, VC, AI, VCV, crowdfunding, entrepreneurial and worker talent, knowledge, professionals, intermediaries, networking services and engagement events. To our knowledge, this is the first study to provide a comparison of two national entrepreneurial ecosystems and their role in entrepreneurial internationalisation from the level of the ecosystem. The results of the present study lead to several theoretical contributions.

Theoretical contribution.

To begin with, an entrepreneurial ecosystem is an important topic to focus on to comprehend what may be the prerequisites for economic value creation and how these systems should be set up to cater to the needs of a continually evolving firm in creating this value. It is critical to focus on the structural components of the system to see how they affect firms during their growth processes. Therefore, promoting a framework that includes an updated count of entrepreneurial ecosystem elements, born globals and firm life cycle studies would enable us to realise how multilateral relationships work in this complex setting and how the stage for value creation is being set up. In detail, it is important to look at what is critical for the ecosystem to function properly in the preliminary phases of firm progress where the ecosystem is influenced the most (Alvedalen and Boschma, 2017; Malecki, 2018). These findings could then be compared in different ecosystems (Mack and Mayer, 2016).

Specifically, the current study contributes to the literature by elaborating on the firm’s progress through the entrepreneurial ecosystem concept, which is different from clusters, innovation systems and industrial districts (Spigel and Harrison, 2018; Autio et al., 2018). Therefore, it is essential to understand how this difference affects the firm and individual-level perceptions towards the structural elements of the local environment. Thus, it was crucial to generate a set of comparable measures (Audretsch and Belitski, 2017) that could use all the pillars of the
system in a balanced manner by focusing on other, less studied but well-performing ecosystems (Mack and Mayer, 2016).

From this perspective, we followed Cavallo et al. (2018) and concentrated on the critical subelements of the ecosystem to better understand how they affect firm development, focusing on born global firms (Kuivalainen et al., 2012) to combine the entrepreneurial ecosystem and born global studies under one study framework in the IE context. However, it was not only important to look at which elements are crucial for the preliminary stages, but also, the emphasis was put on how these elements perform compared with one other, in between the stages and between the two-country context.

This approach enabled us to contribute directly to the current theoretical standpoints in multiple ways. First, we elaborated on the critical elements for born global development in two stages and verified that these critical conditions were the same in both countries (except for two elements in the validation stage). Second, we managed to group the elements that represent the strength, potential strength and weakness for the system, but also which of these elements were noncritical for progress or even irrelevant. Third, it was important to compare both ecosystems to understand how they perform on the given scales. This was an important advancement: By comparing two systems not just on the macro level, but also on the micro level, we could get the most up-to-date and applicable information for policy advancements. Nevertheless, these previous findings show that the ecosystems were deemed to be dissimilar in their configuration and abundance, reflecting their local uniqueness, while the underlying structural composition remained the same.

Overall, by focusing on the nurturing of born globals in the entrepreneurial context, we further reinforced the research avenue by combining both topics. To the best of our knowledge, this is the first multiscalar comparative study of such phenomena. Consequently, this also brings them together in the international entrepreneurship research context by furthering our knowledge and connecting the dots on what is necessary for creating productive grounds for rapidly internationalising firms that create value on the global scale.

*Practical implications*

Looking at this from the entrepreneurs’ point of view, it is imperative to acknowledge that the present study managed to build a roadmap for prospective entrepreneurs and other interested participants, guiding them through the local surroundings. Determining the critical elements in the discovery and validation stages creates a better understanding of where participants should focus when launching and growing potential born global firms. Hence, because the layout of the system is now available, founders can concentrate on the elements that matter and consider other elements when necessary.

Moreover, based on the performance of individual elements at each stage and during the transition between stages, it is easier for practitioners to take this information into account when developing their strategies, business models and value proposals while having a better view of mitigating risks and anticipating bottlenecks during the progress. For example, both Finnish and Estonian founders viewed VC as a weakness of the system, yet this capital raising was deemed important in the validation stage. Therefore, when these firms prepare for internationalisation, managers should build their business models to be endurable and scale without VC input. Still, entrepreneurs need to continue working on an attractive scenery for VC entry.
Looking at this from the policy makers’ point of view, there is much to consider. Government and local institutions should try to boost entrepreneurial ecosystem because it caters to the needs of rapidly growing and globalising firms. The emphasis should be on knowledge seeking, innovation and value creation, which all have a positive effect at the regional level. Hence, the public sector in both countries should concentrate on the weaknesses of both systems and reinforce their respective strengths. One of the common weaknesses for both countries was informal debt, which indicates how the local community supports entrepreneurship, perceives risk taking and deals with relational trust in a highly volatile environment. Therefore, the government needs to encourage entrepreneurs to take risks by creating a set of safety nets (e.g., tax exemptions, pension schemes, loan guarantees, etc.), not just celebrating victories in public, but also acknowledging and reflecting that failure is acceptable as long as it is a part of a learning process and leads to new entrepreneurial endeavours in the future.

In comparison, the analysis indicates that there are issues with the quantity and quality of the human resources on both sides of the system. On the one hand, Finland has better performance of appropriate entrepreneurial and worker talent, whereas these are regarded as the weaknesses of Estonia’s environment. On the other hand, Estonia performs better in leadership and bootstrapping, which are regarded as weaknesses in the Finnish system. All of these elements could be regarded as a part of human activities and resources. Because both countries are rather small in a global context, it could be argued that there is a potential for the two systems to create synergies by creating a common setting. One way is to ‘build a bridge’ between the two communities to share resources while implementing the best practices of entrepreneurship and making it possible for the managerial talent to locate more easily across the borders. Therefore, both governments should work together to enable this convergence and develop a framework of policies to incentivise both ecosystems to become strategically in line, enabling them to complement one another’s weak points. This in turn would help to increase the potential of the region and create a more competitive and attractive playground for VC entry, among other benefits. As a result, the system would perform better in launching born global firms and create aggregate value for both societies. This could be followed up as the first step in creating a framework for a transnational entrepreneurial ecosystem.

**Limitations and future research suggestions.**

We readily acknowledge some limitations of the current study’s results. The current research is exploratory and stays rather descriptive. Hence, it is necessary to create a set of case studies to interview born global founders; this would allow us to gather richer data to explain the interconnections of the two phenomena in the two-country context. With a similar perspective, the findings from this study indicate that there is a potential to assess these two countries in the transnational entrepreneurial ecosystem context because there are indications towards a possible convergence of the regional environments.

