Enabling entrepreneurship at the regional level: An analysis of entrepreneurial ecosystems and their elements using a meta-analysis and an in-depth study of start-up competitions

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Lennard Stolz, M. A.

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Referent: Prof. Dr. rer. nat. Rolf Sternberg

Korreferent: apl. Prof. Dr. rer. pol. habil. Klaus Fichter

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Abstract

Understanding what determines entrepreneurial activity in countries and regions has motivated scholars for decades. In recent years, researchers began to understand the various actors and factors that influence entrepreneurship as a spatially embedded ecosystem. This cumulative dissertation examines the relevance of individual elements of such entrepreneurial ecosystems (EEs) for entrepreneurial activity, with a specific focus on the role of start-up competitions as policy instruments within EEs. The dissertation includes four scientific articles, each of which addresses one element of EEs in detail. First, a meta-analysis synthesizing existing knowledge on determinants of entrepreneurial activity is presented, and the statistical effect sizes of the relationships between each element of EEs and entrepreneurial activity on different spatial levels (local, regional, country) are provided. Subsequently, start-up competitions are examined in order to determine what role they play in EEs. A conceptual article illustrates the manifold interdependent relationships between start-up competitions and different ecosystem elements. In the next article, two start-up competitions in the contrasting EEs of Berlin and Hannover are analyzed based on 45 qualitative interviews. This is followed by an article in which a subset of these interviews is analyzed to further explore the learning processes of participants in the competitions.

Findings show that a) the EE approach has strong explanatory power regarding entrepreneurial activity, b) the relevance of its elements depends on the spatial level of observation, c) start-up competitions anchor public entrepreneurship support in the two analyzed regions and provide networking opportunities, d) this both influences the ecosystem and is influenced by the ecosystem and the region, and e) entrepreneurial learning in the competitions is not affected by the region or ecosystem but rather by participants' prior experiences. Overall, this dissertation contributes to knowledge of EEs and indicates that there are generic functions underlying the mechanisms of action of each element of the ecosystems (such as providing knowledge or capital), but that the form of these functions is influenced by (regional) context. The dissertation closes with a summary of the main findings, and implications for policy and further research are presented.

Keywords: entrepreneurship, entrepreneurial activity, entrepreneurial ecosystems, meta-analysis, case study, fsQCA, fuzzy-sets qualitative comparative analysis, start-up competitions, business plan competitions, Hannover, Berlin

Kurzzusammenfassung

Zu verstehen, was die Determinanten von Gründungsaktivitäten in verschiedenen Ländern und Regionen sind motiviert Wissenschaftler:innen seit Jahrzehnten. Jüngst hat sich dabei ein Ansatz etabliert, der die verschiedenen Akteure und Faktoren, die Gründungen beeinflussen, als ein räumlich eingebettetes Gründungsökosystem versteht. Diese kumulative Dissertation analysiert die Relevanz von den einzelnen Elementen dieser Ökosysteme für die Gründungsaktivität. Ein besonderer Fokus wird dabei auf die Rolle von Gründungswettbewerben als Teil der Gründungspolitik in solchen Ökosystemen gelegt. Die Dissertation beinhaltet vier wissenschaftliche Studien, die im Verlauf der Arbeit immer spezifischer hinsichtlich der Rolle einzelner Elemente von Gründungsökosystemen werden. Zunächst wird eine Meta-Analyse präsentiert, die das bisherige Wissen zu den Determinanten von Gründungsaktivitäten synthetisiert. Die Studie zeigt die statistischen Effektgrößen der Beziehungen zwischen einzelnen Elementen von Gründungsökosystemen und der Gründungsaktivität auf verschiedenen räumlichen Betrachtungsebenen (lokal, regional, national). Anschließend wird der Fokus auf Gründungswettbewerbe gelegt, um deren Rolle in Gründungsökosystemen zu analysieren. Dazu wird zunächst eine Studie vorgestellt, in der die potenzielle Rolle von Gründungswettbewerben in Gründungsökosystemen theoretisch-konzeptionell erarbeitet wird. In der anschließend dargestellten Studie werden zwei Gründungswettbewerbe in den kontrastierenden Fallstudienregionen Berlin und Hannover auf Basis von 45 qualitativen Interviews untersucht. Es folgt eine Studie, in der eine Teilgruppe dieser Interviews gesondert ausgewertet wird, um die Lernprozesse der Teilnehmer:innen bei den Wettbewerben zu untersuchen.

Die Ergebnisse zeigen, unter anderem, dass der Ansatz der Gründungsökosysteme einen hohen statistischen Erklärungsgehalt für Gründungsaktivitäten bietet, die Relevanz einzelner Elemente jedoch von der (räumlichen) Betrachtungsebene abhängt. Die untersuchten Gründungswettbewerbe haben eine Anker-Rolle für die öffentliche Gründungsförderung in den beiden Regionen. Diese Rolle steht in interdependenter Beziehung zum regionalen Gründungsökosystem. Die Lerneffekte für Teilnehmer:innen werden dagegen nicht von der Region beeinflusst, sondern primär von eigenen Vorerfahrungen. Die Dissertation schließt mit einer Zusammenfassung der Kernergebnisse und mit der Ableitung von Handlungsempfehlungen für die Politik und weitere Forschung.

Schlagworte: Gründungen, Gründungsaktivität, Gründungsökosysteme, Meta-Analyse, Fallstudie, fsQCA, fuzzy-sets qualitative comparative analysis, Gründungswettbewerbe, Businessplan Wettbewerbe, Hannover, Berlin

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Abbreviations

EA	Entrepreneurial activity
EE	Entrepreneurial ecosystem
ENT	Entrepreneur (interview partner)
EXP	Ecosystem expert (interview partner)
fsQCA	Fuzzy-sets qualitative comparative analysis
GDP	Gross domestic product
GEM	Global entrepreneurship monitor
HDI	Human development index
MARA	Meta-analysis regression analysis
NUTS	Nomenclature des unités territoriales statistiques
QCA	Qualitative comparative analysis
SME	Small and medium-sized enterprises
SUC	Start-up competition
TEA	Total early-stage entrepreneurial activity
USO	University spin-offs
VC	Venture capital

1. Introduction

1.1 Motivation

When one thinks of entrepreneurship, famous entrepreneurs like Elon Musk, Jeff Bezos, and Bill Gates, who are often mentioned in the news for their political and economic activities, quickly come to mind. Their companies, founded as start-ups, are now among the largest in the world and bring great wealth and political influence not only to their founders but also to the cities and regions in which they are based. Other well-known examples include social entrepreneurs like Muhammad Yunus and famous start-ups like Too Good To Go, which may be changing the world for the better. However, when one tries to explain why these or other examples of entrepreneurship were so successful, things get difficult. Why did these founders and start-ups succeed where others failed? Why where these start-ups founded in these certain areas and not elsewhere?

Scientists have attempted to answer these questions. Since first mentions in Cantillon's *Essay on the Nature of Trade in General* in 1755[1], economists have held that entrepreneurs and entrepreneurship, as an activity or process, play a key role in the economy (Kirzner, 1973, 1979; Knight, 1921; Schumpeter, 1934). Today, entrepreneurship and why, how, and where it takes place is researched in various fields including economics, management, sociology, geography, and psychology. In recent decades, the importance of combining research from multiple disciplines to gain overarching knowledge about entrepreneurship has become evident (Acs & Audretsch, 2010). Additionally, taking into account the context in which entrepreneurship takes place (e.g., social, spatial, and historical context) has become key to entrepreneurship research (Welter, 2011). In particular, the spatial context and especially the regional context have been widely researched (Sternberg, 2021). Understanding why entrepreneurship takes place more often in certain regions than in others, and particularly whether the reasons for this also hold true for specific types of entrepreneurship (e.g., high-growth, sustainable, or social entrepreneurship), is one of the core motivations of entrepreneurship research today. A research approach that tries to answer these questions

[1] See Cantillon (2015) for an current, translated version.

and takes the two recent developments mentioned above into account is entrepreneurial ecosystems (in the following: EEs). According to this approach, entrepreneurship is the output of a regionally or nationally embedded system that consists of several actors and factors. These actors and factors have interdependent relationships with one another, and together they build the system that produces the output (Stam, 2015).

Examples of famous regions with a strong presence of entrepreneurship like Silicon Valley, London or Berlin, quickly make the approach tangible and credible. It is easy to imagine that, in these regions, famous entrepreneurs, financiers, and thought leaders gather in creative environments, create new ideas, and inspire others to become entrepreneurs. However, why are there much smaller regions (e.g., Boulder, Colorado, USA; Waterloo, Ontario, Canada) that locals and researchers likewise understand as strong EEs? Additionally, and even more interestingly, why are there regions with similar characteristics in terms of population, institutional frameworks, and economic prosperity with fewer or no EE characteristics? Research on EEs focuses on these questions and attempts to identify specific elements that make up EEs and are present in every EE (or that can compensate for less developed or absent elements). Understanding how such an ecosystem works, which elements it consists of, how important these elements are, and which functions each element has in the EE are core goals in research on EEs and motivate this dissertation.

A particularly salient aspect of research on EEs is whether they can be positively affected by specific policies (Brown & Mason, 2017; Brown & Mawson, 2019). The example of Germany illustrates that this is not always effective: Support measures for entrepreneurs in the country are evaluated positively, but entrepreneurial activities among the population are low compared to those in other countries (Sternberg et al., 2022). Being on site, talking to founders, and determining which roles specific policy instruments, such as start-up competitions (SUCs), play in EEs is the second motivation of this dissertation.

The remainder of this work is structured as follows: First, an overview of the entrepreneurship phenomenon and its social and economic relevance is provided, followed by an introduction to the interdependent relationship between entrepreneurship and geography. Next, the theory underlying and antecedents of the EE approach are presented, and recent developments are discussed. Research gaps regarding EEs that this dissertation aims to close are identified, and the objectives of this dissertation are presented. The introduction closes

with a brief overview of the methods and data utilized. After that, four chapters follow, each of which contains one research article that this dissertation is built on. In the conclusion, the main findings are highlighted, the contributions and research limitations are discussed, and implications for research and policy are presented.

1.2 Theoretical foundations

1.2.1 Entrepreneurship and its relevance for academia and society

Defining entrepreneurship is difficult, and the term can be understood in different ways (Davidsson, 2016). For example as the creation of new organizations (Gartner, 1989), as individual opportunity perception (Shane & Venkataraman, 2000), or as a process including entrepreneurial orientation (Lumpkin & Dess, 1996). To test the postulated economic relevance of entrepreneurship, researchers needed to develop measures for the results of such individual actions: the entrepreneurial activity (EA). EA is most often measured by examining self-employment rates (Verheul et al., 2006), rates of firm entry (Ashcroft et al., 1991), and the share of individuals in the population that undertake specific steps to found a new venture (Reynolds et al., 2005). Two scientifically well-documented findings have emerged from this process, upon which this work is based.

The first finding is that EA differs across countries and across regions within countries. Like many others, Blanchflower (2000), using OECD data, finds significant differences in self-employment rates across 23 countries. Gindling & Newhouse (2014) achieve similar results when examining self-employment rates in 74 developing countries. The differences also exist for new firm formation rates across countries (e.g., Freytag & Thurik, 2007; Klapper et al., 2010; Reynolds et al., 1994). Researchers find similar results when examining the percentage of individuals in a country's population who undertake specific steps to found a new venture. In the scientific literature, the most well-known operationalization of this is the Global Entrepreneurship Monitor (GEM), for which numerous teams in countries across the world have conducted standardized population surveys on entrepreneurship each year since 1998 (Bosma et al., 2021; Reynolds et al., 2005). Various publications based on GEM data show strong differences in EA across countries and, more importantly, even across countries in similar stages of economic development (Bosma, 2013; Bosma et al., 2021; Sternberg &

Wennekers, 2005; Wong et al., 2005). The manifold evidence for differences in EA also holds true at the regional level (Armington & Acs, 2002; Davidsson, 1995; Davidsson et al., 1994; Sternberg, 2009). Differences not only exist among regions that differ due to various factors (e.g., cities vs. rural regions), but also among cities in the same country (Acs & Armington, 2004) and between cities in different countries (Bosma & Sternberg, 2014).

The second finding upon which scholars widely agree is that EA is related to economic development. This is a two-way relationship, as shown by studies analyzing the relationship between EA and GDP (Ferreira et al., 2017; van Stel et al., 2005; Wennekers et al., 2005). Small and medium-sized enterprises (SMEs) provide the majority of jobs, both in the US (Birch, 1987) and across the world (International Labour Organisation, 2019). A key driver for this job creation are young firms, start-ups, and the self-employed (Carree et al., 2015; Doran et al., 2016; J. Haltiwanger et al., 2013). In addition to job creation, EA serves as a way to commercialize knowledge and thereby contribute to economic growth (Acs et al., 2012). It can help to foster the productivity of existing firms (Andersson & Koster, 2011) and labor productivity (Audretsch & Keilbach, 2004). However, EA's effects differ depending on the development level of the country and the type of EA (Valliere & Peterson, 2009). Researchers have previously attempted to differentiate different types of entrepreneurship and their potential to positively or negatively affect the economy (see the seminal work of Baumol, 1990). However, scholars have only recently emphasized the relevance of opportunity-driven, ambitious, innovative, and high-growth entrepreneurship for economic development, rather than general measures of all types of EA (Acs, 2011; Stam et al., 2011).

These two facts have led to great academic, political, and societal interest in the question of what influences the frequency and quality of entrepreneurship. A large body of research investigates this question by examining entrepreneurs' personality traits (Brandstätter, 1997; Leutner et al., 2014; Obschonka et al., 2012; Rauch & Frese, 2007; Şahin et al., 2019). However, the fact that EA varies greatly, even within culturally and economically similar countries and regions, indicates that there must be non-individual factors that shape these personality attributes, help people with these attributes successfully found ventures, or ensure that these people tend to settle in certain regions. Thus, the context, and therefore also the geographic context, must have a relationship with entrepreneurship too.

1.2.2 Economic geography and entrepreneurship

Entrepreneurship has an interdependent relationship with spatial context. This is a core assumption of economic geography, which can be defined as "the science of spatial order and spatial organization of the economy" (translated from Schätzl, 2001, p. 21). One direction of the relationship between entrepreneurship and spatial context has already been explained: EA contributes to the economic development of regions and countries, and it thus helps to shape the spatial distribution of innovation, wealth, and economic growth. In the other direction, spatial context affects the quality and quantity of entrepreneurship in a particular area.

In their seminal contributions, the economists Marshall (1890), Arrow (1962), and Romer (1986) highlight the importance of specialization within the same industry by firms within a region for knowledge spillovers and economic wealth. Others, by contrast, assert that it is complementary industries in a region, and thus the diversification of firms, that lead to this prosperity (Jacobs, 1962). Other theories highlighting the importance of space for economic activities stem from Porter's (1990, 1996) work on national competitiveness and the importance of the geographical clustering of industries within nations for this competitiveness. Another prominent contribution is Krugman's theory on economic localization based on increasing returns (Krugman, 1991, 1999). What these theories and their successors have in common is that they attribute particular importance to the spatial concentration, agglomeration, or clustering of economic activities within particular regions for creating more or better economic activities. Martin (1999) describes this focus on space and regional context as a "geographical turn in economics" based on some of the aforementioned contributions. In the past roughly three decades something similar happened in entrepreneurship research (Sternberg, 2009).

From a theoretical point of view, entrepreneurship scholars adapted theories that were already being used in economic geography and economics, which already included spatial dimensions, and added entrepreneurship. Examples include regional innovation systems (Sternberg, 2007; Ylinenpää, 2009), clusters (Delgado et al., 2010; Rocha & Sternberg, 2005; Sternberg & Litzenberger, 2004), and institutions theory (Ebner, 2006; Verheul et al., 2002). Empirical contributions show that a variety of spatially embedded factors (e.g., in a region, city, or country) influence the quantity and type (and thus the quality) of EA. At the country

level, research mostly focuses on institutional factors like regulation, protection, and corruption and how they influence EA (Bowen & De Clercq, 2008; McMullen et al., 2008; van Stel et al., 2007). Although this can be used to explain differences across countries in terms of entrepreneurship, it cannot explain why individual regions produce a significantly above-average number of entrepreneurs and, in particular, successful entrepreneurs. In line with management scholars who assert that local context is important to an individual's decision to become an entrepreneur (Dubini, 1989; Spilling, 1996; van de Ven, 1993), seminal case studies of economically and entrepreneurially active regions by the economic geographers Saxenian (1994) and Feldman (2001) show that a variety of interdependent, regionally integrated, and historically evolved factors determine EA in a region. The studies and developments presented in this section, both in economic geography research, which has become increasingly concerned with entrepreneurship, and in entrepreneurship research, which has increasingly taken regional aspects into account, are described in detail by Sternberg (2009, 2021), Stam (2010), and Plummer & Pe'er (2010).