Furthermore, because the entrepreneurial ecosystem research is theoretically immature, it is important to continue to develop studies that specifically target the dynamic relationship between the framework and systemic elements. It is important to understand that although framework elements do not directly affect entrepreneurial activities, they still influence them indirectly at the systemic level. Hence, it is important to take this into account and undertake a more comprehensive study.

Another recommendation is to apply the extended framework model and the configuration of the critical elements in their various stages to other countries. It is imperative to validate the
findings in different surroundings and benchmark entrepreneurial ecosystems based on their contextual uniqueness. In addition, there is a need for configurational and longitudinal studies addressing the support mechanisms of born global development towards mitigating the risks of a high default rate coded in their rapid progress. First, it is necessary to distinguish the ecosystem element formations that born globals successfully utilise. Second, comparing these configurations and critical perceptions of the structural design in different time frames would help us get closer to cracking the code on how to shape entrepreneurial ecosystems that would improve the survival of born globals.

In sum, the theoretical foundations and concept formulation of the entrepreneurial ecosystem and the holistic views of the ecosystem structure and elements are converging; however, because the research on the causal relationship between the entrepreneurial ecosystem and entrepreneurial activity in new venture creation is still relatively scarce, this is a useful focal point for the current study. In addition, it is necessary to understand the ecosystem construct in detail and the dynamics that lie between the elements. To delimit the study, we focused only on the local systemic elements of the ecosystem that control human interactions because they were defined as the central driving forces of the entrepreneurial activity and the key to determining the success of the ecosystem. The concept of the entrepreneurial ecosystem is critical in facilitating the international growth of enterprises and enabling rapid and intensive foreign expansion, which is captured in the concept of born globals. Nevertheless, to date, neither the IB nor IE field of research has incorporated the ecosystem concept. The present study represents one of the first exploratory steps in linking the entrepreneurial ecosystem to born globals by outlining the composition and strengths and weaknesses of two environments in two countries from the point of view of rapidly internationalising born global start-ups.
REFERENCES


Table 1. Means, Cut-off Points, Ratios, Performance Levels, and t Test of the Ecosystems’ Elements

<table>
<thead>
<tr>
<th>STRUCTURAL ELEMENTS</th>
<th>MEAN VALUES</th>
<th>RATIOS</th>
<th>T-TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage 1</td>
<td>Stage 2</td>
<td>Presence</td>
</tr>
<tr>
<td></td>
<td>FIN</td>
<td>EST</td>
<td>FIN</td>
</tr>
<tr>
<td>Entrepreneurial Talent</td>
<td>83.57</td>
<td>88.76</td>
<td>80.37</td>
</tr>
<tr>
<td>Knowledge</td>
<td>83.47</td>
<td>69.12</td>
<td>83.69</td>
</tr>
<tr>
<td>Leadership</td>
<td>75.76</td>
<td>69.41</td>
<td>72.80</td>
</tr>
<tr>
<td>Informal Debt</td>
<td>75.69</td>
<td>79.24</td>
<td>42.41</td>
</tr>
<tr>
<td>Networks</td>
<td>72.98</td>
<td>60.85</td>
<td>76.35</td>
</tr>
<tr>
<td>Bootstrapping</td>
<td>72.08</td>
<td>71.74</td>
<td>51.43</td>
</tr>
<tr>
<td>Worker Talent</td>
<td>69.45</td>
<td>57.29</td>
<td>85.53</td>
</tr>
<tr>
<td>Engagement Events</td>
<td>62.92</td>
<td>66.29</td>
<td>57.14</td>
</tr>
<tr>
<td>Angel Investors</td>
<td>61.76</td>
<td>59.56</td>
<td>62.61</td>
</tr>
<tr>
<td>Intermediaries</td>
<td>56.29</td>
<td>47.68</td>
<td>52.16</td>
</tr>
<tr>
<td>Professionals</td>
<td>47.69</td>
<td>38.82</td>
<td>62.71</td>
</tr>
<tr>
<td>Networking Services</td>
<td>47.27</td>
<td>40.97</td>
<td>57.90</td>
</tr>
<tr>
<td>Venture Capital</td>
<td>47.20</td>
<td>32.91</td>
<td>76.27</td>
</tr>
<tr>
<td>Crowdfunding</td>
<td>32.24</td>
<td>41.15</td>
<td>36.39</td>
</tr>
<tr>
<td>Corp. Venture Capital</td>
<td>24.78</td>
<td>17.35</td>
<td>50.71</td>
</tr>
<tr>
<td>Banking Institution</td>
<td>23.14</td>
<td>13.68</td>
<td>33.55</td>
</tr>
<tr>
<td>CUTOFF POINTS</td>
<td>58.52</td>
<td>53.43</td>
<td>61.38</td>
</tr>
</tbody>
</table>

Means below cutoff were excluded from ratio analysis.
Publication IV

Velt, H., Torkkeli, L., and Saarenketo, S.
Transnational entrepreneurial ecosystems:
The perspectives of Finnish and Estonian born-global start-ups

Reprinted with permission from
Research Handbook on Start-Up Incubation Ecosystems
pp. 110–134, 2020
© 2020, Edward Elgar Publishing
Transnational Entrepreneurial Ecosystems: The Perspectives of Finnish and Estonian Born-Global Start-Ups

ABSTRACT

The entrepreneurial-ecosystem concept has recently gained renewed attention among entrepreneurship scholars, yet research in the fields of regional studies and international entrepreneurship has stayed notably silent on the role that incubating environments can have in driving entrepreneurial activities in developing rapidly internationalising born-global (BG) firms.

In this exploratory study, we seek to further the discussion on the role that the entrepreneurial ecosystem can have in the research on international entrepreneurship affecting firm development. We assess entrepreneurial ecosystems in Finland and Estonia from the point of view of BG entrepreneurs and do so in a transnational-ecosystem context. Using a survey method and data analysis employing an analysis of variance (ANOVA), this study contributes to the literature on regional studies and international entrepreneurship by examining which of the transnational entrepreneurial ecosystem’s structural elements are critical for start-ups during their developmental stages and how these elements are perceived differently depending on the characteristics of BG firms. The study thus enhances understanding of the interactions of the transnational entrepreneurial ecosystem and its role in supporting new ventures.

Keywords: transnational entrepreneurial ecosystem, born-global start-ups, financial capital, knowledge, networks, Finland, Estonia.

JEL subject code: F60, L25, L26, M13, O52
INTRODUCTION

The entrepreneurial-ecosystem concept has gained much attention from scholars in diverse research disciplines during recent years (Maroufkhan et al., 2018); it is, however, still a young stream of research and lacks coherent insights required to expose how the ecosystem influences entrepreneurial activities and thus the consequent value creation. In previous decades, studies have focused on the established concepts of industrial districts, clusters and innovation systems to describe unique entrepreneurial environments (Autio et al., 2018). Yet, newer studies focusing on the co-creation of the setting and the aspirations of local entrepreneurs (Spigel and Harrison, 2018) have gained their place at the heart of international business and entrepreneurship studies. All the recent advancements in ecosystem contextualisation have been constructive, however, Mack and Mayer (2016) argue that previous efforts to identify entrepreneurial ecosystems are still too narrow and are based on already well-performing communities, and that they should be updated to create the grounds for additional investigations focusing on the entrepreneurial entities.

Moreover, consensus on what constitutes a successful ecosystem has not yet been reached, thus there is a need to produce studies to better capture the phenomenon in full. For example, how are entrepreneurial environments constructed (Kshetri, 2014) and how do they promote entrepreneurially-driven firms during rapid progress towards global markets (Ács et al., 2016)? In addition, the advancement of new theoretical frameworks and views on the ecosystem construct would allow us to challenge the status quo and gain insights into the conditions supporting firm growth and international expansion across regional geographies (Zander et al., 2015). Hence, following venture creation in the regional entrepreneurial context (Ács et al., 2017; Borissenko and Boschma, 2017; Cavusgil and Knight, 2015) would help us to elaborate the structural conditions (Stam, 2014) facilitating the risk-taking actions of entrepreneurs in finding opportunities to globally enhance societal value propositions.

Subsequently, to explore the entrepreneurial-ecosystem context, it is essential to understand the prerequisites affecting the entrepreneurial activities in developing globally-scalable firms. Thus, exploring the ecosystem’s structural elements through the views of the founders becomes the focal point. In other words, studying how rapidly internationalising firms develop in the entrepreneurial ecosystem and which elements are critical in supporting high-risk–high-reward
activities (Cavallo et al., 2018) would explain the uniqueness of the regional entrepreneurial ecosystems and how they are perceived by the entities operating in them. Therefore, the context becomes relevant and an appropriate setting should be chosen for further exploration.

Traditionally, international growth-oriented firms that have a strong capability towards creating an innovation-driven environment (Cannone and Ughetto, 2014) are common in countries with small domestic markets (Luostarinen and Gabrielsson, 2006). However, as smallness often refers to deficiencies, entrepreneurial ecosystems tend to share and compete for the same resources (e.g., human capital). Fortunately, unlike many regions in the world, in the European Union, the free movement of labour is part of the four economic freedoms (European Union, 2012). This is a strong enabler for small countries to compete over and acquire appropriate resources. In the light of this transformative process, there is potential for transnational entrepreneurship (Bailetti, 2018; Lundberg and Rehnfors, 2018). As small ecosystems are bound to share resources, they may perhaps converge certain goals and policies, and create a transnational entrepreneurial ecosystem on the regional level.

Considering the above, countries such as Finland and Estonia would be good case examples, as both are small economies while being start-up-intensive and familiar with nurturing “unicorn” (i.e., start-ups valued at over 1 billion dollars) born-globals (BGs; e.g., Rovio, Supercell, Skype and TransferWise). Finland and Estonia could be considered a transnational region with a substantial human resource concentration in their capital regions (Sergeevich and Alekseevna, 2015), making these countries share and complement their sources of goods, services, labour and capital. This, in turn, enables them to collaborate and create economic synergies (Nauweelaers et al., 2013) and form the antecedents for the integration of regional skills and capabilities. Hence, it is relevant to look at these entrepreneurial ecosystems from the transnational viewpoint (Velt et al., 2018a) to determine what makes these converging environments unique from the vantage point of local entrepreneurs and how they support the internationalisation of high-growth firms.

In sum, there is a need for further exploration regarding how transnational entrepreneurial ecosystems and their structural elements influence BG start-up development and how the specific characteristics of a firm impact the perceptions of the regional ecosystem. Thus, the present study aims to address how an incubating ecosystem augments and encourages BG start-ups’
development and internationalisation by seeking answers to two research questions (RQs) in particular:

RQ1. Which elements of the transnational ecosystem are critical for BG progress during the early stages?

RQ2. How do BG perceptions differ depending on the intra-group characteristics?

The remainder of the study is structured as follows: In the next section, we review key concepts and outline the research methodology, after which the results are then presented. In the last section, we discuss our findings with respect to the RQs and conclude with the theoretical and managerial implications, limitations of the study and avenues for future research.

ENTREPRENEURIAL ECOSYSTEMS AND BORN-GLOBALS

The concept of an entrepreneurial ecosystem was proposed late in the last century (Bahrami and Evans, 1995; Moore, 1993; Spilling, 1996; Van de Ven, 1993) as more reputable concepts (e.g. clusters and networks) were found to have limitations for elaborating the role of the entrepreneur in the local economic context (O’Connor et al., 2018). Hence, in recent years, the entrepreneurial ecosystem has gained renewed attention (Ács et al., 2018; Autio et al., 2018; O’Connor et al., 2018; Spigel and Harrison, 2018) to comprehend how the local environment nurtures the entrepreneurial lifeforce. Thus, the entrepreneurial ecosystem has been defined as “a combination 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). Based on Stam’s (2015) belief regarding the surrounding ecosystem, there are two sets of conditions relevant for nurturing entrepreneurial activities on the framework and systemic levels. In his view, the systemic elements directly influence entrepreneurial activities during the development of BG firms. Henceforth, we use Velt et al.’s (2018b) view of the systemic elements and sub-elements to elaborate the local context. However, as we have proposed a two-country context where both systems are sharing resources across a border, we introduce a “transnational” dimension to the context and refer to it as a transnational entrepreneurial ecosystem.
Moreover, entrepreneurial activities, domestic or international, are processes that encompass “the discovery, evaluation and exploitation of opportunities for creating future goods and services” (Shane and Venkataraman, 2000, p. 218), however, these processes commence on home ground. Hence, local conditions are relevant for capturing the creation of value and nurturing the needs of new ventures under conditions of resource scarcity (Sasi and Arenius, 2012) and rapid progress (Nummela et al., 2016). In addition, constant attention is placed on growth-oriented ventures in the current literature on entrepreneurial ecosystems (Alvedalen and Boschma, 2017; Mason and Brown, 2014). Thus, focusing on BG firms (Knight and Cavusgil, 2005; Oviatt and McDougall, 1994) in the entrepreneurial-ecosystem context is a suitable approach to take as BGs create value “through the identification and exploitation of opportunities that cross national borders” (Peiris et al., 2012, p. 296). However, to shed light on the dynamic relationships and aspects of the ecosystem influencing BGs, it is important to concentrate on the criticality of the elements and how they affect the processes in each of the firm’s life-cycle stages. Thus, we chose the Marmer Stages (Marmer et al., 2011) that have been widely used by practitioners in start-up communities. Therefore, we focus on the first stages of discovery and validation, arguably because the regional ecosystem has its strongest influence on BGs as they are still homebound while being launched and supported with the aim of starting rapid internationalisation. Broadly put, the discovery stage includes entrepreneurial processes involved in forming and launching new BG start-ups, and the validation stage includes the authentication activities of the offer and visible expansion into foreign markets.