1.2.3 Entrepreneurial ecosystems

The multidisciplinarity inherent in entrepreneurship studies and the importance of including spatial context in entrepreneurship research are particularly evident in a recent widespread approach to understanding EA and explaining its incidence: entrepreneurial ecosystems (EEs). Literature overviews indicate that the number of scientific articles published on this topic has been increasing rapidly (Alvedalen & Boschma, 2017; Cavallo et al., 2019; Fernandes & Ferreira, 2022; Malecki, 2018). The increasing research on this topic and the interest of both economists and geographers (both separately and together) in it is also illustrated by several special issues on EEs in leading journals in the field of (regional) entrepreneurship research. These include *Small Business Economics* (Vol. 49, Issue 1, 2017; Vol. 52, Issue 2, 2019; Vol. 56, Issue 3, 2021) and *Entrepreneurship & Regional Development* (Vol. 33, Issue 1-2, 2021) as well as special sessions at the *Interdisciplinary European Conference on Entrepreneurship Research – IECER* (2021) and at the *Geography of Innovation Conference* (2022).

What is remarkable about the EE approach is that practitioners, politicians, and policy advisors quickly adopted it. It could even be said that that they have been instrumental in spreading it, not only in politics but also in research. Several frameworks have been developed specifically for policy or by practitioners before the approach was as widely researched as it is today.

Isenberg (2010) presents some questions that policy makers should ask themselves as well as rules for creating EEs in an article in *Harvard Business Review*. In an article in *Forbes* one year later, he presented a framework for such ecosystems (Isenberg, 2011). At the same time, Brad Feld's (2012) book *Start-up Communities. Building an Entrepreneurial Ecosystem in Your City* was published, in which he discusses his experiences as a researcher, entrepreneur, and investor in Boulder, Colorado (USA) and how an EE was created there. Another well-known EE framework was published by the World Economic Forum (2013). It is composed of eight elements and was used in the same report to measure the quality of EEs in some regions and countries. In a report for the Kauffman Foundation directed at policymakers, Auerswald (2015) makes a further contribution by defining how to create and build EEs. A report for the OECD by Mason & Brown (2014) summarizes several ecosystem approaches and provides implications for policy makers.

If one looks at the research articles that cite these publications, one finds that almost all (early) scientific articles that provide theory on EEs cite them (Acs et al., 2017; Autio et al., 2018; Spigel, 2017; Stam, 2015). Scientific research was led by policy, rather than the other way round – something that the scholars in the field recognize themselves (Wurth et al., 2021).

EEs can be defined as “combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative start-ups, and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assisting high-risk ventures” (Spigel, 2017, p. 50). They can also be defined as “institutional and organizational as well as other systemic factors that interact, and influence identification and commercialization of entrepreneurial opportunities” (Audretsch & Belitski, 2017, p. 1031). What these and other definitions of EEs (for an overview, see e.g., Malecki, 2018) have in common is that they explicitly name EA as the results of the combination of various elements in a given area. As shown in the previous chapter, neither systemic approaches to explaining specific economic activity in a region (e.g., regional innovation systems or clusters) nor the interdependency of the regional context with EA is new. Even the name of the EE approach has been used in a similar manner for a similar phenomenon. Examples include Qian et al.’s (2013) “regional systems of entrepreneurship” or Neck et al.’s (2004) “entrepreneurial system view of new venture creation”.

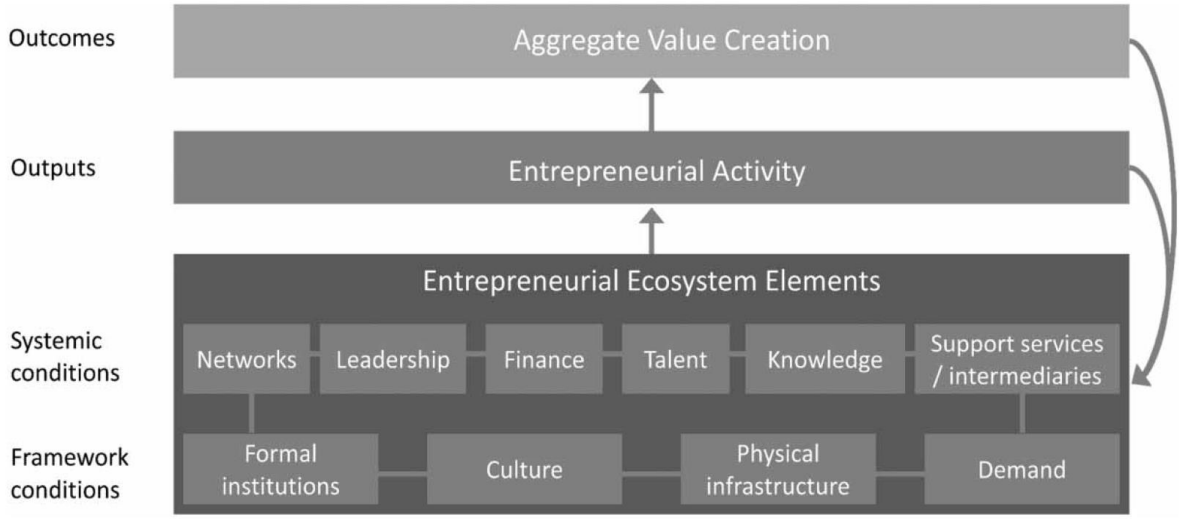
However, the EE concept is distinct from other approaches because it explicitly focuses on entrepreneurs not only as an output but also as an input of the ecosystem (Stam, 2015). This allows to integrate previous findings on manifold factors affecting EA at different levels of analysis, such as the individual, regional, and country levels. In addition to the personality traits and regional factors mentioned above, research shows that there are other factors affecting entrepreneurship (and its success) that can easily be assigned to multiple of these dimensions.

One example for this are individual networks. Scholars have demonstrated their importance for individual opportunity perception, new venture financing, and success (Brüderl & Preisendörfer, 1998; Fuentes Fuentes et al., 2010; Shane & Cable, 2002; Shane & Stuart, 2002). Additionally, individuals in contact with entrepreneurial role models are more likely to see entrepreneurship as a career opportunity and to become entrepreneurs than those without such contact (Austin & Nauta, 2016; Bosma et al., 2012; Burke et al., 2008; Stanworth et al., 1989; van Auken et al., 2006). In combination with findings that levels of EA stay persistent in regions over long time periods (Fritsch & Mueller, 2007; Fritsch & Wyrwich, 2014) and that geographical distance matters when seeking and obtaining financing from venture capitalists (Colombo et al., 2019; Lutz et al., 2013), it is clear that individual-level networks (and thus the individual level of analysis) that influence specific aspects of opportunity perception, exploitation, and successful new venture creation are also influenced by geography (and thus the spatial level of analysis). This geographical influence is particularly clear in the case of networks, as geographical proximity makes many networks possible in the first place (for entrepreneurship and proximity, see e.g., Sternberg, 2022).

The EE approach explicitly takes this multidimensionality and the interdependencies of the various factors influencing entrepreneurship into account, and therefore offers an advance over previous concepts. It provides, and this is something that other approaches to systems that enable entrepreneurship in a particular area were not able to do, a conceptual framework for synthesizing previous knowledge on the different aspects of EA in a spatial area, and at the same time the basis for integrating new knowledge with explicit reference to the ecosystem. What the EE approach does, is giving something that scholars were (more or less successful) explaining for decades, a language to describe it.

One of the most influential examples of a synthesis of previous research into a holistic EE framework is Erik Stam's (2015) "Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique". It provides a definition of EEs, a ten-element framework for EEs (figure 1.1), and a (more or less strong) theoretical foundation for each of these elements. Stam (2015) defines EEs as „a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship." This definition highlights two important assumptions of the EE literature. First, both actors (i.e., individuals and organizations) and factors (e.g., infrastructure, institutions, and markets) have interdependent relations that must be coordinated to enable entrepreneurship. Second, entrepreneurship, which should be productive, is the output of such an ecosystem. Later, Stam's definition was extended by the addition of "in a particular territory"; and thus, spatial context was explicitly included (Stam & Spigel, 2018).

Figure 1.1. Stam's (2015) framework of entrepreneurial ecosystems



Source: Stam (2015, p. 1765)

Stam's conceptual approach to, framework for, and definition of EEs, along with the underlying theories presented in previous chapters, form the theoretical foundation of this thesis. While his framework is often used in empirical research on EEs (Iacobucci & Perugini, 2021; Leendertse et al., 2021; Perugini, 2022; Stam & van de Ven, 2021), other frameworks or conceptualizations of EEs exist and must be mentioned here.

Based on case studies of two different regional EEs, Spigel (2017) provides a framework for EEs and highlights that configurations of the elements can differ among ecosystems. Harima et al. (2021) provide a framework for the development of EEs based on their study of the EE of Santiago, Chile. Nicotra et al. (2018) provide a framework for EE factors that affect input factors (financial, knowledge-based, and social forms of capital) of the ecosystem that, in combination, result in productive entrepreneurship. Cunningham et al. (2019) develop a framework for governing EEs that consists of public policy, industry, public capital providers, private capital providers, and research organizations, which are connected by individual principal investigators. Another framework for ecosystem governance is presented by Colombelli et al. (2019). O'Shea et al. (2021) develop a framework of sustainable EEs. Sternberg et al. (2019) further develop the framework created by Stam (2015) by enabling measurement using GEM data. Ligouri et al. (2019) also provide a framework for measuring EEs that consists of six aggregated elements of the ecosystems. Acs et al. (2014) use 19 individual-level (mostly attitudes towards entrepreneurship), and 17 country level indicators (e.g. market sizes, corruption, economic freedom) to compose an index of "national systems of entrepreneurship". Audretsch & Belitski (2017) use six aggregated indices to measure EEs in cities and EA as their output. Hechavarría and Ingram (2018) use eleven aggregated indices for measuring EEs and their influence on male and female EA as an output.

Though this brief list of various frameworks is far from comprehensive, it provides an overview of research in the field and demonstrates that EE frameworks are often combinations of various elements that make up ecosystems. Which elements are included in each framework and how they are labeled differs. However, most frameworks include the following (O'Shea et al., 2021; Roundy et al., 2018; Spigel, 2017; Spigel & Harrison, 2018; Stam, 2015; Sternberg et al., 2019; Wurth et al., 2021):

- A place of origin of new knowledge (universities, research institutes, companies)
- The presence of human capital and talents (skilled workers)
- Financial capital, preferably provided by actors with a specific focus on entrepreneurs (venture capital funds, business angels)
- Access to markets
- Leadership through prominent actors and entrepreneurial role models

- An entrepreneurial spirit and a culture of the acceptance of failure
- Networks of entrepreneurs
- Events that connect the players in the ecosystem
- A supportive institutional environment

All of these frameworks build on strong theoretical foundations, particularly regarding the spatial context in which EA takes place. Empirical studies that use the presented frameworks to measure the quality of EEs and their effects on EA as an output emphasize the importance of these elements (Audretsch & Belitski, 2017, 2021; Content et al., 2020; Iacobucci & Perugini, 2021; Leendertse et al., 2021; Perugini, 2022; Sarma & Marszalek, 2020; Stam & van de Ven, 2021; Szerb et al., 2019). Nevertheless, this approach has also been criticized, and research gaps exist regarding understanding of the elements, spatial levels of analysis, and causal chains within EEs. It is necessary to address these gaps in order to further establish the EE approach and prevent it from being a fad without benefits (Alvedalen & Boschma, 2017; Wurth et al., 2021).

1.3 Research gaps

A strength of EE as a research concept is that it provides a basis for synthesizing knowledge from different research streams and different disciplines with an explicit focus on entrepreneurs and the region. However, this is also one of its weaknesses, as it is unclear what is new about this approach. Scaringella & Radziwon (2018) conducted a systematic literature review of 104 articles on ecosystems in a social science context and identified four types of ecosystems that are frequently mentioned in the literature: business ecosystems, innovation ecosystems, entrepreneurial ecosystems, and knowledge ecosystems. They conclude that ecosystem approaches share the same fundamentals as territorial approaches (e.g., industrial districts, innovative milieus, regional innovation systems); thus, ecosystem approaches can be criticized as “old wine in new bottles” (Scaringella & Radziwon, 2018, p. 75). They argue that, rather than developing new streams of research, scholars from different fields should combine their expertise to develop a common understanding (Scaringella & Radziwon, 2018).

While scholars see this rather theoretical aspect differently – some argue that the integration previous concepts is beneficial, and others that it is not – there is also an empirical viewpoint on this. If one looks at studies that empirically analyze EEs, they mostly use a combination of variables based on secondary data to measure elements of EEs (as independent variables) and regress them on some type of EA as an output (as the dependent variable). Examples include studies conducted by Audretsch & Belitski (2017), Audretsch et al. (2021), Stam (2018), Stam & van de Ven (2021), Ghio et al. (2019), Hechavarría & Ingram (2018), and Yan & Guan (2019). Researching these relationships in a manner like this holds little potential for new findings compared to previous research that analyzed the effects of such variables (or groups of variables) on EA within a given spatial area. This has previously been done in a similar manner, with similar or even with the same variables (Armington & Acs, 2002; Audretsch & Belitski, 2013; Stenholm et al., 2013; Stuetzer et al., 2014). However, some recent empirical contributions focus on the role of the EE as a moderator between EA and economic growth (Audretsch, Belitski, et al., 2021; Bruns et al., 2017; Szerb et al., 2019). Still, and analogous to the synthesis of other theories, the question remains as to whether the approach holds something new empirically. If its strength is synthesizing prior knowledge and analyzing it from a new perspective, a synthesis not only of previous theories but also of previous empirical findings is needed.

Another open question has to do with the spatial level of analysis. Early descriptions of EEs focus on cities (Feld, 2012), and on countries (Isenberg, 2010). Empirical studies assess them at the country level (Acs et al., 2014; Hechavarría & Ingram, 2018), at the broader regional level (Content et al., 2020; Stam & van de Ven, 2021), and city level (Audretsch & Belitski, 2017; Zhang & Roelfsema, 2020). The EU-wide differentiation of regions into NUTS categories is often used for studies of EEs. It has been used at all levels, ranging from the regional, at NUTS-3 (Perugini, 2022) to NUTS-2 (Leendertse et al., 2021), NUTS-1 (Bruns et al., 2017), and NUTS-0 (the country level, see above for respective studies). While most scholars agree that entrepreneurship is primarily a regional event (Feldman, 2001) and that EEs should therefore be analyzed at the regional level, it is clear that country-level factors also affect entrepreneurship and that some ecosystems are geographically smaller or larger than others (Malecki, 2018). Thus far, research has provided no clear answers as to whether certain elements of EEs are only relevant at certain spatial levels or whether individual ecosystems are integrated into larger ones.

A research gap also exists regarding the causal mechanisms within EEs. This has been a major critique for several years (Alvedalen & Boschma, 2017) and remains one a core issue on what further research is required (Cao & Shi, 2021; Wurth et al., 2021). Some of this was already addressed by studies with particular emphasis on analyzing the mechanisms that make up the networks within ecosystems (Motoyama & Knowlton, 2017), their overall configuration (Spigel, 2017), their resource distribution (Scheidgen, 2021), and their resource re-allocation (Spigel & Vinodrai, 2020). Still, the specific role of individual elements of EEs often remains unclear. Research on individual elements can be criticized because the EE approach involves understanding the system (Wurth et al., 2021). However, this criticism is mainly related to the focus on only one particular element of one ecosystem in one territory (Wurth et al., 2021). Understanding the elements and their configurations by analyzing ecosystems in different regions helps to strengthen understanding (a positive example is Spigel, 2017). Further research on the roles specific elements play could also provide guidance for policymakers and practitioners, which is particularly necessary due to the complexity of the interactions in EEs (Feldman et al., 2019). Individual policy measures to support EEs can work, but these have been criticized in favor of systemic approaches (Brown & Mason, 2017). However, researching individual elements and their role in the overall ecosystems helps to better understand the mechanisms within EEs (Spigel, 2016).