Subsequently, by incorporating all sides of the framework, we elaborate the ecosystem’s systemic structure in the international entrepreneurship context to comprehend the relevance of such elements for the wider setting and mainly for BGs. All the systemic elements have received attention in the international entrepreneurship literature (e.g., leadership, see Mets, 2015; financial capital, see Gabrielsson et al., 2004, 2008; talent, see Jantunen et al., 2008; Luostarinen and Gabrielsson, 2004; networks, see Gabrielsson and Kirpalani, 2004; Laanti et al., 2007; knowledge, see Gabrielsson et al., 2008; Loane et al., 2007; Rialp et al., 2012; support, see Harrington, 2017; Pauwels et al., 2016). However, these studies have tended to examine only one or a couple of the systemic elements at a time, thus neglecting the role of the entrepreneurial ecosystem from a holistic point of view, which would thus enable considering the effects of all its respective elements. Hence, it is important to clarify how a transnational ecosystem powers entrepreneurial internationalisation (Andersson et al., 2013; Coviello, 2006) and to elaborate
the relations between the structure of the system and its influence on the development and subsequent value for potential BG firms (Borissenko and Boschma, 2017; Spigel, 2015; Stam, 2015).

There are six main domains of systemic elements (Stam, 2014) and it is necessary to subdivide some of them to elaborate their relevance for the life-cycle stages of the BGs (Velt et al., 2018b). These elements are entrepreneurial leadership, financial capital sub-elements, two types of talent, knowledge as a singular concept, networks and sub-elements of the support services. Therefore, we briefly explain all of them, starting with entrepreneurial leadership, which is defined as “influencing and directing the performance of group members toward the achievement of organisational goals that involve recognising and exploring entrepreneurial opportunities” (Renko et al., 2015, p. 55). In the context of this study, this leadership is visible in the ecosystem, as established entrepreneurs motivate others to follow in their footsteps. Also, it trickles down to the firm level as the founders reflect their leadership abilities on their team members. These entrepreneurial leaders are crucial for a healthy ecosystem to create strong firms (Feld, 2012; Mets, 2015; Vissak, 2007).

Furthermore, financial capital is one of the main topics affecting firm growth and progress (Gabrielsson et al., 2004). There are multiple ways to raise capital or to secure financial resources creatively without lending money or selling equity such as empowering bootstrapping or minimising funding need (Harrison et al., 2004). Yet, in the context of rapidly evolving BG start-ups, the founders need to raise capital from lenders (e.g. credit institutions, family and friends) and from equity investors (e.g. business angels [BAs], venture capitalists). Lenders usually use official collateral requirements to allocate a credit line and run their due diligence to assess the risks (Winton and Yerramilli, 2008). However, family and friends behave similarly (Chua et al., 2011; Wu et al., 2016) while using trust as a form of collateral. Also, it is not only about lending, but possessing an equity stake to support activities. However, such sources should not be considered as strategic partners, like BAs, who use a hands-on approach to improve the firm’s survival (Kerr et al., 2014) by providing “seed capital” (Wong et al., 2009). Similarly, venture capital (VC) firms and corporate VC (CVC) investors utilise their networks to back their investment and use their extensive knowledge and capabilities to enhance the success of the firms (Denis, 2004; Kaplan and Strömberg, 2000). The main difference with the latter two is that CVC investors have corporate agendas and often integrate the focal company into their business platform ecosystem (e.g. iOS, Amazon). In addition, the most recent concept of
“crowdfunding” is a way to raise capital from many individuals over the internet at once (Mollick, 2014) and has become a valid substitute for other forms of capital sources.

Moreover, every city, region and country has its own talent pool that is considered a critical resource for firm development and consequent success in the ecosystem (Cohen, 2006; Stam, 2014). Hence, talent is fundamental for creating entrepreneurial activities and often becomes visible in diverse and open societies (Lee et al., 2004), thus talented individuals attract others to join their efforts in creating a sustainable environment to thrive in (Bahrami and Evans, 1995; Cohen, 2006). In addition, welcoming societies have an agglomeration of such talent, which creates the right conditions for the launch and growth of new ventures (Thomas et al., 2015). However, when the opposite deglomeration occurs, potential entrepreneurs tend to move out from such environments to establish their businesses in another location where there is an abundance of talented people to hire and collaborate with (Neck et al., 2004), thus making talent critical for new venture success (Foster et al., 2014).

Correspondingly, with the movement of talent, specific and appropriate knowledge moves into the entrepreneurial ecosystem. The knowledge build-up under resource constraints (Oviatt and McDougall, 1994) helps in recognising opportunities, which entrepreneurs then exploit by creating new innovations and building firms around novel solutions. However, knowledge creation does not usually happen in isolation (Huggins and Thompson, 2015), rather the entities capture the knowledge spill-overs by externally screening for innovations (Katila, 2002). Thus, entrepreneurs recognise opportunities by exploiting these spill-overs and then create new ventures to convert this revealed knowledge into commercial knowledge (Ács et al., 2013). In parallel, the needed knowledge, information, resources, activities and capabilities are shared and acquired from a complex set of relationships among the entrepreneurs and network participants. Thus, there is a need for established networks that are “defined by the enduring exchange relations established between organisations, individuals and groups” (Weber and Khademian, 2008, p. 334) inside and extending outside of the local entrepreneurial ecosystem.