The need to further analyze individual elements of EEs, such as government-provided support services, becomes clear when examining the sheer quantity of policy measures intended to foster entrepreneurship in general, and, in recent years, EEs in particular. The idea of providing public support to foster entrepreneurship in a region is not new, and specific tools like establishing entrepreneurial education; providing financing; and creating start-up competitions, incubators, and accelerators have been applied for decades (Katz, 2003; Lundström & Stevenson, 2005). According to research on EEs, these public instruments play specific roles; they are explicitly considered part of EEs, and they have functions like educating and connecting potential entrepreneurs (Spigel, 2016; Spigel & Harrison, 2018). Hence, several such instruments like incubators, accelerators, co-working spaces, as well as their role in EEs, have already been researched (Hochberg, 2016; Nicholls-Nixon et al., 2021; van Rijnsoever, 2020). A policy instrument that received less attention in the EE context is start-up competitions (in the following: SUCs). This is surprising given that they are frequently mentioned as being part of EEs by practitioners (Feld, 2012; Harrington, 2016; Isenberg, 2011;

World Economic Forum, 2013) and scholars (Mason et al., 2020; Motoyama & Knowlton, 2017; Wright et al., 2017). Here, it is important to note that scholars researching EEs sometimes mention SUCs as being individual elements of EEs (e.g., Wright et al., 2017), while others (e.g., Stam, 2015) provide frameworks for EEs that consist of different elements, to some of which SUCs can be attributed to. In Stam's work this would be the element "support services / intermediaries" (Stam, 2015, p. 1766). For the purposes of this dissertation, SUCs are considered one *part* of this *element* of EEs. Outside the EE context, SUCs are researched primarily with a focus on participants' perceptions and behaviors (Russell et al., 2008; Watson et al., 2015, 2018). Some empirical contributions analyze their on the likelihood that participants will really go on to found their proposed venture (Gailly, 2006; Klinger & Schündeln, 2011; Michelsen et al., 2013) and their influence on the integration of sustainability into participants' business activity (Fichter & Tiemann, 2020). However, despite this scholarly interest and the fact that hundreds of SUCs are active in Europe alone (Passaro et al., 2017; Schwartz et al., 2013), the role they play in EEs has not been researched sufficiently. This is particularly true regarding their goal of providing entrepreneurial knowledge to participants (Schwartz et al., 2013). The accumulation and transfer of this knowledge, which primarily relates to identifying and acquiring resources, contacts, and business opportunities, is a core functionality of EEs (Spigel & Harrison, 2018).

This dissertation is motivated by these gaps in research on EEs. It aims to help close these gaps by providing four research articles that, individually and in combination, contribute to doing so. It should be noted, however, that there are other relevant areas in the EE field for which additional research is required that cannot be addressed in this dissertation. For example, further analysis of other elements of EEs as a whole (not only support services) and (if applicable) of the small parts that make up these elements is needed. Other areas for which research is needed include the dynamics of EEs and their development over time (Mack & Mayer, 2016), the characteristics or commonalities of EEs in rural or small-town areas (Roundy, 2019), the relationship between EEs and sustainable entrepreneurship (Volkmann et al., 2021), the relationship between EEs and different outcome measures like overall well-being (Wurth et al., 2021), and the overarching question of whether every region has or can have an EE at all (Malecki, 2018).

1.4 Research objectives and structure of this dissertation

The aim of this dissertation is to help close the aforementioned research gaps. Based on these gaps, three research objectives were derived and inform the analysis. The first research objective is to synthesize quantitative evidence on the antecedents of EA within the EE framework. Doing so provides statistical evidence for the explanatory power of the EE framework and to the relevance of its elements for its outcome. The second research objective is to provide quantitative evidence for the relevance of individual EE elements at different spatial levels of analysis. This helps to reduce the uncertainty currently prevailing regarding the relevance of particular EE elements and which spatial levels are suitable for analyzing EEs. The third research objective is to analyze the role SUCs play in EEs. Understanding the role of SUCs, a widely used policy tool that has been researched insufficiently in the EE context, helps to strengthen overall understanding of how EEs work and whether or not they can be influenced by policy measures.

As described above, this cumulative dissertation consists of four research articles that alone and in combination help to achieve these objectives. This introduction is followed by an article that focuses on the first two objectives. This article provides readers with information on several measures used for different types of EA and the factors that influence them on different spatial scales. It provides a meta-analytical synthesis of the empirical findings of 545 quantitative studies on EA. The results show which elements of Stam's (2015) framework have significant relationships with different types of EA. The paper differentiates three spatial levels of analysis (i.e., local, regional, country), and two types of EA as output of the EE. It thereby helps strengthen knowledge of EEs and the different spatial levels at which they can be studied.

To achieve the third research objective, the first research article is followed by three articles that explicitly focus on SUCs as one part of one element of EEs. Using a conceptual view and based on theories and previous empirical contributions, the second article in this dissertation shows the multiple, interdependent relationships that SUCs, as a single, small part of an ecosystem, can potentially have with other elements in the EE. The third article in this dissertation extends these conceptual ideas with qualitative empirical findings based on investigation of two SUCs in Germany and their roles in their respective ecosystems. To take

into account both the multidimensionality of entrepreneurship and the explicit focus on the entrepreneur, which are required when analyzing EEs, the fourth research article analyzes a subset of the interviews from the third paper in even more depth, with a particular focus on entrepreneurial learning. Overall, each paper in sequence represents a progressively finer, smaller-scale look at EEs or one of their elements.

This highlights the main reason for the structure of this dissertation. Each scientific article included in this dissertation, its current status, and the journal it has been submitted to or published in is presented in table 1.1. The column “level of aggregation” represents the rationale behind the selection and order of the articles in this thesis. Given complexity of EEs and the fact that different EE frameworks consist of several elements (which scholars assess using many different variables and research approaches), it is clear that it would be impossible to examine all elements of EEs, their roles, and their relationships to the other elements in sufficient depth in a single dissertation. Therefore, this dissertation presents a combination of a comprehensive, complex, quantitative synthesis of previous research on EEs and three studies illuminating a specific part of an element and the role it plays in EEs conceptually and qualitatively from different perspectives. With each paper, the dissertation becomes progressively more specific about the role the elements play in the ecosystems.

Table 1.1 Overview of articles included in this dissertation

Title	Author(s)	Research objective(s)	Status	Journal	Method	Data	Level of Aggregation
Synthesizing the Evidence on Entrepreneurial Contexts: A Meta-Analysis of Entrepreneurial Ecosystems and their Effects on Entrepreneurial Activity	Stolz Queißner Weiss	1: To synthesize the quantitative evidence on the antecedents of EA within the EE framework 2: To provide quantitative evidence for the relevance of individual EE elements on different spatial levels	under review	*Journal of Business Venturing*	Meta-Analysis	Quantitative data from 545 empirical studies, secondary data	Whole ecosystems and all of their elements
Start-up Competitions and their Role in Entrepreneurial Ecosystems: A Conceptual Attempt	Stolz	3: To analyze the role SUCs play in EEs	published	*Zeitschrift für Wirtschafts-geographie*	Conceptual	-	Single ecosystem element (support services): Using the example of SUCs
Start-up competitions as anchor events in Entrepreneurial Ecosystems: First findings from two German regions	Stolz	3: To analyze the role SUCs play in EEs	published	*Geografiska Annaler: Series B, Human Geography*	Qualitative Content Analysis	45 qualitative interviews	Single ecosystem element (support services): Using the example of SUCs
Do the Winners Really Take It all? Exploring Entrepreneurial Learning in Start-Up Competitions	Stolz Sternberg	3: To analyze the role SUCs play in EEs	published	*Entrepreneurship Education and Pedagogy*	Fuzzy-sets Qualitative Comparative Analysis	26 qualitative interviews	Individual level in the ecosystem context: Using the example of SUC participants

1.5 Methods and data

Addressing the research objectives required two unique datasets: one with comprehensive data on previous quantitative research on EA and its antecedents, and one with detailed data on SUCs. Both datasets and the rationale behind data collection and the research methods used in the papers are briefly described below.

1.5.1 Method and dataset of the meta-analysis

To achieve the aim of the first paper (chapter 2) by synthesizing prior evidence on the elements of EEs, a meta-analysis was conducted. A meta-analysis is the "statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings" (Glass, 1976, p. 3). Meta-analysis provided seminal input on active debates in entrepreneurship research, including on entrepreneurial orientation and business performance (Rauch et al., 2009), internationalization and business performance (Schwens et al., 2018), and personality traits and entrepreneurship (Rauch & Frese, 2007). Synthesizing knowledge through meta-analysis helps to evolve the literature in a given field (Rauch, 2020); thus, it is a suitable method for the study presented in chapter 2. To conduct the meta-analysis, an extensive literature research was needed, with the ultimate goal of screening all empirical studies of determinants of EA in order to extract their data and group the variables used into the elements of an EE framework.

This was achieved by screening web-based search engines for scientific literature, namely Scopus, Web of Science, and ProQuest, for search terms that included all possible combinations of "entrepreneur", "start-up", "start up", "new business formation", or "new venture formation" with words like "activity", "climate", "ecosystem", "system", "environment", and "support" (for a full list of search terms, see appendix A). This resulted in 9,435 studies.

The inclusion conditions were that studies were quantitative, included information about EA in the econometric model, and included at least one other variable that could be attributed to Stam's (2015) framework for EEs. The econometric model of the collected studies would have approximately the following generic form:

$$EA_{i,t} = \alpha + \beta_1 Demand_{it} + \beta_2 \text{ Culture }_{it} + \beta_3 \text{ Finance}_{it} + \beta_4 \text{ Formal Institutions}_{it} + \beta_5 \text{ Knowledge}_{it} + \beta_6 \text{ Leadership}_{it} + \beta_7 \text{ Network}_{it} + \beta_8 \text{ Physical infrastructure}_{it} + \beta_9 \text{ Support Services}_{it} + \beta_{10} \text{ Talent}_{it} + \gamma Z_{it} + \varepsilon_{it} \quad (1)$$

In this equation, EA is entrepreneurial activity, and each derivation of β represents one of the ten elements of EEs according to Stam's (2015) framework, which is presented in figure 1.1. It is important to highlight that each study did not have to have a variable for each β to be included in the meta-analysis. Additionally, for the purpose of the meta-analysis, the variable that measures EA did not necessarily had to be the dependent variable in the study it comes from. Every study was included that had at least one β and a measurement for EA. For example, a study reporting descriptive statistics for a variable that measures EA (e.g., new business formation per 10,000 inhabitants) and for one or more variables that can be attributed to one element of Stam's framework (e.g., GDP, which can be attributed to the *demand* element) would be included. Studies that did not include a variable that measures EA were excluded. Studies including a variable for EA but not a variable that could be meaningfully assigned to an element of the EE framework were excluded.

If a study contained these variables, it additionally had to contain 1) the correlation between the EE framework element variable and the EA variable or 2) the mean and standard derivation of both variables to be included. Additionally, it had to report the sample size. All of this information was extracted for the meta-analysis. Further, all available observational levels i (individual, city, regional, federal, and country) for any time point or time frame t were extracted. In equation one, the dependent variable *EA* represents all types of measures of EA. Within the included studies, these were self-employment, new firm formation, churn rate, and nascent and young entrepreneurs (e.g., TEA). Each extracted variable that measured EA was assigned to a "general EA" or "productive EA" category to further differentiate between different types of EA in the EE context (see chapter 1.2.3 for productive EA in the EE context

and chapter 2.3.2 for the grouping process).[2] Lastly, several study characteristics (e.g., publication type, research method, data sources) were collected and relevant study controls (e.g., the country of analysis, combined with secondary data like the HDI) (Z_{it}) were noted for meta-regression as a robustness check.

Applying these criteria resulted in 443 suitable studies. For these studies, all forward and backward citations were collected from the Scopus database. This resulted in another 11,019 publications, which were screened based on the same criteria (total of 20,454 screened studies). Some publications met inclusion criteria in terms of the variables but lacked relevant data or other information. In these cases, we contacted the authors. Fifty-six authors of such papers were contacted, and 9 provided the missing information. In total, 545 studies met all criteria. Some of these (75) contained data for two or more time periods or individual data from multiple countries. These were added as individual studies. Additionally, studies with multiple dependent variables (e.g., new firm formation and TEA) were included separately for each independent variable (292). As a result, a total *K* of 912 studies were used for the analysis. This included a total *N* of 2,584,110 space–time observations.

The meta-analysis was conducted in order to determine the relevance of the elements of the EE framework for EA as its postulated output. Hence, it was necessary to measure the effect size of each element. First, to determine the effect size of the relationship between each variable and EA, the Pearson product-moment correlation was used to measure the direct relationships between the EA variables and the EE element variables. Missing correlation coefficients (not reported in the study) were approximated based on Hedges' g, which can be calculated based on the mean, standard derivation, and sample size of the EA variable and the EE element variable (Borenstein et al., 2009).

However, doing this only provides the effect size of the relationship between each *individual variable* (e.g., GDP) and EA. To estimate the overall effect sizes of each *element* (e.g. demand) of the EE framework and its relationship with EA, each independent variable[3] was grouped

[2] Please note that, in this differentiation, every variable that measures productive EA is a measure of productive EA only, while measures of general EA (e.g., business entries per 1,000 inhabitants) could potentially include productive EA as well.

[3] Please note that "independent" here refers to the variables that represent the elements of the EE framework (thus the right sight of equation one). Due to the method that underlies the meta-analysis, no statements on the causal mechanisms or directions of the effects can be made. All following statements only refer to the relationships between the variables and their effect sizes.

into the suitable element of Stams' (2015) framework (for a detailed description of this process, see chapter 2.3.2). Next, in order to calculate the effect size of each element, the weighted mean of the individual variables' effect sizes of each framework element were to be calculated, which can be done by using either a fixed-effect model or a random-effects model. When a large and heterogeneous body of empirical studies is included in the analysis, the random-effects model is preferable because it accounts for the heterogeneity within and between studies (Borenstein et al., 2009). In other words, in our case it is plausible that the true effect size differs across the studies. For example, two measures of the effect of GDP on EA might differ if the studies are conducted in different countries. The heterogeneity between studies was tested by the Cochrane's Q test for heterogeneity as well as the H test statistic and the I^2 (for detailed explanations see e.g., Borenstein et al., 2009; Cooper et al., 2019; Lipsey & Wilson, 2001). Because of the results of these tests the random-effects model is used for data analysis and interpretation.

In fixed-effect analysis, each study is weighted only by the inverse of its variance. By contrast, in random-effects analysis, each study is likewise weighted by the inverse of its variance, but this variance includes the original within-studies variance plus the estimate of the between-studies variance (Borenstein et al., 2009). The algebraic formulation of the random-effects models is:

$$\theta_{i,j} = \mu_j + \upsilon^*_{i,j} \qquad (2)$$

where $\theta_{i,j}$ is the true effect for study i and EE framework element j (Demand, Culture, Finance, Formal Institutions, Knowledge, Leadership, Network, Physical infrastructure, Support Services / intermediaries, and Talent), μ_j is the combined average true effect size for the framework component j, and $\upsilon^*_{i,j} = \upsilon_{i,j} + \tau^2$ is the variance of the within-study errors $\upsilon_{i,j}$ plus the between-study variance τ^2. The weights ($w^*_{i,j}$) for the random-effects meta-analysis are constructed using the common inverse variance weighing method ($w^*_{i,j} = \frac{1}{\upsilon^*_{i,j}}$).

To estimate the summary effect sizes of each element (μ_j), the meta-analysis additionally relied on the Fisher z-transformation to accommodate skewed distributions of the correlation coefficient (Borenstein et al., 2009).

Overall, this method allowed to synthesize the empirical evidence on the relationship between variables that can be attributed to elements of EEs and EA. The further method and robustness checks are described in chapter 2.3 and chapter 2.4.2.

1.5.2 Case study regions and qualitative data on start-up competitions

In order to understand the role SUCs play in EEs, data were required to analyze their main effects and their position within EEs. Two factors had to be taken into account. First, as a part of EEs, an influence of the region in which the SUC is located on its role in the ecosystem can be assumed. Second, elements of EEs have interdependent relationships with one another, and actors in these ecosystems are embedded in complex networks. Therefore, data that allows for in-depth analysis of these relationships were required.

A research approach that is suitable for this is conducting case studies. For the present thesis, the two contrasting cases of the SUC "BPW"[4] in the EE Berlin and the SUC "start-up Impuls" in the EE Hannover were chosen. The rationale behind these cases was to select comparable SUCs, but in contrasting regions in terms of the size and maturity of the EEs (for a detailed description case selection, see chapter 3.3). Therefore, SUCs, and thus a comparable element of the two EEs, could be analyzed in different contexts. By selecting two contrasting cases, the quality of the findings is strengthened, and the results provide a starting point toward theoretical replication (Yin, 2009). Achieving this was the goal because the role of SUCs remains unclear in current EE research. Case studies are a relevant tool in economic geography and entrepreneurship research, and they are suitable for exploring under-researched phenomena to provide input for theory development (Eisenhardt, 1989).

Within the case study regions, and thus the ecosystems in which the SUCs are located, qualitative interviews were conducted. In both regions, interviews with the competition organizers were conducted first in order to gain information, establish initial contacts, and gain legitimation within the competitions' surroundings. After that, interviews with

[4] This competition was formerly known as „Businessplan-Wettbewerb Berlin-Brandenburg"

participants were conducted. Participants were identified via Internet research on the competitions. After initial interviews were conducted, a snowball approach was applied. Additionally, interviews with local ecosystem experts were held. These experts were identified based on the literature on EEs as well as through contacts made during other interviews. Interviews with participants were restricted to those who had participated at some point in the last three years as of 2019 (thus, they participated after 2016), to take into account the cases as contemporary events (Yin, 2009) and to limit the risk of distorted memories. Sampling was stopped when theoretical saturation was reached regarding the role of both competitions (Glaser & Strauss, 1967). All interviews were held in person in Berlin and Hannover. The interviews were semi-structured, recorded, and transcribed afterwards. The interview guidelines are presented in appendix I and J. Anonymity was ensured to all interviewees. Interviews with organizers were conducted in May 2019. All other interviews took place between July 2019 and January 2020. A list of all interviews is provided in table 1.2.