Last of all, there is a set of support conditions that needs to be present to cater to the needs of entrepreneurial firms such as consulting services, intermediaries, networking providers and engagement events. Consultants are “a sophisticated service infrastructure [that] allows start-up firms to focus on their chosen steeple of expertise, rather than dissipate their energies across a broad range of peripheral or supporting activities” (Bahrami and Evans, 1995, p. 63), meaning
that entrepreneurs should focus on their core activities and outsource the rest. Zhang and Li (2010) argued that firms’ innovation capability is related to professionals who share new knowledge, information on inventions, and reduce costs (McEvily and Zaheer, 1999) and mitigate the risks of disrupting the innovation process (Saxenian, 1990).

Similarly, intermediaries provide “support to start-ups to improve the probability of survival of the portfolio companies and accelerate their development” (Pauwels et al., 2016, p. 14). Incubators target very early-stage firms with greenhorn founders with scalable business models (Isabelle, 2013; Stagars, 2015) and accelerators focus on already established fast-tracking knowledge-intensive ventures (Bosma and Stam, 2012; Pauwels et al., 2016) by validating their businesses. Likewise, there is a set of network mediators (e.g. industry associations, alumni) which provides networking support and smoothens out information exchange and other interactions (Howells, 2006; Suresh and Ramraj, 2012) to enable new firms to gather the required resources. In addition, engagement services play a crucial role in motivating firms to launch. These meeting events enable entrepreneurs and community members to collaborate, initiate, pursue and combine new innovations (e.g. via start-up weekends and hackathons) (Feld, 2012; Harrington, 2017).

In sum, all the above-mentioned elements reflect the ecosystem’s moral and inspirational conditions and highlight the value of the resources essential for developing business proposals based on the newest technological advancements. These forces are accessed, enriched, upheld and enabled by relationships between stakeholders, who in turn are supported early on to reach sustainable growth and development in the transnational entrepreneurial-ecosystem setting.

**RESEARCH METHODOLOGY**

The list of BG start-ups for the empirical part of this study was extracted and combined from a set of secondary sources: Startup 100, Crunchbase, FunderBeam and ActicStartup. All the firms found in the databases have been certified by start-up community leaders and investors, affirming that these firms possess the potential to become next-generation BG ventures. We introduced the stratified sampling method (cf. Neyman, 1934) to only target firms that had reached the second life-cycle phase to account for their timely knowledge regarding the preliminary stages of discovery and validation. Further, we applied the online survey method and managed
to gather responses from 51 founders from Finland and 33 from Estonia. As the sample collection only targeted BG start-ups, we then verified their speed of internationalisation, market scope and export extent (Kuivalainen et al., 2012). However, we were less strict regarding the requirement for BG to be present in at least two continents (cf. Luostarinen and Gabrielsson, 2006; Nummela et al., 2014) as this has a marginal effect on smaller economies (Choquette et al., 2017). In addition, as we were looking at the first stages of the life-cycle, some of the firms had no revenue as they were still less than 3 years old and had become international via other value-chain activities (e.g., global team allocation, joining a platform ecosystem).

Additionally, we controlled for the common method bias (Podsakoff et al., 2003). When composing the survey, it was important to elaborate the elements and split some of them into sub-elements (i.e., financial capital, talent and support systems) to make clear distinctions and comparisons. Hence, this distinction ensured that the respondents would assess the elements as objectively as possible based on their own experience, allowing for the mitigation of the common method bias risk. In addition, we conducted Harman’s single factor test and did not detect any individual factor that was solely influencing the results. Hence, we argue that there were no obvious issues with the common method bias.

Furthermore, we developed a set of metrics (cf. Audretsch and Belitski, 2017; Corrente et al., 2018; Liguori et al., 2019) measuring the elements and sub-elements on a scale from 0 to 100. This allowed us to clearly demonstrate which elements were ranked as essential for the preliminary stages of the BG life-cycle. Then, to answer RQ1, all mean averages were calculated for each element in its respective stage for both countries combined. These mean values were then used to calculate the aggregate equivalents as cut-off points to distinguish the critical elements from the non-critical ones associated with the firm’s progress.

Thereafter, to answer RQ2, we collected data on multiple characteristics of the entrepreneurial firms regarding their organisational (i.e., age, team size, service–product orientation, revenue) and international features (i.e., team allocation, origin of the owners, speed of internationalisation, market scope) and divided the firms into binary groups. These characteristics elaborate how ecosystem elements have influenced BG development. We then applied an analysis of variance (ANOVA) to compare the statistical significance of the entrepreneurial perceptions to verify if there were any discrepancies in terms of how these firms interpreted their environment. Resulting from the above steps, we could then answer the RQs by identifying which elements
were most critical for firm development and how BGs were influenced by the ecosystem during life-cycle stages, depending on their characteristics.

**FINDINGS**

The findings were divided into two sections corresponding to the RQs (see Table 1 below). In the first section, we arranged the elements in descending order based on their mean average values. This was essential to visualise the position of the elements and their rank in both stages. Then, after calculating the cut-off points, it became clear that there were six elements that were critical for the stages (i.e., entrepreneurial talent, knowledge, leadership, networks, worker talent and BAs), five were non-critical for progress (i.e., intermediaries, networking services, crowdfunding, CVC, credit institution) and five were in a transition mode (i.e., informal debt, bootstrapping, engagement services, consultants, VC). In terms of the latter elements, their positions changed by around ten places with a deviation of up to 31.67 points (i.e. VC), indicating that the elements’ configuration for BG development effectively changed when they moved from one stage to the other.

(Insert Table 1 here)

Furthermore, in the second section, it was imperative to explore if there was any contrast in these perceived rankings. Ergo, we needed to analyse firms’ intra-group variance to detect if there was any disparity among their characteristics. We applied the ANOVA method to analyse the 16 ecosystem elements in the context of 8 BG attributes. Intra-group variance was detected for more than half of the elements, indicating that firms had assorted perceptions towards their entrepreneurial ecosystem. We found 9 distinctions in the discovery stage and 7 in the validations stage, of which 2 were statistically significant at the 1% level and 14 were significant at the 5% level. However, the ANOVA results explain the background of the relationship as none of the intra-group perceptions changed the ranking from critical to non-critical and vice versa. In addition, the correlation coefficients were not measurable because we compared continuous dependent variables with binary independent variables and thus utilised point-scale deviations to demonstrate their significance.
In summary, the above results revealed that some elements were more critical than others under transnational conditions, and intra-group variations explained the contextual differences in how these elements influenced BG launches and their consequent internationalisation. All these results will now be discussed in detail.

**DISCUSSION**

The RQs of this study examine the ecosystem elements by exploring their criticality levels for BG development and how BGs perceive these elements in various ways depending on their intra-group characteristics. Also, it is rational to discuss each element independently in the transnational entrepreneurial-ecosystem context to attain a sound outline of the results.