Table 1.2 Interview data

	Berlin	**Hannover Region**	**Total**
Interviews	26	19	45
… with organizers	1	1	2
… with participants	16	13	29
… with ecosystem experts	9	5	14
… of whom are investors (Venture Capitalists, Business Angels, Banks)	3	2	5
… of whom are other experts (Chambers of Commerce, University Entrepreneurship Office, Business Development Agencies, Judges at SUC)	6	3	9
Average length of interviews (minutes)	49.0	50.4	49.6
Total length of interviews (minutes)	1,274	957	2,231

To analyze the role of the competitions in both EEs (chapter 4 in this dissertation), all interviews were used, and qualitative content analysis was conducted. This method is suitable for qualitatively exploring hitherto little-researched phenomena. It simultaneously claims the

quality criterion of "reliability" since a strict procedure and strict coding rules are followed (Mayring, 2015). This method allows researchers to apply deductive codes based on the theory and to complement them with inductive codes based on the material (Kuckartz, 2016).[5]

Apart from their role in EEs, previous research on SUCs highlights their importance as a policy instrument for fostering entrepreneurial learning (Russell et al., 2008; Watson, 2019; Watson et al., 2015). Specific knowledge on activities related to entrepreneurship, cumulated in certain persons, networks, and regions, is a key part of the theory of EEs (Spigel & Harrison, 2018; Stam & Spigel, 2018). To analyze this further, especially because research on SUCs shows heterogeneous findings regarding learning outcomes, a subset of the interviews with participants was analyzed in-depth using a different method and from an entrepreneurial learning perspective. For this study, only interviews with participants who had been nominated for prizes were selected (n = 26). This was done in order to analyze only the learning outcomes of a comparable set of participants who had put effort into preparing for the competition. This subset of interviews was analyzed using fuzzy-sets qualitative comparative analysis (fsQCA). This method is used to analyze the relationships between the outcome of interest and all possible combinations of states of its predictors (Rihoux & Ragin, 2009; Schneider & Wagemann, 2012). It has increasingly been used in entrepreneurship research to investigate complex phenomena (Douglas et al., 2020; Kraus et al., 2018). Therefore, it is particularly well suited to examining entrepreneurial learning as an outcome of SUCs, with a special focus on prior experience and participation behavior. To provide further insights, fsQCA was combined with a newly conducted qualitative content analysis of the interview data.

[5] All anonymized interview transcripts and codings are available upon request.

2. Evidence on entrepreneurial contexts: A meta-analysis of entrepreneurial ecosystems and their effects on entrepreneurial activity

This chapter contains the current version of a paper by Stolz, L.; Queißner, M.; Weiss, M., currently under review at the Journal of Business Venturing (as of 28.06.2022).

Abstract: This meta-analysis examines the potential antecedents of entrepreneurial activity on different spatial levels. An extensive literature research is applied to identify quantitative studies covering entrepreneurial activity (545 studies), and their data are extracted (2,584,110 observations), as well as information on the spatial level of analysis, type of entrepreneurship measured, variable sources, and publication metrics. To synthesize the findings, we group the potential antecedent variables according to Stam's (2015) framework of entrepreneurial ecosystems. The results show that there are large differences between individual ecosystem elements in terms of their empirical relevance and that these differences vary greatly depending on the spatial level of investigation. At the local and regional levels, leadership has the largest effect size; at the country level, supports services/intermediaries has the largest effect. By examining research on entrepreneurial activity and entrepreneurial ecosystems that distinguishes between different forms of entrepreneurial activity, we find that formal institutions have the strongest influence on productive entrepreneurial activity, followed by culture and finance. Our results remain robust after using different methods for variable grouping, applying meta-analysis regressions, and controlling for country and publication specifics and grouping errors. Based on the findings, theoretical implications for entrepreneurial ecosystem theory and future research opportunities are developed and discussed.

2.1 Introduction

Entrepreneurial activity (EA) differs across countries (Blanchflower, 2000; Bosma, 2013; Terjesen et al., 2010), and across regions within countries (Davidsson et al., 1994; Fritsch & Wyrwich, 2014; Sternberg, 2011a). Due to the economic relevance of entrepreneurship (Acs et al., 2009; Kirzner, 1973; Schumpeter, 1934), scholars have devoted decades of research to understanding the reasons for these differences and the antecedents of EA.

Since they began analyzing EA, researchers have debated the spatial level on which it should be considered. Seminal case studies have shown that entrepreneurship can be understood as a regional event (Feldman, 2001; Spilling, 1996), while global country-level data have helped identify stylized facts about EA and some of its key determinants (Bosma, 2013). Audretsch et al. (2019) identify two research streams: research on regional economic development and entrepreneurship (Bosma & Sternberg, 2014), and research on institutions and entrepreneurship at the country level (van Stel et al., 2007).

The relevance of the antecedents of EA on different spatial levels also plays an important role in the current debate on entrepreneurial ecosystems (EEs) (Abootorabi et al., 2021; Alvedalen & Boschma, 2017; Malecki, 2018; Wurth et al., 2021). The EE approach emphasizes the role of the (social) context and the interdependencies of actors and factors that allow or restrict entrepreneurship in a given spatial area (Acs et al., 2014; Spigel, 2017; Stam, 2015). As a systemic approach that explicitly sees entrepreneurs not only as a part of an ecosystem but also as its output, EE theory is a way to synthesize developments of other systemic concepts that are or can be related to entrepreneurship, such as clusters and innovation systems (Acs et al., 2017; Wurth et al., 2021).

Similar to other approaches that analyze EA in a given spatial area, observations of specific cities and smaller regions guide our knowledge about EEs (Feld, 2012; Isenberg, 2010; Motoyama & Knowlton, 2017; Spigel, 2017), but their empirical measurement takes place on different spatial levels, as is the case with comparisons of countries (Acs et al., 2016; Hechavarría & Ingram, 2018; Yan & Guan, 2019) or federal states and regions (Audretsch, Belitski, et al., 2021; Stam & van de Ven, 2021; Zhang & Roelfsema, 2020). In parallel, empirical research on EEs uses not only measures of general EA (Audretsch & Belitski, 2017; Content et al., 2020) but also measures of productive EA (Leendertse et al., 2021; Stam & van de Ven,

2021) to analyze the output of ecosystems. In the EE literature, productive EA refers to EA that contributes to the output of the economy in the sense of Baumol (1990), and it is often proxied by high-growth or innovative start-ups (Wurth et al., 2021). To further develop the theory on EEs, empirical evidence on the relevance of their elements and the spatial scale on which they influence different types of EA is needed.

Various literature reviews of EEs exist, and these shed light on the diversity of relevant definitions and the theoretical foundations of the approach and highlight the importance of understanding the causal mechanisms of EEs to further develop the theory (Cao & Shi, 2021; Credit et al., 2018; Malecki, 2018; Wurth et al., 2021). A consistent theoretical foundation and empirical basis must be established (Wurth et al., 2021). However, to the author's knowledge, there is no comprehensive quantitative synthesis of a large number of studies on the antecedents of EA. This is needed, as it would help provide this empirical basis and reveal stylized facts on the relevance of the individual elements of EEs.

Motivated by this gap in research, we follow an evidence-based research approach (Frese et al., 2014) and conduct a meta-analysis on the antecedents of EA at different spatial levels. This meta-analysis builds on decades of research on various factors and their effect on EA and on the current research on EEs. The analysis distinguishes between the local, regional, and country levels of spatial aggregation and between productive entrepreneurship and general EA as the dependent variable. In identifying and categorizing relevant independent variables, we rely on the EE framework of Stam (2015). Stam's framework consists of ten elements that together produce EA as an output and is based on an integration of previous literature (Stam, 2015). It has been the basis for various empirical studies of EEs (Iacobucci & Perugini, 2021; Leendertse et al., 2021; Perugini, 2022; Stam & van de Ven, 2021). We explicitly focus on the relationships between each element and each type of EA at each spatial level.

With this article, we aim to make three contributions to the development of EE theory. First, we provide a quantitative synthesis of the existing empirical findings on the influence of elements of EEs on EA. In this way, we contribute to reducing the heterogeneity prevalent in EE research by identifying the overall directions and magnitudes of the relations between elements of EEs and EA. In the literature on EEs, the question of the relevance of individual elements has been of constant concern (Alvedalen & Boschma, 2017; Spigel, 2016; Spigel & Harrison, 2018; Wurth et al., 2021). Synthesizing prior findings through meta-analysis can help

evolve the knowledge in the field and charter new pathways for future research (Bacq et al., 2021; Rauch, 2020).

Second, we contribute to the theory on EEs by providing quantitative evidence regarding the relationships between its elements and EA as its output on different spatial levels. Based on the geographical multidimensionality of EEs (Credit et al., 2018), our study shows the relevance of individual elements in relation to EA and that this relevance changes at different spatial levels of analysis. This helps strengthen our understanding of EEs and their constitution on different scales. Previous studies have often measured EEs with the same or similar variables at different spatial levels (Acs et al., 2014; Stam & van de Ven, 2021). The combination of our results at different levels may serve as a starting point for further multiscale approaches, as called for by current research (Alvedalen & Boschma, 2017; Wurth et al., 2021).

Third, our empirical analysis differentiates between two types of EA: productive entrepreneurship and general EA. The theory on EEs not only suggests that they generate productive entrepreneurship as an output but also highlights the role of all entrepreneurs and their interactions in the ecosystem (Spigel, 2017; Stam, 2015, 2018). However, empirical contributions on EEs often limit their focus to either general measures of EA (Content et al., 2020) or productive EA (Leendertse et al., 2021). Adequately measuring different types of EA remains a key task of entrepreneurship research, but combining several existing measures can help capture some aspects of "reality" (Henrekson & Sanandaji, 2020, p. 755). By analyzing both types of EA, we contribute to understanding which elements of EEs target productive EA and which target overall EA. This provides guidance for further research and holds implications for practice.

2.2 Theory

2.2.1 Spatially embedded antecedents of entrepreneurial activity

Entrepreneurship is identified as an engine for job creation (Acs & Armington, 2004; Birch, 1987; Carree et al., 2015; Doran et al., 2016), structural change, and growth of the economy (Acs et al., 2012; Andersson et al., 2012; van Stel et al., 2005). In recent decades, scholars have devoted thousands of studies to understanding the antecedents of EA at different spatial levels. Examples include unemployment rates (Dohse & Vaona, 2018), wages (Audretsch & Vivarelli, 1995), domestic market sizes (Roman et al., 2018), national bankruptcy laws (S.-H. Lee et al., 2011), economic freedom (Díaz-Casero et al., 2012), R&D intensity (Hellerstedt et al., 2014), the presence of venture capital (Guerini & Quas, 2016), or cultural values (Wennberg et al., 2013).

Since they began analyzing such spatially embedded antecedents, some scholars have argued that these antecedents should not be seen individually but rather as systems or combinations of factors that determine EA in a given spatial area. Guided by seminal studies on particular regions that have built strong entrepreneurial cultures (Feld, 2012 (Boulder, USA); Feldman, 2001 (Washington DC, USA); Saxenian, 1994 (Silicon Valley & Boston Area, USA); Spilling, 1996 (Lillehammer, Norway)), these scholars began to focus on interdependencies between factors that influence entrepreneurship, and they developed systemic approaches to understanding EA (Delgado et al., 2010; Neck et al., 2004; Qian et al., 2013; van de Ven, 1993; Ylinenpää, 2009).

2.2.2 Focusing on entrepreneurial ecosystems

Recently, scholars have integrated previous systemic concepts into the EE approach (Acs et al., 2014; Spigel, 2017; Stam, 2015). Similar to the other approaches, these scholars view EA as the output of EEs. However, some studies analyze EEs as a moderator between EA and economic prosperity (Audretsch, Belitski, et al., 2021; Bruns et al., 2017; Szerb et al., 2019). Thus, EEs can be defined as “a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory” (Stam, 2015, p. 1765). The EE approach is currently intensively discussed in research on EA (Wurth et al., 2021). Recent literature overviews show that the amount of research on systemic approaches

to entrepreneurship has grown exponentially (Cao & Shi, 2021; Cavallo et al., 2019; Malecki, 2018). The EE approach was quickly adapted and broadly used by scholars and policymakers (Brown & Mawson, 2019; Malecki, 2018).

Research on EEs was first established based on observations and case studies of specific regions and nations (Feld, 2012; Isenberg, 2010; Spigel, 2017). In recent years, the number of quantitative empirical contributions has also increased. These studies mostly use secondary data as a means to analyze the so-called elements (or pillars or conditions) of ecosystems and measure their influence on EA, which is considered the output of an ecosystem (Audretsch, Lehmann, et al., 2021; Audretsch & Belitski, 2017; Ghio et al., 2019; Hechavarría & Ingram, 2018; Stam, 2018; Stam & van de Ven, 2021; Yan & Guan, 2019). Measuring EEs in this way is similar to previous research that analyzed the influences of different groups of antecedents of EA in given spatial areas, often using variables and variable sources that are similar or identical to those used in the EE literature. Examples of such studies include Armington & Acs (2002), Audretsch & Belitski (2013), Stenholm et al. (2013), and Stuetzer et al. (2014).

Additionally, analogous to Audretsch et al.'s (2019) differentiation, ecosystem approaches to entrepreneurship exist at the local and regional levels (Audretsch & Belitski, 2017; Zhang & Roelfsema, 2020), state level (Content et al., 2020; Stam & van de Ven, 2021), and country level (Acs et al., 2014; Hechavarría & Ingram, 2018). This highlights some of the gaps that currently exist in the research on EEs; for example, the novelty of this approach is clearer than that of previous approaches (Scaringella & Radziwon, 2018), its implications for policy are more consistent (Brown & Mason, 2017), and clear, multiscalar approaches with quantitative evidence regarding individual elements are developed and used (Alvedalen & Boschma, 2017; Wurth et al., 2021).

2.2.3 Elements of entrepreneurial ecosystems and their roles for EA

As a theoretical basis for identifying and grouping relevant variables, this study builds on the framework of EEs provided by Stam (2015). An overview of its elements and the empirical studies that provide potential measurements for them is given in table 2.1. Stam's framework is divided into ten elements (networks, leadership, finance, talent, knowledge, support services/intermediaries, formal institutions, culture, physical infrastructure, and demand). These elements are similar to those of other frameworks and empirical assessments of EEs

(Hechavarría & Ingram, 2018; Iacobucci & Perugini, 2021; Spigel, 2017). Stam's framework has already been applied to study EEs empirically (Leendertse et al., 2021; Stam & van de Ven, 2021). By resulting of a synthesis of other concepts of EEs and previous studies on the antecedents of EA, Stam's framework and its components have strong theoretical and empirical foundations:

Networks: Connecting to others is important for the steps of the entrepreneurial process, for example, becoming a nascent entrepreneur (Davidsson & Honig, 2003), achieving venture performance (Batjargal, 2003), and realizing resource acquisition (Semrau & Werner, 2014). An active network of entrepreneurs in particular territory is critical to the quality of an EE (Spigel, 2017).

Leadership: Role models can motivate others to become entrepreneurially active (Bosma et al., 2012). Sets of "visible" entrepreneurial leaders are seen as critical in building and maintaining EEs (Stam, 2015). This happens through the diffusion of entrepreneurship-related knowledge through experienced entrepreneurs (Spigel & Harrison, 2018).

Finance: External financing is an important factor of the establishment, survival, and growth of new firms (Chowdhury & Maung, 2022; Fotopoulos & Louri, 2000). In the literature on EEs, the importance of regional financers with knowledge of entrepreneurship is highlighted (Stam, 2015), but countries' capital markets are also relevant (Acs et al., 2014).

Talent: A diverse and skilled group of workers is positively associated with EA (S. Y. Lee et al., 2004; Seth & Lee, 2017) and provides the basis for EEs (Stam, 2015).

Knowledge: Knowledge generated by universities, companies, and R&D institutes positively influences (knowledge-intensive) EA (Audretsch & Lehmann, 2005; Colombelli & Quatraro, 2018). It provides a basis for opportunities for entrepreneurship (Spigel, 2017).

Support services / intermediaries: In the entrepreneurial context, typical support services include incubators (Colombelli et al., 2021), accelerators (Audretsch & Belitski, 2021), and business consultancies (Stam & van de Ven, 2021). These services/intermediaries can lower barriers to entry in EEs (Stam, 2015). Moreover, institutional conditions that aim to foster EA provide a national framework for such support (Acs et al., 2014; Audretsch, Belitski, et al., 2021).

Formal institutions: Analyzing institutions and their impacts on EA is a key research topic in understanding why EA differs systematically (Audretsch, Belitski, et al., 2019). Scholars have identified the influence of institutions on EA, for example, in terms of the legislative environment and rule of law (Levie & Autio, 2011) or taxes (Braunerhjelm et al., 2021). In EEs, formal institutions provide the "rules of the game" (Audretsch, Belitski, et al., 2021).

Culture: Cultural values and attributes play a major role in explaining differences in EA at the country level (Suddle et al., 2010). Culture is often associated with the entrepreneurial climate (Goetz & Freshwater, 2001) that supports and normalizes entrepreneurial actions in EEs (Feld, 2012; Spigel, 2017).

Physical infrastructure: Transportation access (Chatman et al., 2016) and broadband access (Alderete, 2017) can positively influence EA. In the literature on EE frameworks, scholars argue that both at the regional level and at the national level, physical infrastructure can enable or constrain human interaction (Isenberg, 2010; Spigel, 2017; Stam, 2015).

Demand: The relationship between economic prosperity (e.g., GDP, value added) and EA has been shown (Verheul et al., 2009; Wennekers et al., 2005). Demand for new goods and services and market sizes provide opportunities and enable venture creation in EEs (Spigel, 2017; Stam, 2015).

Table 2.1 Overview of grouping into entrepreneurial ecosystem elements

Element (Stam, 2015)	Examples of Categories*	Examples of Variables included
Networks	Business density; private connectedness	Firm density (Backman, 2015); Density of associational activity (Weiss et al., 2019)
Leadership	People, management; high-growth firms	Project leaders (Stam & van de Ven, 2021); Share of high-growth firms (Audretsch & Belitski, 2021)
Finance	Finance, access; finance, VC	Ease of getting credit (Awaworyi Churchill, 2017); Number of VC investments (Li & Zahra, 2012)
Talent	Education, tertiary; Employment, Research	% bachelors degree (Dove, 2020); R&D employees in private firms (Mueller, 2007)
Knowledge	Patents / Trademarks; Research, Facilities	Industry patents (Audretsch et al., 2012); No. universities (Baptista & Mendonça, 2010)
Support services / intermediaries	Business, support services; Government, Entrepreneurship	Incubators (Colombelli & Quatraro, 2018); Government Entrepreneurship Programs (Yan & Guan, 2019)

Formal institutions	Corruption, Measure; Government, Rule of Law	Corruption (Jauregui et al., 2021); Rule of law index (Levie & Autio, 2011)
Culture	culture, Uncertainty avoidance; culture, Entrepreneurial culture	Uncertainty avoidance (Autio et al., 2013); Self-employment rate, 1989 (Fritsch & Wyrwich, 2014)
Physical infrastructure	Infrastructure, ICT; urban, Settlement structure	Internet penetration rate (Kolokas et al., 2020); Metropolitan city dummy (Iacobucci & Perugini, 2021)
Demand	Demography, Population growth; GDP per capita	Population growth (Armington & Acs, 2002); GDP per capita (Avnimelech et al., 2014)

*categories based on own coding procedure (see chapter 2.3.2)

2.3 Method

This meta-analysis follows recommendations of Gurevitch et al. (2018) and Steel et al. (2021) on how a meta-analysis should be structured. Furthermore, it incorporates methodological recommendations from Gurevitch et al. (2018) and Cooper et al. (2019). This study uses a meta-analytical framework to construct broad generalizations of large groups of heterogeneous studies with the particular goal of identifying 1) sources of heterogeneity in EA and 2) antecedents of EA, using EE as a moderating factor.

2.3.1 Sampling

As a starting point for the meta-analysis, we identified relevant search terms and keywords that are used in the literature to find empirical studies that include measures of EA and EEs as well as factors that explain them. The list of search terms included all the possible combinations, variations, and synonyms of the terms entrepreneur and ecosystem in combination with possible variations of the terms environment, climate, support, entry, and activity (see Appendix A for a full list of search terms). Our selection of search terms was guided by seminal studies and previous literature overviews on antecedents of EA and elements of EEs (for instance, see O'Connor et al., 2018; and Wurth et al., 2021). This meta-analysis used Scopus, the Web of Science, and ProQuest (the latter includes dissertations, conference proceedings, and additional unpublished studies) as academic search engines to find publications. The described search strategy resulted in 9,435 studies, which were then

full-text screened to determine their relevance and examine their reported quantitative results. The eligibility criteria used to select empirical studies were that the study contained at least one measurement of EA (dependent variable of this meta-analysis) and one variable that could be attributed to the EE framework of Stam (2015). In the literature, there are different ways to measure the EA output metric of an entrepreneurial process (Ahmad & Hoffmann, 2012; Henrekson & Sanandaji, 2014). Therefore, we included studies that reported at least one of the following EA measures previously discussed in the literature: self-employment rates, new firm formation, churn rates, number of start-ups, and total-early stage entrepreneurial activity (TEA). The EE framework was defined rather broadly to include many diverse studies.

After we screened all 9,435 papers based on these criteria, 443 studies remained. A forward and backward citation search on those empirical studies resulted in a second screening of 11,019 additional papers, resulting in a total of 20,454 screened studies. During the screening process, we filtered out studies with missing data and contacted the authors. Out of 56 contacted authors, 9 provided data. In total, 545 studies fulfilled all the criteria and were included in the final dataset (see the Appendix for a list of the included studies). Some of these contained data for two or more time periods or individual data from multiple countries, and these were then added as individual studies (75). Additionally, studies with multiple dependent variables (e.g., new firm formation and TEA) were included separately for each independent variable (292). As a result, a total K of 912 studies were used for the analysis. This K covered a total N of 2,584,110 space-time observations.

This meta-analysis used the Pearson product-moment correlation, which is a measure of the direct relationships between two variables commonly used in the field of systematic literature reviews, as an effect size indicator (Aguinis et al., 2011). In this meta-analysis, one of these variables is a measure of EA (our dependent variable) and another is a variable attributable to the Stams EE framework (our independent variable) Any missing correlation coefficients from the studies were calculated based on Hedges' g (Borenstein et al., 2009). The final set of correlation coefficients was used for effect size estimation and meta-regression modeling. After coding the independent variables into the EE framework, for each study, we used the average pooling of the correlation coefficients of the independent variables belonging to the same framework element (K). This helped us avoid sampling errors and oversized study

weights. Last, study characteristics (e.g., publication type, research method, peer-review status, journal impact factor, time span, responses, imputation, and ecosystem variable included in the model) were extracted and used in the meta-regression. To complement the analysis, secondary data at the country level were added to the dataset (Human Development Index, Gross Domestic Product, federalism country (1=yes), cultural tightness, cultural looseness, and several cultural indices from the GLOBE project) (House, 2011). The moderator matching required that the data of each empirical study belong to one country. Studies that cover multiple countries were set to "not available" for the moderators. A list of the countries covered by the empirical papers that could be identified is provided in Appendix B. These vast sets of moderators help explain the heterogeneity across the studies (Borenstein et al., 2009).

2.3.2 Grouping of variables

A challenging aspect of this meta-analysis was the assignment of the numerous extracted variables and their corresponding different measurements to the constructs that were used in the meta-analysis (Lipsey & Wilson, 2001). To accomplish this task, we used a systematic step-by-step grouping similar to that of Martin et al. (2013).

Grouping the antecedents of EA (our independent variables) based on the elements of EEs can be challenging when multiple elements can match, as the framework does not provide clear definitions for the elements or identify the measurements that could belong to them. The grouping process strictly adhered to the following procedure. First, all the variable names and variable sources were unified. Second, a coding procedure was applied to group similar variables based on their sources and their objects of measurement (resulting in 152 categories). Third, these categories were assigned to the elements of the Stam framework. To accomplish this, a theory-based rationale was written down for each group based on the definitions and explanations of Stam (2015, 2018), Stam & van de Ven (2021), and Leendertse et al. (2021). For example, measures of human capital were grouped into the talent element based on the argument that a skilled group of workers is a key element of an EE and that this factor thus belongs to the talent element (Leendertse et al., 2021; Stam, 2015). Examples of this matching process and example literature references are presented in table 2.1. A necessary condition for the assignment was that it coincided with Stam's reasoning regarding each element. Each of these procedures were performed by the authors separately. Disagreements were resolved by discussion until full consensus was reached (B. C. Martin et

al., 2013). In some cases, variables were excluded due to limited relevance (e.g., CO2 emissions) or missing variable descriptions.

This meta-analysis aimed to investigate effect sizes on different spatial levels and on different types of EA. The different measures of EA and their grouping originated from Leendertse et al. (2021), and they were designed to capture the effect of productive EA, which is a subset of total EA. Productive EA contributes to the output of the economy (Baumol, 1990) and is commonly measured in terms of knowledge-intensive, innovative new firms or high-growth firms. These productive EA measures are associated with increases in regional development through employment and production growth (Acs, 2011; Fritsch & Schroeter, 2011). Therefore, a binary dummy variable was created to capture this relationship moderator and how EE elements differ between productive EA and total EA. The created variable equaled one if the EA-type measures in a given empirical study could be attributed to productive entrepreneurship and zero otherwise. Thus, if the empirical study used variables such as the number of gazelles (Zhang & Roelfsema, 2020) or number of knowledge-intensive start-ups (Fritsch & Schilder, 2008), the binary indicator was equal to one. Please note that every variable that measures productive EA is a measure of productive EA only, while measures of general EA (e.g., business entries per 1,000 inhabitants) could include productive EA as well. We further included factor variables to account for the empirical EA measure itself. The spatial levels were factor-coded according to the observational level of the included study. The other extracted study-related characteristics and most of the moderating factors were binary coded. The country effect moderators were continuous variables and matched to the study characteristics. When matching was not possible, the corresponding cells were set to “not available”. The main criterion used for matching was that the moderators were required to fit the observational time and space of the corresponding study.

2.3.3 Analytical approach

The large, heterogeneous body of empirical studies required the use of random-effects-based meta-analytical models. According to Borenstein et al. (2009), a random-effects model was preferable since it accounts for heterogeneity within and between studies. We tested for heterogeneity between studies using Cochrane’s Q test for heterogeneity, the H test statistic, and I^2 (Cooper et al. 2019). Based on the results of these tests, the random-effects model was used for data analysis and interpretation. The weights of the random-effects meta-analysis

were constructed using the common inverse variance weighting method (Borenstein et al., 2009). To estimate the summary effect sizes, we relied on Fisher z-transformation to accommodate skewed distributions of the correlation coefficient. To ensure that our results were relatively conservative, we relied on the Sidik-Jonkman estimator with a Knapp-Hartung (-Sidik-Jonkman) adjustment. As pointed out by Jackson et al. (2017), this method performs well and, if the meta-analysis is complemented by a sensitivity analysis and robustness checks, it leads to conservative results.

Threats to inference, such as selection bias, publication bias, and the method-related biases mentioned by Cooper et al. (2019), were addressed by the research strategy in the following way. The pooling, reliability correction and transformation of the effect sites within the empirical studies reduced the biases affecting the primary studies and the way in which they influenced the results of the meta-analysis. We addressed biases due to missing information by using only empirical studies for which all the necessary information for an effect size estimation was available.

Considerations regarding the meta-analysis itself were accounted for with a wide range of robustness models and estimation techniques. This meta-analysis used a meta-analysis regression analysis (MARA) in combination with a three-layer model to validate the empirical findings. This procedure is in line with Cheung (2019) and Borenstein et al. (2009) because it addresses both the problem of publication biases and unit-of-analysis errors. Within a meta-analysis, it is important to evaluate the behavior of the effect size estimate jointly with the presence of country-level specifics and study-specific characteristics. According to Cooper et al. (2019), addressing publication bias with the MARA framework is important within meta-analysis because it reduces the potential bias arising through major, influential studies that might be published due to the professional networks of the authors. The search strategy used in this meta-analysis to find empirical studies was not restricted to particular keywords, search terms or publication types. Moreover, because of the full-text screening process employed, many different types of empirical work were included in the meta-analysis. Last, due to the large number of collected studies and entries per study, it was reasonable to assume that the individual effect sizes were not independent. Therefore, a nested three-layer model was used (Cheung, 2019).

The three-layer MARA models were used for robustness checks and not for interpretation because the choice of reference categories influences the outcome. To compensate for this drawback, the robustness of the results was additionally evaluated; first, this was done with different subsets and aggregation levels, and second, variations in the weightings of how the final effect sizes were computed were employed. The use of the median and the arithmetic mean as unweighted measures and the fixed-effects model, which uses a different between-study variation, helped validate the estimated effect sizes with respect to applying different weights in the effect-size aggregation process. To further investigate how sensitive the results were to different weights, we used the total number of observations reported in the studies in a complementary random-effects model. To check for the coding of the antecedents of EA, we employed another random-effects model with only variables that could be directly attributed to Stams' (2015) framework. These variables were same empirical variables used by Stam (2015, 2018), Stam & van de Ven (2021), and Leendertse et al. (2021). Following Harrer et al. (2021) all the estimations and calculations were performed using the statistical software R.

2.4 Results

2.4.1 Meta-analytical findings

The results of the meta-analysis are reported in table 2.2. This table shows the results for each of the ten framework elements in the overall sample. The findings show that all the elements, except for networks, have significant positive relationships with EA. The correlation between demand and EA is significantly higher than that between demand and culture or that between demand and knowledge.

When differentiated at the spatial aggregation level, the results vary. Table 2.3 shows the results for the local level (e.g., cities, local samples of individuals), the regional level (e.g., NUTS-3 to NUTS-1 in the EU, states and metropolitan statistical areas in the U.S.), and the country level. Only talent, formal institutions, and demand show significant effects at all three spatial levels of analysis. At the country level, we find no significant effects of leadership, knowledge, or culture. All the other EE elements show significant relationships with EA at this level. At the regional level, all the elements except for networks, knowledge, support

services/intermediaries, and physical infrastructure show significant effects. Among the significant elements, the relationship of formal institutions with EA is significantly stronger than that of talent. At the local level, networks, finance, knowledge, and support services/intermediaries do not have significant relationships with EA.

Table 2.4, which differentiates the results by the dependent variable used, shows that networks, support services/intermediaries, and physical infrastructure show no significant relationship with productive EA. Knowledge, which has a highly nonsignificant relationship at all other levels of analysis, shows a positive relationship with productive EA that is significant at the 1% level. Leadership is covered by less than 5 studies, so it is excluded here. Finance, talent, formal institutions, culture, and demand show significant relationships with productive EA. Networks, support services/intermediaries, and physical infrastructure are not significantly related to productive EA.

Based on our own categorization of the variables (see the explanation of the grouping procedure in the methodology section), some additional finer-grained findings can be presented here (the results of the random-effects models for each category are provided in the appendix). Knowledge, whether it is measured as publications per researcher, patents/trademarks, or research expenditures, shows no significant relationship with productive EA. Patent density is significant at the 10% level (effect size=0.228, p=0.06). The research environment (effect size=0.68, p=0.03) and research facilities, e.g., the number of universities or research institutes (effect size=1.58, p=0.02), are more relevant.

Examining only the significant relationships with productive EA, we find through in-depth analysis with our categorization (results are presented for >=10 variables per category) that first employment shares in the service sector (10 variables, effect size=0.72, p<0.01), second property regulations (18 variables, effect size=0.58, p<0.001), and third demography of the population (30 variables, effect size=0.57, p<0.001), have the highest estimated effect sizes.

Table 2.2 Results for the total sample

Set	Independent Variable	K	N	$\hat{r}$	$\hat{r}_{SD}$	p value	95% CI		80% CV		I^2
							Lower limit	Upper limit	Lower limit	Upper limit	
	Networks	126	128838	0.00	0.09	0.99	-0.17	0.16	-0.84	0.84	1.00
	Leadership	39	11872	0.18	0.08	0.03	0.02	0.32	-0.43	0.67	0.98
	Finance	325	268125	0.17	0.03	0.00	0.12	0.22	-0.43	0.67	0.99
	Talent	726	551897	0.18	0.02	0.00	0.14	0.22	-0.50	0.73	0.99
Total	Knowledge	316	217030	0.07	0.03	0.05	0.00	0.14	-0.62	0.69	0.99
sample	Support services/intermediaries	214	97587	0.16	0.05	0.00	0.07	0.25	-0.63	0.79	1.00
	Formal institutions	379	244527	0.21	0.04	0.00	0.14	0.28	-0.61	0.82	1.00
	Culture	386	348469	0.10	0.03	0.00	0.04	0.16	-0.60	0.71	0.99
	Physical infrastructure	195	143535	0.12	0.06	0.04	0.01	0.22	-0.71	0.81	1.00
	Demand	814	572230	0.21	0.02	0.00	0.17	0.25	-0.51	0.76	0.99

Note. $\hat{r}$ =estimated population effect size, with a random-effects model; $\hat{r}_{SD}$ is the standard deviation of estimated population effect size; K = number of studies; N = total sample size; CI = confidence interval; CV = credibility interval; I^2 = heterogeneity measure. Findings are rounded to two digits.