**Leadership**

Leadership (particularly entrepreneurial leaders in the ecosystem context) is considered as influential individuals who share their experience in discovering and exploiting opportunities for value creation with their community and indirectly with the rest of the world (Greenberg et al., 2011). In this study framework, it became clear that the leadership element was critical for BG development in the preliminary stages. This stable influence is in line with the previous research indicating that entrepreneurial leaders should become role models for others and motivate them (McGrath and MacMillan, 2013) to embrace creativity (Cardon et al., 2009) and work towards entrepreneurial objectives and activities (Gupta et al., 2004; Yukl, 2008). However, leadership in some sense is limited to the local context, thus this is why the ANOVA results indicated that BGs with local teams were more exposed to the leadership element during validation processes. From another perspective, BGs with team members allocated across borders have arguably commenced internationalisation activities and therefore perceive leadership as less critical for the validation stage. The above results are in line with Mets (2015), who argued that leadership is a main factor for early internationalisation, hence its high ranking in both stages and the visible discrepancy for already internationalised firms.

**Finance**

Entrepreneurial finance focuses on BGs’ decision to raise financial capital. Entrepreneurs create innovations and transform these into viable products and services (Burgelman and Hitt, 2007). As this process is time-dependant (Suddaby et al., 2015) and requires immense amounts of capital investment (Ebben and Johnson, 2006), this action of commercialisation (Luostarinen and Gabrielsson, 2006) makes financial capital a primary element for progress. Overall, our
results are in line with the above reasoning as some elements are efficient in the first stage and others in the second. However, as there are multiple sources of capital, it is crucial to explore which of them matter for BGs.

Our results suggest that informal debt and bootstrapping are critical for the discovery stage, but as they cannot cope with the speed of commercialisation and the cash burn-rate, these elements become non-critical for the validation stage. The ANOVA suggests that younger BGs value informal debt as more critical than older BGs do. This clearly indicates that high-risk investments and raising capital from the inner circle have been accepted by the local community to support BG development. Confidence is determined as collateral and failures are accepted as part of the learning process. In addition, it is interesting to note that BGs with foreign equity investors perceive informal debt as more critical. Perhaps founders with solid business plans are confident in raising capital from their family and friends, as otherwise they would risk harming their relationships. Thus, this degree of legitimacy generates trust among and is attractive to professional investors.

Moreover, BAs and VC are more suited for commercialisation in the second stage, as they improve firm survival, integrate new talent and lead to higher online visibility and traction, while simultaneously consulting and extending founders’ networks (Kerr et al., 2014; Luostarinen and Gabrielsson, 2006). Our results indicate that BAs are critical in both stages as they are considered as the region’s own private investors who invest “seed capital” (Chemmanur and Fulghieri, 2014; Wong et al., 2009) and support the development from there. This is visible in the validation stage, as the results demonstrate that younger start-ups perceive BAs as more critical, denoting that these consortiums of investors have become a suitable source of finance for BG growth. However, BGs that have internationalised during their first year after inception find BAs less critical than others do. This is an indication that BAs have tendencies to constrain aggressive scaling, which instead is in line with the strategies of VC (Gabrielsson et al., 2004). Thus, our results clearly support the previous statement that VC is one of the principal elements in the validation stage and a prerequisite for successful internationalisation. Nevertheless, intra-group perceptions reveal that VC is more critical for BGs with foreign equity shareholders in the first stage compared to BGs with only local owners. This suggests that BGs backed by foreign equity owners are more open, have already attracted VC funding (Gabrielsson et al., 2008), or local founders just might feel reluctant to share their business in the discovery stage, or the BG business model is not yet suited to VC strategies.
Other sources such as crowdfunding, CVC and credit institutions were not found to be critical in supporting BG development. Crowdfunding is one of the newest popular ways to raise funding (Mollick, 2014), however, as it is rather understudied (Maroufkhani et al., 2018), our results suggest that there might be a mismatch between “smart” and “capital” for founders, making such online platforms non-critical. We argue that the information potential investors receive is ambiguous, that they might easily lose their money due to high default rates, and for the founders, it does not include the required benefits of monitoring, advising, teaching, recruiting and connecting with the right people when compared to VC and BAs (Chemmanur and Fulghieri, 2014).

CVC is also seen as less critical, which might be due to its formal strategy of only targeting BGs suitable for longitudinal investment plans and aligned with corporate strategies. The ANOVA reveals that CVC is attractive for BGs with foreign equity owners, similarly to VC, except CVC’s strategic position differs. However, an interesting find is that BGs with pre-revenue status perceive CVC as more critical for their discovery stage than those with revenue do. The simplest explanation could be that CVC firms only target BGs that can be integrated into their business platform ecosystems (e.g. Skype and Microsoft, WhatsApp and Facebook), making other BGs in the sample rank them less critically. As BG development incorporates high levels of uncertainty and risk (Gabrielsson et al., 2008), we argue that firms with complex products–services and longer R&D time horizons perceive CVC as a stable environment, where the focus is on building meaningful solutions for platform bundling and is less on making money straight away.

Lastly, the results show that credit institutions were ranked as the lowest form of capital source, arguably because first-time entrepreneurs lack the collateral instruments and proven track record, thus making them less attractive for the credit institutions (Zott and Huy, 2007). This is further verified by the intra-group perspectives, as highly rapid internationalising firms perceived these institutions as inhibitors of internationalisation compared to standard BGs, probably because any kind of a constraint on cash flow would hinder momentum and progress. Concluding the results on capital sources, it is apparent that informal types of funding are more critical in the first stage, formal ones for scaling and internationalisation, and traditional and online institutions were not seen as critical for BG development because they lack the hands-on approach, personal connection and cannot directly commit to the success of the new venture.
Talent

Talent is one of the main resources for firm development, as entrepreneurs are the ones initiating BGs and driving them, while worker talent is considered as a spectrum of specialists in their respective fields who join the venture when the tasks become too complex for the founders to handle alone. Hence, there is a direct connection between talent and well-performing start-ups (Rauch and Rijsdijk, 2013; Talaia et al., 2016).

The results indicate that entrepreneurial talent is the most critical element in BG development in both stages. The statement that founders with proactive mindsets search for opportunities and create innovations while taking a substantial risk (cf. Kuivalainen et al., 2007; Nummela et al., 2004; Vissak, 2007) received support in the empirical analysis. Worker talent is slightly less critical in the discovery stage but becomes highly critical when validation begins. Hence, founders take charge in the first stage and as the processes become more complex, talented people will be integrated to create synergies and together confront the challenges.