Table 2.3 Results for the local, regional, and country levels

Set	Independent Variable	k	N	$\hat{r}$	$\hat{r}_{SD}$	p value	95% CI		80% CV		I^2
							Lower limit	Upper limit	Lower limit	Upper limit	
	Networks	24	4146	0.16	0.08	0.03	0.02	0.30	-0.29	0.56	0.90
Country	Leadership	22	3521	-0.03	0.08	0.71	-0.18	0.13	-0.47	0.42	0.95
level	Finance	194	48394	0.17	0.03	0.00	0.11	0.22	-0.36	0.61	0.97
	Talent	248	47513	0.18	0.04	0.00	0.10	0.26	-0.54	0.75	0.98

	Knowledge	97	19911	0.08	0.07	0.29	-0.07	0.21	-0.68	0.76	0.99
	Support services/intermediaries	133	32754	0.24	0.06	0.00	0.13	0.34	-0.53	0.79	0.99
	Formal institutions	233	60288	0.10	0.04	0.01	0.03	0.18	-0.58	0.70	0.99
	Culture	180	37989	-0.03	0.03	0.36	-0.09	0.03	-0.49	0.44	0.97
	Physical infrastructure	78	21341	0.16	0.08	0.06	-0.01	0.31	-0.67	0.81	0.99
	Demand	352	77105	0.16	0.04	0.00	0.09	0.23	-0.61	0.77	0.98
Regional level	Networks	75	53813	-0.04	0.12	0.76	-0.27	0.20	-0.88	0.87	1.00
	Leadership	11	7040	0.39	0.18	0.02	0.06	0.65	-0.39	0.85	0.99
	Finance	94	101968	0.19	0.06	0.00	0.08	0.30	-0.47	0.71	1.00
	Talent	349	264014	0.14	0.03	0.00	0.08	0.20	-0.54	0.71	1.00
	Knowledge	164	127935	0.07	0.05	0.16	-0.03	0.16	-0.62	0.70	0.99
	Support services/intermediaries	68	47165	0.02	0.10	0.82	-0.18	0.22	-0.79	0.81	1.00
	Formal institutions	101	105778	0.39	0.09	0.00	0.24	0.52	-0.60	0.91	1.00
	Culture	144	138802	0.16	0.06	0.01	0.04	0.27	-0.66	0.81	1.00
	Physical infrastructure	74	60376	0.03	0.10	0.77	-0.17	0.23	-0.80	0.82	1.00
	Demand	333	261828	0.22	0.03	0.00	0.16	0.27	-0.42	0.71	0.99
Local level	Networks	27	70879	-0.05	0.21	0.82	-0.42	0.34	-0.90	0.88	1.00
	Leadership	6	1311	0.47	0.18	0.01	0.15	0.70	-0.22	0.84	0.98
	Finance	37	117763	0.15	0.11	0.19	-0.07	0.35	-0.63	0.78	1.00
	Talent	129	240370	0.29	0.04	0.00	0.21	0.36	-0.29	0.71	1.00
	Knowledge	55	69184	0.06	0.06	0.30	-0.05	0.17	-0.45	0.54	0.99
	Support services/intermediaries	13	17668	0.10	0.10	0.30	-0.09	0.29	-0.38	0.55	1.00
	Formal institutions	45	78461	0.33	0.13	0.01	0.09	0.54	-0.68	0.91	1.00
	Culture	62	171678	0.31	0.09	0.00	0.14	0.46	-0.55	0.85	1.00
	Physical infrastructure	43	61818	0.18	0.11	0.08	-0.03	0.38	-0.63	0.80	1.00
	Demand	129	233297	0.33	0.06	0.00	0.23	0.42	-0.43	0.81	1.00

Note. $\hat{r}$ =estimated population effect size, with a random-effects model; $\hat{r}_{SD}$ is the standard deviation of estimated population effect size; K = number of studies; N = total sample size; CI = confidence interval; CV = credibility interval; I^2 = heterogeneity measure. Findings are rounded to two digits.

Table 2.4 Results for productive and general entrepreneurial activity

Set	Independent Variable	k	N	$\hat{r}$	$\hat{r}_{SD}$	p value	95% CI		80% CV		I^2
							Lower limit	Upper limit	Lower limit	Upper limit	
General entrepreneurial activity	Networks	102	110023	0.02	0.10	0.82	-0.17	0.21	-0.85	0.86	1.00
	Leadership	35	9378	0.14	0.08	0.09	-0.02	0.30	-0.45	0.65	0.98
	Finance	273	245023	0.16	0.03	0.00	0.10	0.22	-0.47	0.68	0.99
	Talent	589	455055	0.19	0.02	0.00	0.14	0.23	-0.51	0.73	0.99
	Knowledge	231	147072	0.03	0.04	0.46	-0.05	0.11	-0.65	0.68	0.99
	Support services/intermediaries	172	72954	0.17	0.05	0.00	0.06	0.27	-0.62	0.78	0.99
	Formal institutions	339	223304	0.19	0.04	0.00	0.11	0.26	-0.62	0.81	1.00
	Culture	342	320104	0.07	0.03	0.03	0.01	0.14	-0.62	0.71	0.99
	Physical infrastructure	161	112795	0.13	0.06	0.03	0.01	0.25	-0.70	0.81	1.00
	Demand	681	494796	0.21	0.02	0.00	0.16	0.25	-0.55	0.77	0.99
Productive entrepreneurial activity	Networks	24	18815	-0.10	0.18	0.57	-0.42	0.24	-0.85	0.79	1.00
	Leadership	4	2494	0.43	0.27	0.08	-0.06	0.76	-0.55	0.91	0.99
	Finance	52	23102	0.23	0.04	0.00	0.15	0.31	-0.16	0.56	0.98
	Talent	137	96842	0.16	0.05	0.00	0.07	0.24	-0.48	0.68	0.99
	Knowledge	85	69958	0.17	0.06	0.01	0.05	0.29	-0.52	0.73	0.99
	Support services/intermediaries	42	24633	0.15	0.12	0.22	-0.09	0.37	-0.70	0.82	1.00
	Formal institutions	40	21223	0.38	0.12	0.00	0.17	0.56	-0.52	0.88	1.00

	Culture	44	28365	0.28	0.07	0.00	0.15	0.39	-0.29	0.70	0.99
	Physical infrastructure	34	30740	0.03	0.14	0.81	-0.24	0.30	-0.78	0.81	1.00
	Demand	133	77434	0.24	0.04	0.00	0.17	0.30	-0.28	0.65	0.98

Note. $\hat{r}$ =estimated population effect size, with a random-effects model; $\hat{r}_{SD}$ is the standard deviation of estimated population effect size; K = number of studies; N = total sample size; CI = confidence interval; CV = credibility interval; I^2 = heterogeneity measure. Findings are rounded to two digits.

2.4.2 Robustness checks

The robustness checks confirm the results reported earlier. The weighting variation produces generally similar results to those of the random-effects model. Only the fixed effects model fails to yield the same results (Appendix C). This can be explained solely due to the different weights used to estimate the final effect sizes. Furthermore, if the number of studies per framework and setting is rather small, the results diverge in comparison to the random-effects model. The unweighted measures can be seen as a lower bound of the effect size estimate. These estimates largely confirm our results with the same level of significance. The random-effects model, which uses total observations as between study weight, exhibits only minor differences with respect to significance levels in relation to the reported results (Appendix D).

The next empirical robustness check performed is the MARA in combination with the three-layer model (Appendix E). As described earlier, to control for publication characteristics, this meta-analysis uses publication type (paper, book, dissertation, etc.) and publication-quality (impact factor and whether a publication was peer-reviewed) measures as publication controls. The moderating factors comprise spatial level indicators, country fixed effects (e.g., culture measures, HDI, and GDP) and study specifics (e.g., publication time, variable data sources).

Generally, these results remain similar to the main results. Across all the settings, the publication-related control remains nonsignificant, indicating the absence of a publication-related bias. The results regarding the finance, talent, leadership, formal institutions and demand elements are very similar to those reported earlier. In particular, the results indicate that networks are more relevant for new firm formation than nascent entrepreneurship. To fully utilize the moderating variables, this meta-analysis additionally uses the multimodel inference technique described by Harrer et al. (2021). This procedure helps investigate which moderators best describe the focal relationship in a given setting. It confirms that publication-related characteristics are of minor importance. On the other hand, it shows that the country-level moderator HDI is the most important moderator in explaining the effect size variation. Overall, the results of the MARA model confirm the results of the random-effects model with different settings. The integration of all the settings into the three-layer model helps address publication bias and provide new insights into the relationships of the underlying

phenomenon. Last, although the number of moderators increases, the unexplained between-study variation remains high.

The robustness of the coding and the corresponding constructs is evaluated with a random-effects model. The first check relies on the empirical variables across all the studies that were previously used by Stam (2015, 2018), Stam & van de Ven (2021), or Leendertse et al. (2021) and is presented in Appendix F.

In general, we find results that are similar to those reported if the numbers of variables and observations are sufficiently large. The results regarding demand, finance, culture and the talent framework elements coincide. The results regarding the other elements are nonsignificant and partly unreliable since the values of k and n are lower than they are in the results reported in table 2.2. The second evaluation focuses on the grouping process and how the directions of the correlation coefficients of the created constructs impact the effect size estimates. This procedure helps account for the ambiguity of the empirical operationalized variables used in the studies. Therefore, this meta-analysis uses a two-stage random-effects model consisting of absolute correlation coefficients based on the 153 categories. In the first stage, the effect size and standard deviation of each category are estimated. In the second stage, another random-effects model for each of the ten EE framework elements is used, and the estimated effect size and standard deviation from the first stage serve as inputs. In the second stage, the absolute deviation of the effect sizes is used to investigate framework element relevance and significance. The results are reported in table 2.5.

The results show that in all the settings, all the framework elements except networks and leadership are meaningful antecedents of EA. For the framework elements networks and leadership, the effect size estimates are only significant at the country and local level. These results support the reliability and validity of the reported results.

Table 2.5 Robustness check for correlation aggregation

Set	Independent Variable	K	N	$\hat{r}$	$\hat{r}_{SD}$	p value	95% CI		I^2
							Lower limit	Upper limit	
Total sample	Networks	126	128838	0.10	0.06	0.16	-0.06	0.27	0.00
	Leadership	39	11872	0.17	0.15	0.37	-0.46	0.80	0.53
	Finance	325	268125	0.18	0.02	0.00	0.12	0.23	0.00
	Talent	726	551897	0.24	0.03	0.00	0.17	0.31	0.68
	Knowledge	316	217030	0.14	0.03	0.00	0.07	0.21	0.19
	Support services/intermediaries	214	97587	0.16	0.03	0.00	0.08	0.24	0.00
	Formal institutions	379	244527	0.20	0.04	0.00	0.12	0.28	0.51
	Culture	386	348469	0.21	0.02	0.00	0.16	0.25	0.68
	Physical infrastructure	195	143535	0.16	0.06	0.02	0.03	0.29	0.35
	Demand	814	572230	0.19	0.03	0.00	0.12	0.25	0.78
Country level	Networks	24	4146	0.30	0.09	0.03	0.06	0.54	0.86
	Leadership	22	3521	0.05	0.00	0.06	-0.01	0.12	0.00
	Finance	194	48394	0.16	0.03	0.00	0.09	0.24	0.31
	Talent	248	47513	0.24	0.04	0.00	0.15	0.33	0.57
	Knowledge	97	19911	0.14	0.04	0.01	0.05	0.23	0.37
	Support services/intermediaries	133	32754	0.31	0.09	0.02	0.08	0.54	0.84
	Formal institutions	233	60288	0.18	0.05	0.01	0.06	0.30	0.61
	Culture	180	37989	0.26	0.04	0.00	0.18	0.33	0.82
	Physical infrastructure	78	21341	0.20	0.08	0.04	0.01	0.40	0.67
	Demand	352	77105	0.14	0.03	0.00	0.08	0.20	0.51
Regional level	Networks	75	53813	0.13	0.06	0.10	-0.04	0.29	0.00
	Leadership	11	7040	0.30	0.09	0.20	-0.91	1.50	0.00

	Finance	94	101968	0.38	0.08	0.00	0.20	0.55	0.97
	Talent	349	264014	0.22	0.04	0.00	0.15	0.30	0.41
	Knowledge	164	127935	0.18	0.04	0.00	0.09	0.27	0.59
	Support services/intermediaries	68	47165	0.23	0.06	0.01	0.08	0.38	0.00
	Formal institutions	101	105778	0.23	0.03	0.00	0.15	0.30	0.00
	Culture	144	138802	0.34	0.06	0.00	0.21	0.47	0.95
	Physical infrastructure	74	60376	0.33	0.08	0.00	0.14	0.53	0.92
	Demand	333	261828	0.22	0.04	0.00	0.13	0.30	0.65
Local level	Networks	27	70879	0.12	0.04	0.04	0.01	0.24	0.00
	Leadership	6	1311	0.58	0.18	0.08	-0.18	1.33	0.79
	Finance	37	117763	0.36	0.09	0.00	0.15	0.56	0.47
	Talent	129	240370	0.33	0.05	0.00	0.23	0.43	0.94
	Knowledge	55	69184	0.34	0.12	0.03	0.05	0.63	0.93
	Support services/intermediaries	13	17668	0.20	0.05	0.01	0.07	0.32	0.46
	Formal institutions	45	78461	0.24	0.04	0.00	0.15	0.34	0.93
	Culture	62	171678	0.36	0.07	0.00	0.21	0.52	1.00
	Physical infrastructure	43	61818	0.26	0.11	0.05	0.00	0.51	1.00
	Demand	129	233297	0.29	0.05	0.00	0.18	0.39	0.95
General entrepreneurial activity	Networks	102	110023	0.08	0.04	0.12	-0.04	0.20	0.00
	Leadership	35	9378	0.14	0.14	0.42	-0.46	0.74	0.34
	Finance	273	245023	0.17	0.03	0.00	0.09	0.24	0.09
	Talent	589	455055	0.26	0.03	0.00	0.19	0.33	0.61
	Knowledge	231	147072	0.13	0.03	0.00	0.05	0.21	0.00
	Support services/intermediaries	172	72954	0.15	0.03	0.01	0.06	0.23	0.00
	Formal institutions	339	223304	0.18	0.03	0.00	0.12	0.25	0.29
	Culture	342	320104	0.21	0.02	0.00	0.17	0.26	0.65

	Physical infrastructure	161	112795	0.15	0.05	0.02	0.03	0.27	0.23
	Demand	681	494796	0.19	0.03	0.00	0.12	0.25	0.75
Productive entrepreneurial activity	Networks	24	18815	0.16	0.07	0.09	-0.04	0.36	0.00
	Leadership	4	2494	0.36	0.13	0.10	-0.18	0.90	0.00
	Finance	52	23102	0.27	0.04	0.00	0.19	0.36	0.39
	Talent	137	96842	0.26	0.05	0.00	0.15	0.37	0.94
	Knowledge	85	69958	0.18	0.04	0.00	0.08	0.27	0.72
	Support services/intermediaries	42	24633	0.33	0.13	0.06	-0.02	0.67	0.93
	Formal institutions	40	21223	0.30	0.06	0.00	0.17	0.43	0.65
	Culture	44	28365	0.29	0.06	0.00	0.17	0.42	0.97
	Physical infrastructure	34	30740	0.22	0.06	0.01	0.07	0.36	0.46
	Demand	133	77434	0.17	0.03	0.00	0.11	0.23	0.28

Note. $\hat{r}$ =estimated population effect size, with a random-effects model; $\hat{r}_{SD}$ is the standard deviation of estimated population effect size; K = number of studies; N = total sample size; CI = confidence interval; I^2 = heterogeneity measure. Findings are rounded to two digits.

2.5 Discussion

The present article provides a comprehensive meta-analysis of the antecedents of EA. Empirically synthesizing the findings of the body of research that examines the antecedents of EA reduces the empirical and theoretical heterogeneity in the research on EEs. Within the overall sample, our findings show significant positive relationships between EA and many ecosystem elements, except for knowledge, networks, and physical infrastructure. This is in line with the broader body of literature on the elements of EEs and their influence on EA. In particular, empirical assessments of Stam's framework show mostly significant positive relationships between the examined elements and EA as an output (Leendertse et al., 2021; Stam & van de Ven, 2021).

2.5.1 Relationship between elements of entrepreneurial ecosystems and entrepreneurial activity at the local, regional, and country spatial levels

When differentiated by spatial level, the results vary. This provides empirical support for the importance of the spatial scale in analyses of EEs (Credit et al., 2018) and of the nestedness of some elements within other elements (or groups of them) that build the broader context (Wurth et al., 2021). Delving deeper into the results at the three spatial levels, we find that demand, formal institutions, and talent are the only elements that show significant relationships with EA on all the spatial levels. Demand, which includes variables such as GDP, is covered by nearly all the studies, as this is a typical control variable. Its strong relationship with EA is relatively extensively researched in the entrepreneurship literature (Ferreira et al., 2017; Wennekers et al., 2005) and confirmed by our findings. This also applies to formal institutions (Bennett, 2021; Dau & Cuervo-Cazurra, 2014; Valdez & Richardson, 2013). Regarding talent, our findings highlight its significant relationship to EA on all levels. Regarding talent, which is mostly measured as the percentage of the population with a tertiary education, Ghio et al. (2019) and Content et al. (2020) find no significant relationships with EA in their empirical assessments of EEs. This could be due to insufficient variation in the education levels of the analyzed regions (Content et al., 2020). Our synthesis of empirical findings on this topic from a range of countries confirms a significant relationship between

talent and EA. This supports the findings of Leendertse et al. (2021), and Stam & van de Ven (2021).

At the country level, we find strong significant relationships between EA and networks, finance, talent, support services/intermediaries, formal institutions, and demand. Culture is nonsignificant here, which partly contradicts previous findings (Autio et al., 2013; Dheer, 2017). This could be due to the operationalization of cultural measures in the studies included in the meta-analysis. Cultural practices influence EA differently (Autio et al., 2013). Additionally, different measures of culture, which partially offset each other due to their impacts and the direction of their relationships with EA, needed to be aggregated in our analysis. A deeper analysis of our results shows that measures such as uncertainty avoidance and power distance are not significantly related to EA. Additionally, specific measures of entrepreneurial culture, e.g., prior self-employment rates, show no significant relationship with EA at the country level (this does not exist at the regional level either, but it does exist at the local level). Only masculinity is significantly related to EA at the country level. Our robustness check with the absolute derivations of the effect sizes, which provides a measure of the effect size that is less likely to be influenced by different operationalizations and causal directions, shows a significant relationship between culture and EA at all the levels (table 2.5).

At the regional level, culture and leadership become significant, but networks and support services/intermediaries lose their relationship with EA. At the local level, this remains the same, but finance also becomes nonsignificant. On both the local and regional levels, networks and support services/intermediaries show no significant relationship with EA. Based on our classification, we find that all the categories that measure networks are nonsignificant on both levels. The relevance of networks, while well researched at the individual level, is not empirically clear in the research on EEs (Leendertse et al., 2021; Stam & van de Ven, 2021). Our findings fail to show a relationship between networks and EA; however, this could be due to the operationalization in our study. For support services, the situation is similar.

2.5.2 Elements of entrepreneurial ecosystems and their relationship with productive entrepreneurship

Productive EA is influenced by ecosystem elements differently than general entrepreneurship. The results differ primarily in relation to knowledge, support services/intermediaries, and

physical infrastructure. Knowledge shows no significant relationship with general measures of EA, but it has a significant positive relationship with productive EA. Support services/intermediaries are significantly and positively related to general EA but have a nonsignificant relationship with productive EA. A detailed analysis of the categories grouped into this element shows that the business environment (including variables pertaining to the ease of doing business index) has no significant relationship with productive EA. The same applies to a category we call industrial entrepreneurship support (includes variables such as the number of business service firms). This enriches the findings of Stam & van de Ven (2021), who use the number of business service firms as a proxy for support services/intermediaries; however, they agree that this proxy is far from perfect in terms of measuring support services/intermediaries. They find a positive impact on new firm formation and thus entrepreneurship in general. Interestingly, research support (e.g., technology transfer offices), which we included in the element support services/intermediaries, has a significant relationship with productive EA (effect size=0.31, $p<0.01$). This again highlights the importance of knowledge for this type of EA. Our detailed analysis also confirms the importance of venture capital, which had no significant relationship with general measures of EA or on the specific spatial levels, for productive EA (effect size=0.25, $p<0.001$).

In conclusion, both productive EA and general EA as an output of EEs show significant relationships with the overall economic situation (demand and finance) and the framework (culture and formal institutions), as well as with population skills (talent). Business density and business interactions (networks) do not have significant relationships with either type of EA. Support services/intermediaries and physical infrastructure become nonsignificant antecedents for productive EA, but the opposite is the case for knowledge.

2.5.3 Overcoming methodological issues and robustness of the model

One potential source of bias in this meta-analysis that needs to be discussed more carefully is the classification of the extracted variables, which we described as the “grouping of the variables”. Due to the number of extracted variables and their heterogeneity, it is not possible to distinguish between them clearly. To address this problem, this meta-analysis used three methods. First, estimating a random-effects model (Appendix F) including only the empirical variables (across all studies) that were previously used by Stam (2015, 2018), Stam & van de Ven (2021), or Leendertse et al. (2021). Second, a two-stage random-effects model based on

the constructs and the assigned EE framework elements (table 2.5) was used. The results of both approaches support the relevance of the EE framework and its respective influence on EA. Third, all the codings were performed by the authors separately, and in cases of ambiguity, discussions were held until full consensus was achieved. Moreover, each variable was assigned twice to the framework, since some variables fit well with two elements (all clear cases were assigned the same element both times). Additionally, reliability was checked by comparing the groupings of the preliminary results (k=315 in March 2021) with those of the final results (intertemporal reliability of 82%).

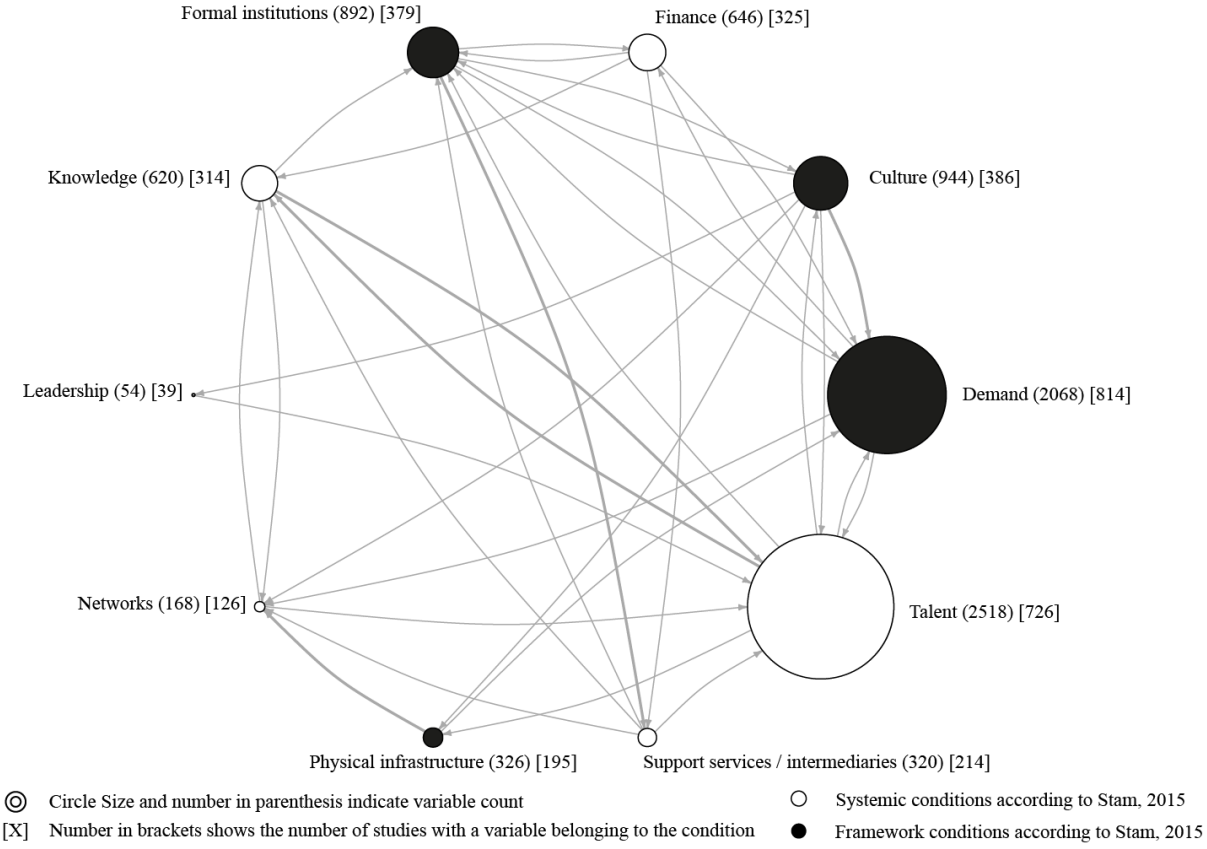
The results of the first and second assignments to the framework are plotted in figure 2.1. The links between the bubbles (and their directions) show whether a variable that was assigned to a bubble in the first assignment had a second-best-fitting element that it was assigned to during the second step. The size of each link depends on the share of the variables corresponding to this element that underwent a second assignment (thus not clearly belonging to one element).

Out of all the variables, 46% were coded the same, and 54% had a different second assignment. This highlights the ambiguity involved with measuring elements of EEs. However, figure 2.1 shows that this is not the case for all the elements. Leadership, networks, and support services are covered by only a few variables and have small percentages of unclear variables (represented by a few outward links). This shows that they are covered by few existing data sources but that they can be assigned quite clearly. As the graph shows, our grouping process has the most ambiguous cases between knowledge and talent. This is due to variables such as publications per researcher, which refers to both elements. Additionally, culture can often be mapped to demand, and formal institutions can be mapped to support services. The former can be interpreted as a result of grouping variables such as the Gini coefficient, which, as a measure of income inequality, can represent both culture and the distribution of potential customers, thus representing demand. The latter is a result of a myriad of variables that measure regulations in relation to the business of (young) companies and thus also affect both elements.

Explaining heterogeneity is of particular interest in a meta-analysis in relation to illuminating a phenomenon of interest (Gurevitch et al., 2018). As shown by the results of the explained between-study variation of the random-effects estimates and the small improvement in

explained heterogeneity in the three-layer MARA setting, it seems appropriate to develop more sophisticated models or better theoretical models to explain EA. Last, with an increased number of included studies and more complex constructs, the asymptotical inference and efficiency of available meta-analysis models/estimators and settings should be further investigated (Cooper et al., 2019).

Figure 2.1 Visual representation of potential second-best assignments to the ten conditions of entrepreneurial ecosystems



Source: Own representation

2.5.4 Theoretical implications

This meta-analysis is of particular relevance for the development of entrepreneurship research, as the lively debate on EEs is likely to continue to grow (Wurth et al., 2021); moreover, scholars in the field agree that, even if its importance decreases, location and local contextual factors will continue to matter for entrepreneurship (van Gelderen et al., 2021). The results point to several theoretical and methodological contributions and implications.

First, our research highlights that data sources on EA and its determinants are limited. Out of the 5,656 independent variables we found in the literature, the majority were taken from countries' official statistics (2,501) and from global indicators such as the World Bank's World Development Indicators (483), Doing Business (146), the World Governance Indicators (124) Hofstede Centre (83), the Economic Freedom Index of the Fraser Institute (76) and Heritage Foundation (54). Considering the continued growth in the number of studies on EEs, we suggest that further research should analyze different studies using single databases and provide in-depth overviews of the evidence provided by such data sources to identify stylized facts (Rauch, 2020). Another way in which research could benefit would be to incorporate new types of data sources, such as big data or social media data (Obschonka et al., 2020; examples include von Bloh et al., 2020), which were rarely found in the studies we included.

Second, our results provide quantitative evidence that EEs can be studied at different spatial levels but that the elements that are important for EA differ across spatial levels. This has two implications. First, researchers and policy makers should pay close attention to individual elements and their influences at various spatial levels. One-size-fits-all (spatial levels) approaches are not suitable. Second, the importance of embedding regional or local EEs in national systems becomes clear. A fine-grained categorization of elements of ecosystems that are still grouped into regionally embedded and overarching elements could be helpful.

Third, differentiating the type of EA as an output of the ecosystem holds implications for theory and practice. The EE literature focuses on productive EA as the output of ecosystems (Wurth et al., 2021) yet emphasizes the importance of all entrepreneurs and their interactions (Spigel, 2017). Our findings show that both types have significant relationships with elements of the same EE framework and that these relationships differ according to the type of EA.

Fourth, the methodology used to obtain the empirical results is partially novel, especially within the research on EEs. The process of grouping variables and the difficulties involved, which we have discussed in detail, reveal some of the shortcomings of previous research on EEs. If one develops a theory on EEs and then tests its elements empirically, it becomes difficult to find suitable data (Credit et al., 2018). However, if one starts an empirical investigation from the variables and then groups them, as is the case in this study, these difficulties become even more apparent, and it becomes clear that many partially suitable variables can be assigned to several elements or influence several elements.

2.6 Limitations and avenues for future research

The quality of a meta-analysis is limited based on its input. As a limited range of data sources exist in the studies we found, research on the antecedents of EA faces issues due to common source bias, as do meta-analyses building on it. Additionally, our findings are limited by the grouping process used for the variables. The grouping of variables based on elements of EEs is suitable for our research purpose, as it allows for comprehensively synthesizing a mass of studies; however, it also bears risks. By applying intertemporal and intercoder reliability, grouping based on two different frameworks of EEs, and using a second-best-fitting assignment for unclear variables, we reduced the risk of invalid grouping as much as possible. Nevertheless, other frameworks or different approaches to grouping could be used. The assignment of the variables to elements of the framework determines the estimate of the effect size in the meta-analysis. This clearly shows that different schemes of EE (Feld, 2012; Isenberg, 2011; Spigel, 2017; Stam, 2015) lack clear guidance about which single variables should be used to measure which elements of each framework. This makes the EE approach difficult to empirically validate. In this regard, our study provides a starting point for further research on EE by showing which elements are significantly correlated to EA and on which spatial level they are relevant. Further research could analyze linkages between elements that are relevant at the country level and those that are relevant at the regional and local levels. Open questions concern whether different regional EEs build national or supra-national EEs or whether an institutional context as a national framework shapes specific bridge elements such as culture, which then manifest in regionally embedded elements such as networks and learning.

We argue that future research should utilize the large amount of data that already exists and that has been empirically studied to understand EA rather than building new variations of frameworks. Based on such a synthesis, another area for further research could be the evidence-based adoption of the current EE frameworks, for example, to prioritize specific elements or provide evidence that some elements are not clearly related to the output but potentially moderate the effects of others. The strong differences that our categorization showed within the ten elements of Stam's framework (e.g., infrastructure: transportation is nonsignificant, the availability of ICT shows a significant positive relationship) demonstrate

that combining such variables can potentially result in false causations. Based on the significant body of research we identified, scholars could validate the impact of single, finer-grained groups of variables on a specific type of EA by synthesizing prior evidence on this topic first, before applying it to their statistical model. This calls for more meta-analyses on specific elements of EEs. Our overarching models provide a first step in this direction. Further research could additionally extract correlations between the independent variables of prior studies and use structured equation modeling to further analyze latent underlying systemic variables.

This meta-analysis sheds light on the difficulty of creating constructs and assigning empirical variables to these constructs, which is necessary for meta-analytical modeling (Lipsey & Wilson, 2001). In some cases, the empirical operationalization and corresponding effect estimates within primary studies seem to be valid only under specific circumstances, which cannot be summarized in a one-size-fits-all meta-analysis. The general results of this large-scale meta-analysis showed the importance (moderate effect sizes) and significance of the EE elements and how they influence EA. Future research in the field of entrepreneurship should focus on individual framework elements and a variety of empirical operationalizations to generalize findings or use major data-driven methods to investigate EE interdependencies and find core EA predictors. For future research in the field of meta-analysis, further methodological guidance and a practical rationale are necessary to overcome the limitation of creating constructs and assigning variables to them.

Our analysis of productive EA highlights the importance of differentiating by EA type, as it is influenced by ecosystem elements other than EA in general. The relationship between both types of entrepreneurship in ecosystems remains unclear. Further research should emphasize this, for example, by empirically analyzing the influence of general EA (as a proxy for the culture and buzz in a spatial area) on productive entrepreneurship and whether this impact is moderated by the other ecosystem elements. We suggest an investigation of which elements directly influence entrepreneurship as an output of an ecosystem and which elements show latent effects or moderate this relationship on different spatial levels as the next step in research. Finally, we faced several methodological obstacles when we conducted this meta-analysis. We hope that our detailed and transparent discussion of these problems and identification of different solutions offer added value for future research in addition to the many substantive implications we have presented.