Knowledge

Knowledge is the fundamental source and driving force of modern communities shaped by dynamic innovation processes (Ács et al., 2016). BGs leverage their inner capabilities to learn and create new knowledge to develop unique and specialised products and services (Gabrielsson and Kirpalani, 2004). Our results confirm that knowledge accumulation is highly critical for both stages. However, there are some intra-group differences. In the discovery stage, for younger firms, specific knowledge is essential, but other abilities (e.g., raising less restrictive capital, composing a team and extending networks) also take on a principal role during firm establishment. In contrast, BGs with larger teams perceive knowledge as more critical than smaller ones do. Arguably, the more sophisticated the business model becomes, the more talent with appropriate knowledge is integrated, making the team’s composition and volume essential to run the tasks. In the validation stage, BGs with revenue streams perceive knowledge as less critical compared to pre-revenue firms. The difference in perception could be based on the timeline, as pre-revenue firms can still conduct knowledge-intensive R&D activities. Hence, as the product–service is not yet marketable, revenue is absent. Similarly, service-oriented BGs stated that knowledge was more critical than for product-oriented ventures. We suggest that service firms are vulnerable to demand fluctuations due to their shorter time-to-market periods, making them arbitrarily flexible so that they can respond promptly to constantly changing market requirements. In addition, firms with more than ten markets perceive knowledge as more critical. Resilient international aspirations require a certain mix of knowledge and capabilities.
to retain a strong market presence (Rialp et al., 2012). Thus, expansion via learning-by-doing is a distinctive factor for BGs with a stronger market presence.

**Networks**

Networks are relational structures which entrepreneurs and other community participants engage inside and outside the local ecosystem to link and share information, activities, resources and capabilities to fulfil the requirements for BG development (cf. Mort and Weerawardena, 2006; Zhou et al., 2007). The results from this study confirm that the network element in the ecosystem is also critical for the early development of BGs in both stages. This is in line with the results from previous research arguing that there is a direct connection between building and leveraging networks in the early stages to sustain successful growth (Gabrielsson and Kirpalani, 2004; Laanti et al., 2007) and facilitate rapid internationalisation (Gabrielsson et al., 2008).

**Support services**

Support services play a crucial role in sustaining the development and speeding up internationalisation for BG-type start-ups (Zhang and Li, 2010). Our study concentrated on the elements of consultants, intermediaries, networking and engagement services. Consultants, a set of external specialists, deliver different kinds of support services to BGs, so the teams can concentrate on what matters the most and less on bureaucracy. According to the results, these services were non-critical during the first stage and critical in the second stage. Hence, this corresponds to the idea that BGs handle their issues themselves in the beginning, however, external help becomes more relevant when complexities increase and different support and professional services are looked for (Luostarinen and Gabrielsson, 2006).

Furthermore, intermediaries such as incubators and accelerators form micro-ecosystems to integrate BG start-ups. In both stages, these mediators were ranked just below the cut-off line, making them non-critical for supporting BG development. Previous research has found that these intermediaries play a critical role in firm development and in improving their survival rates and accelerating their development (Feld, 2012; Pauwels et al., 2016). Our argument is that as we focus on small economies, their relative insufficiencies are visible on the incubator and accelerator level. In other words, when the local environment functions under resource constraints and shorter external networks, these micro-entities encounter comparable issues. Hence, the quality and quantity of intermediaries reflects the quaintness of the local ecosystem.
Networking services support entrepreneurs to find needed resources from their own networks and mediate information and other exchanges to enable further development. From the results, these services were found to be non-critical, but they still influenced and benefited the ecosystem (Saxenian, 1990; Suresh and Ramraj, 2012). We suggest this is because these services do not satisfy the BG requirements as ecosystems in periphery regions have shorter network nodes. The intra-group difference shows that, during the discovery stage, firms with foreign equity investors view networking services as more critical than others do. Hence, we argue that foreign stakeholders themselves can behave as the network extension for the firm. These services (e.g. alumni organisations) might in fact have been the key for foreign capital entry in the first place.

Lastly, engagement events are held to build social relationships between entrepreneurs and other community contributors to uncover and pursue innovation frontiers. We realised that engagement services are critical in the discovery stage and non-critical during validation. Hence, these events are appropriate for creating new BGs, but less relevant for validating the business ideas and finding new team members and investors. Previous studies have made clear that these events are significant to healthy ecosystems (Feld, 2012; Harrington, 2017). The ANOVA detected that BGs with revenue streams perceived these events as more critical in the discovery stage than the pre-revenue firms did. This difference explicitly shows that BG participation has a positive effect on achieving revenue streams. Hence, the appropriate team composition and generating captivating business propositions lead to successful sales activities. In sum, even though some of the elements were not depicted to be as critical as others were, they are all relevant in forming and sustaining a healthy entrepreneurial ecosystem in the transnational setting.

**CONCLUSION**

Reflecting on the decades of research on entrepreneurial environments, scholars have studied how to nurture entrepreneurial action in various ways. One of these focal points has been the entrepreneurial-ecosystem construct, which, unlike others, directly influences entrepreneurial activities in launching and growing rapidly internationalising firms. These systems consist of structural elements that each play their role in fostering the needs of a new venture. Therefore, our exploratory study aimed to shed more light on the arrangements in terms of how these ecosystems influence BG start-ups during the preliminary stages of a firm’s life-cycle. We took the transnational viewpoint of two small economies sharing their regional resources, thus unintentionally converging their environments towards a more sustainable arrangement.
Theoretical contribution
The entrepreneurial-ecosystem construct is a topic that has gained momentum in recent years, as researchers, practitioners and policy makers, among others, would like to figure out how to construct and sustain environments that are innovation-driven and focus on value creation for the global society. Therefore, we wanted to explore the topic by integrating the entrepreneurial ecosystem, BGs and life-cycle studies into one framework to comprehend how the ecosystem’s structural elements influence the development of rapidly internationalising firms during their stages of life (Alvedalen and Boschma, 2017; Malecki, 2018). This framework is not new per se (cf. Velt et al., 2018b, 2018a), however, it takes an original perspective. Specifically, we integrate a new dimension of “transnational” into the entrepreneurial-ecosystem context. The relevance is that we focus on two countries that have a high concentration of BG start-ups, and as these economies are situated in close proximity, there is an allusion of convergence. This opens a new study avenue to explore transnational aspects of the ecosystems, but also the effects of regional agglomeration and successive deglomeration.

Furthermore, we assessed the ecosystem level in a balanced manner (Mack and Mayer, 2016) by analysing all the main elements in one study framework and concentrating on the combined perceptions of BG founders to elaborate how these entrepreneurs sense their transnational environment. In detail, we focused on the configurations of criticality (Cavallo et al., 2018) to see which systemic elements were necessary in the regional context to support rapidly internationalising firms. It was appropriate to elaborate these criticality levels based on the intra-group differences of the firms to gather new insights into which elements and their combinations in the various stages should be emphasised to improve the nurturing surroundings when launching new ventures with global aspirations. The division of the stages exposed an increasingly complex view of ecosystem interactions.

Practical implications
For entrepreneurs, our results elaborate how the transnational ecosystem behaves in a regional setting. Defining the critical elements in the preliminary stages would familiarise ecosystem participants regarding where the emphasis should be directed when launching and growing new ventures. These results inaugurate a layout of the ecosystem so that novice entrepreneurs can clearly identify where to allocate their time and effort. For example, they should try to raise capital from established sources such as BAs and VC, rather than spending time with credit
institutions and crowdfunding. Similarly, the firm’s business model and strategy implementa-
tions play a crucial role in the success of a venture, thus, participating in the engagement events
will raise the firm’s potential to better secure revenue streams.

For governments and policy makers, they should try to create a supportive set of regulations
that will counter the shortcomings of the local entrepreneurial environment. As the discussion
is about the formulation of a transnational setting, all relevant institutions should start to align
their goals and introduce common strategies to benefit the regional ecosystem. For example,
the free movement of talent between the countries happens daily, however, it is not easy for
start-ups to officially relocate as corporate regulations and laws are rather different. Hence, it
is important to create a common framework and support the set-up for rapidly internationalising
firms as they are on the frontline of creating new jobs and societal value. It would be a strong
advantage for Finnish ICT start-ups to directly hire Estonian talent for their e-governance units
without having to deal with tax-compliance issues, or for a new Estonian gene-tech firm to
apply for funding from Finnish state grants as there is no considerable equivalent in Estonia.
Thus, creating common policies would benefit both nations in the long-run by sharing the in-
novation capacity.

Limitations and future research
The current study is exploratory and stays relatively descriptive by focusing on the best-in-the-
class firms such as BGs. Hence, there should be other studies introducing and comparing the
perceptions of other types of firms which are rapidly internationalising but have not achieved
BG status. Likewise, based on the firm type, a configuration study would be of great benefit to
reveal the modifications of the ecosystem elements required. In addition, it is essential to dig
deeper and prepare case studies to understand more about the founders’ experience in terms of
why some elements are more critical than others are and how intra-group differences have
played out in real life.

Additionally, by introducing the transnational dimension into the framework, we open a new
avenue for research. Yet, as this is the first study to propose this, we need to verify that trans-
nationality fully applies to the entrepreneurial-ecosystem context. The main dispute could be
that transnationality is suitable in a small-economy context where the ecosystem is more often
defined on the country level. But, for example, if we address a large economy on a state level
that is the size of a country, the local ecosystem does not extend beyond national borders. How-
ever, cross-border convergence still occurs, but not outside the country limits.
References


Page 19 of 25


<table>
<thead>
<tr>
<th>Table 1. Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elements</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Entrepreneurial Talent</td>
</tr>
<tr>
<td>Knowledge</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Informal Debt</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Leadership</td>
</tr>
<tr>
<td>Bootstrapping</td>
</tr>
<tr>
<td>Networks</td>
</tr>
<tr>
<td>Worker Talent</td>
</tr>
<tr>
<td>Engagement Services</td>
</tr>
<tr>
<td>Business Angels</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Intermediaries</td>
</tr>
<tr>
<td>Networking Services</td>
</tr>
<tr>
<td>Consultants</td>
</tr>
<tr>
<td>Venture Capital</td>
</tr>
<tr>
<td>Crowdfunding</td>
</tr>
<tr>
<td>Corp Venture Capital</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Credit Institution</td>
</tr>
</tbody>
</table>

Below cut-off points: 56.57, 61.17

(* *) p < .01; (**) p < .05; (---) no stat. sign. difference among BGs


908. KC, RAGHU. The role of efficient forest biomass logistics on optimisation of environmental sustainability of bioenergy. 2020. Diss.


914. SHNAI, IULIIA. The technology of flipped classroom: assessments, resources and systematic design. 2020. Diss.


916. FILIMONOV, ROMAN. Computational fluid dynamics as a tool for process engineering. 2020. Diss.

917. VIRTANEN, TIINA. Real-time monitoring of membrane fouling caused by phenolic compounds. 2020. Diss.

918. AZZUNI, ABDELRAHMAN. Energy security evaluation for the present and the future on a global level. 2020. Diss.

920. HONKANEN, JARI. Control design issues in grid-connected single-phase converters, with the focus on power factor correction. 2020. Diss.

921. KEMPPINEN, JUHA. The development and implementation of the clinical decision support system for integrated mental and addiction care. 2020. Diss.


923. SIRKIÄ, JUKKA. Leveraging digitalization opportunities to improve the business model. 2020. Diss.

924. SHEMYAKIN, VLADIMIR. Parameter estimation of large-scale chaotic systems. 2020. Diss.


927. FARFAN OROZCO, FRANCISCO JAVIER. In-depth analysis of the global power infrastructure - Opportunities for sustainable evolution of the power sector. 2020. Diss.


929. KARPPANEN, JANNE. Assessing the applicability of low voltage direct current in electricity distribution - Key factors and design aspects. 2020. Diss.


931. CALDERA, UPEKSHA. The role of renewable energy based seawater reverse osmosis (SWRO) in meeting the global water challenges in the decades to come. 2020. Diss.

932. KIVISTÖ, TIMO. Processes and tools to promote community benefits in public procurement. 2020. Diss.

933. NAQVI, BILAL. Towards aligning security and usability during the system development lifecycle. 2020. Diss.

934. XIN, YAN. Knowledge sharing and reuse in product-service systems with a product lifecycle perspective. 2020. Diss.


936. PUOLAKKA, TIINA. Managing operations in professional organisations – interplay between professionals and managers in court workflow control. 2020. Diss.


938. METSOLA, JAAKKO. Good for wealth or bad for health? Socioemotional wealth in the internationalisation process of family SMEs from a network perspective. 2020. Diss.