3. Start-up competitions and their role in entrepreneurial ecosystems: A conceptual attempt

Stolz, L. (2020). Startup Competitions and their Role in Entrepreneurial Ecosystems: A Conceptual Attempt. *Zeitschrift Für Wirtschaftsgeographie*, *64*(4), 233–246. https://doi.org/10.1515/zfw-2020-0009

Abstract: Research on entrepreneurial ecosystems is still on the advance. Both practitioners and scholars claim that the concept has advances compared to other approaches to foster or explain entrepreneurship in regions. The concept, however, has been criticized for a lack of understanding of cause and effects and on the importance of single instruments for its functionality. While practitioners and policy makers are jumping on the bandwagon and try to aim policies directly at entrepreneurial ecosystems, the role of single instruments and their impact on entrepreneurial ecosystems is still investigated insufficiently. A policy-instrument that has been used to foster entrepreneurship for decades are start-up competitions (SUCs). SUCs have been mentioned as an element of entrepreneurial ecosystems from scholars and practitioners. Still, they have not been analyzed as a part of entrepreneurial ecosystems yet. Building on a regional understanding of entrepreneurship and entrepreneurial ecosystems, this paper provides a novel framework of the role of start-up competitions in entrepreneurial ecosystems. Based on previous studies on SUCs, core mechanisms and benefits of the competitions are identified and a general framework of SUCs is presented. The results then are synthesized with mechanisms that are central to entrepreneurial ecosystems, e.g. entrepreneurial learning, networks of entrepreneurial-related actors in the region, and financing entrepreneurship. It is argued that start-up competitions work as network-hubs in entrepreneurial ecosystems, because they connect: a) entrepreneurs among themselves, b) entrepreneurs with relevant actors (financiers, experts, entrepreneurship support organizations), c) those actors among themselves. Therefore, they would be an 'anchor event' and strengthen the overall quality of the EE that they are located in. Also, it is argued that SUCs benefit from a functioning EE through a positive climate for entrepreneurship and the

availability of resources. The study, however, is theoretical in nature. Based on the findings, an agenda for further research is provided.

3.1 Introduction

The concept of entrepreneurial ecosystems (EE) became quite popular in entrepreneurship research in the recent past (Cavallo et al., 2019; Credit et al., 2018; Malecki, 2018). Based on the seminal works of practitioners (Feld, 2012; Isenberg, 2010, 2011), it also found its way to entrepreneurship policy (Auerswald, 2015; World Bank, 2018; World Economic Forum, 2013). With a focus on the interdependent relations between entrepreneurs, related actors, and institutions, the EE approach can solve shortcomings of other related systemic concepts, in which 'the role of entrepreneurs remains a black box' (Stam, 2015, p. 1760). Among many factors and conditions that have been mentioned as elements of EEs, some belong to the field of policy measures directly (e.g. financial support programs) or indirectly (e.g. 'soft' support services like coaching). Entrepreneurship support programs have existed before the EE trend (such as public funds, entrepreneurship centers, business incubators, entrepreneurship support organizations, and so on) and were expanded by programs directly aimed at ecosystems like specific networking events. Policy support for EEs and their functionality, however, is difficult (Spigel, 2016). It needs clear goals, which are difficult to elaborate because of the complexity of interactions in the ecosystems (Feldman et al., 2019), their measurement (Sternberg et al., 2019), and the differences and difficulties that occur when policy is dedicated for new ventures and not to SMEs in general (Fotopoulos & Storey, 2019; Lundström & Stevenson, 2005).

One policy instrument that could even benefit from the complex network-oriented nature of the EE approach are start-up competitions (SUCs). They bring together different (mostly regional) actors (e.g. coaches, financiers, consultants) to provide nascent entrepreneurs a rich environment for learning and networking and at the end award the best of them (Schwartz et al., 2013). SUCs have been first established in the late 70s and early 80s in the US (Katz, 2003). Today, they appear in various ways in entrepreneurship support (Honig, 2004; Passaro et al., 2017; Schwartz et al., 2013), with well-known competitions around the world, e.g. the RICE Business Plan Competition or MIT $100k (Feld, 2012; MIT, 2020; RICE University, 2020; Sekula et al., 2009).

Research on SUCs and their impact has been conducted by scholars among different research fields (Adamczyk et al., 2012; Watson, 2019). Most studies have been conducted on particular

effects of SUCs on the participants, e.g. entrepreneurial learning (Russell et al., 2008; Watson et al., 2015, 2018; Wen & Chen, 2007). Others provide overviews of the different types of start-up competitions (Passaro et al., 2017; Schwartz et al., 2013). First empirical contributions regarding the outcome of SUCs suggest a positive impact on new venture creation (Gailly, 2006; Klinger & Schündeln, 2011; Michelsen et al., 2013).

In the field of entrepreneurial ecosystems, contributions both from practitioners (Feld, 2012; Harrington, 2016; Isenberg, 2011; World Economic Forum, 2013) and scholars (Mason et al., 2020; Motoyama & Knowlton, 2017; Wright et al., 2017) see such competitions as a direct or indirect element of EEs. While SUCs have been used as a starting point analyzing ecosystems (Motoyama & Knowlton, 2017) or (by being named by experts) as a part of an index to measure them (Sternberg et al., 2019) surprisingly their role in EEs has not been analyzed more in depth.

The aim of this paper is to provide a conceptual approach towards an integration of SUCs and their mechanisms in the concept of EEs. To do so, an overview over current research on EEs and SUCs is provided. Additional light is shed on the core mechanisms of SUCs and why they are tanged to aspects that have been identified to be important factors in EEs. The results are then synthesized into a novel framework of SUCs in EEs. Implications for policy and further research are derived at the end.

3.2 Entrepreneurial ecosystems: Elements and processes

As noted by recent literature overviews, the entrepreneurial ecosystem approach and regarding research is still on the advance (Cavallo et al., 2019; Malecki, 2018). The concept emphasizes the importance of the economic and social context for the entrepreneurship process (Spigel, 2016). Thereby, it follows earlier works, for example from Dubini (1989), van de Ven (1993), Spilling (1996), and Feldman (2001), who previously mentioned the importance of the (regional) context for new venture formation. Hence, the EE approach is connected to other systemic concepts that are or can be related to entrepreneurship, such as clusters (Delgado et al., 2010; Feldman et al., 2005; Sternberg & Litzenberger, 2004) or innovation systems (Autio et al., 2014; Sternberg, 2007; Ylinenpää, 2009). The key points that distinct the literature on entrepreneurial ecosystems from other systemic contributions to

entrepreneurship is that it focusses on the entrepreneur and not on the enterprise as the focal point and also sees the entrepreneur as a central player in the creation and survival of such a system rather than only as an output (Stam, 2015).

Despite – or perhaps because of – the variety of publications regarding EEs there is no definition that scholars widely agree on. This is primarily due to the fact that the definitions are based on different elements of ecosystems, research designs, and spatial levels (Malecki, 2018). Regardless of their study design or understanding of an ecosystem, most authors agree in their definition of EEs on the point that the key characteristic of entrepreneurial ecosystems are the interdependent relations between different actors and elements related to entrepreneurship (Cavallo et al., 2019; Malecki, 2018). Among these actors and elements that practitioners and scholars claim to have found as part of entrepreneurial ecosystems often are:

- a local culture of acceptance of failure and risk and a culture of entrepreneurial spirit
- an access to both customer markets and financial markets
- government and policy support
- Strong local community / dense networks
- Human Capital / Talents (e.g. skilled workers)
- Support Services (e.g. Entrepreneurship Support Offices, Accelerators, Incubators, Consulting)
- Leadership / Role Models
- Education and Training
- Universities
- Entrepreneurship related engagement events

(Feld, 2012; Isenberg, 2010, 2011; Spigel, 2017; Stam, 2015; World Economic Forum, 2013).

It is argued that the quality of an entrepreneurial ecosystem is depending mostly on the interactions between individuals, organizations and institutions (Alvedalen & Boschma, 2017; Spigel, 2017; Spigel & Harrison, 2018; Stam, 2015). In this paper entrepreneurial ecosystems

are therefore, in accordance with Stam & Spigel (2018, p. 407), defined as '*a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory*'.

The term 'territory' is not as clear as it should be from an economic geographers or regional economists point of view. A major ambiguity exists in terms of the spatial level that EEs are seen or measured on. This starts at the seminal practitioners works of Isenberg (2010), who names countries like Rwanda or Taiwan as examples for EEs, and Feld (2012), who writes about Boulder, Colorado and 'Building an Entrepreneurial Ecosystem in your City'. Scholars have been empirically measuring EEs at the national level (Acs et al., 2014; Hechavarría & Ingram, 2018) and on the regional level too (Content et al., 2020; Stam, 2018; Stam & van de Ven, 2021). A frequently used method in entrepreneurial ecosystem research are also case studies, which analyze EEs on a local or regional level, e.g. a city or metropolitan area (Mack & Mayer, 2016; Motoyama & Knowlton, 2017; Spigel, 2016, 2017), or even on a local level like universities (Miller & Acs, 2017) or accelerators (Kuebart & Ibert, 2019). For this paper entrepreneurial ecosystems are seen an approach to research, understand, analyze, and/or foster entrepreneurship on the regional level. This argumentation is based on the recognition of entrepreneurship as a regional event (Feldman, 2001).

If one looks at the various schemes and lists of elements of EEs, governance and policy support are frequently mentioned factors. This might be due to the fact that popular literature on EEs was directly aimed at policy-makers and practitioners (Feld, 2012; Isenberg, 2010). Scholars have raised critical appraisals on the EE approach regarding the role of the institutional and political context of the interactions in EEs and the spatial scales of their relevance (Alvedalen & Boschma, 2017). It is still unclear, what empirical influence individual aspects like support programs have on the effectiveness of the EE (Spigel, 2016).

One instrument of entrepreneurship support policy that has been widely used and that is also mentioned to be part of EEs are start-up competitions. They are described to be an element of EEs directly (Feld, 2012; Isenberg, 2011; Motoyama & Knowlton, 2017; Wright et al., 2017), or indirectly by being some kind of event that supports entrepreneurship (Clarysse et al., 2014; Garud et al., 2014; World Economic Forum, 2013).

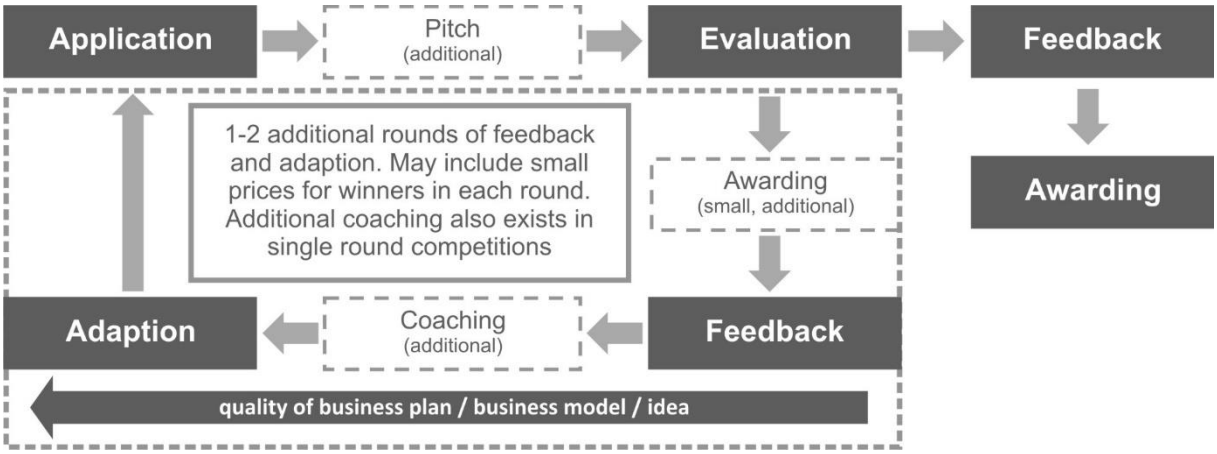
3.3 Start-up competitions: Theory and aims

Start-up competitions have been an instrument to foster entrepreneurship since the late 70ths and early 80ths, starting with the SIFE[6] student business competition in 1979 and with the first larger competitions (business plan competitions) being held at Babson College and University of Texas-Austin in 1984 (Katz, 2003). The term 'Start-up Competition' or 'SUC' works as an umbrella term for various types of competitions or contests, like business plan competitions, idea contests, pitch contests, etc. (Watson, 2019). The objectives of SUCs are to increase a) the quantity of entrepreneurship by shaping the decision of individuals to become an entrepreneur, and b) the quality of entrepreneurship through the development of entrepreneurial skills (Schwartz et al., 2013). To reach these goals, SUCs bring together different (mostly regional) actors, e.g. coaches, financiers, consultants, to provide nascent entrepreneurs a rich environment for learning and networking, and at the end award the best of them (Passaro et al., 2017; Schwartz et al., 2013).

Despite their wide distribution, the scientific understanding of SUCs and their outcome is surprisingly limited (Watson et al., 2018). Existing studies mostly focus on single competitions and particular aspects of them, e.g. team structure or entrepreneurial learning (Schwartz et al., 2013). They often lack a clear spatial focus (i.e. regional sources and effects). However, analyzing the results of previous studies allows for an overview of organization, structure, core actors and the benefits of SUCs. The findings are synthesized into a general framework of SUCs in figure 3.1.

[6] Today known as ENACTUS

Figure 3.1 General framework of start-up competitions



Source: Own representation

Organizational structure:

SUCs are organized either by public organizations (e.g. through entrepreneurship support programs, universities), by private organizations (e.g. banks, large enterprises, consulting companies), or by a mix of public and private actors, as studies of competitions in Germany (Michelsen et al., 2013; Schwartz et al., 2013), Italy (Passaro et al., 2017), Australia (Russell et al., 2008), or the US (Sekula et al., 2009) show. There seem to be differences between the countries. For example, Schwartz et al. (2013) find that German SUCs are mostly organized by a mix of public and private organizations, while Passaro, Quinto, & Thomas (2017) identify the most Italian SUCs to be organized by private organizations.

Regarding the structure of the events there is no uniform pattern. However, most competitions seem to be multi-stage (which means that there are multiple feedback and re-submit / pitch phases) and provide the participants with feedback regarding their business model (Gailly, 2006; Passaro et al., 2017; Russell et al., 2008; Watson et al., 2015, 2018; Wen & Chen, 2007). Comprehensive empirical overviews of different competitions are provided by Schwartz et al. (2013), who analyze 71 German SUCs, and Passaro, Quinto, & Thomas (2017), who analyze 77 Italian SUCs. The basic concept of SUCs can be described as follows: The potential entrepreneurs submit a proposal that is most commonly an elaborated business plan, a detailed pitch deck, or a similar document. The proposal must fulfil formal conditions, e.g. submission deadline, applicants are residents in the region of the SUC or plan to found

the venture there, new venture isn't founded yet or has been founded in a particular time period. After a quick screening, in a second step an advisory committee / jury assesses the quality of each proposal with a focus on the probability of the business idea to be turned into a successful business. In the end the best entrepreneurs are awarded. During the process there are numerous interactions between the advisory committee and the potential entrepreneurs.

Target group:

In terms of the target group, most SUCs are aimed at nascent entrepreneurs (Michelsen et al., 2013; Ross & Byrd, 2011; Schwartz et al., 2013; Watson et al., 2018), which are individuals who are currently involved in starting a business, often operationalized as individuals who are undertaking specific steps to set up a new business (see e.g. Davidsson & Honig, 2003). Regarding the industries, some competitions only allow applications from specific sectors, e.g. Healthcare, Biotech, Internet and ICT, but most competitions are open to any industry (Passaro et al., 2017; Schwartz et al., 2013).

Geographical coverage:

Previous Studies show that a certain proportion of SUCs only allows students and staff of single universities to apply (Russell et al., 2008; Watson et al., 2018). Other competitions are nationwide (Foo et al., 2005) or supra-national (Gailly, 2006). Most SUCs, however, are held on a sub-national level, often allowing only inhabitants from that particular region to apply or to be entitled to win awards (Michelsen et al., 2013; Passaro et al., 2017; Schwartz et al., 2013).

Judges / jury:

In SUCs, the most common method to evaluate the business plans / business models is an assessment by a jury that consists of external experts (Schwartz et al., 2013). Those experts, among others, are identified to be: Experienced entrepreneurs, venture capitalist, bankers, and other financiers (Foo et al., 2005; Russell et al., 2008), start-up or business consultants (Gailly, 2006), academic and university staff (Russell et al., 2008).

Prizes / awards:

The majority of SUCs gives away monetary prizes, followed by prizes in kind, such as professional video-tapes, vouchers for coaching or consulting, office equipment, etc. (Passaro et al., 2017; Russell et al., 2008; Schwartz et al., 2013). Monetary prizes range from a few hundred dollars up to more than hundred thousand dollars for the winners (MIT, 2020; RICE University, 2020; Russell et al., 2008; Watson et al., 2018). The most dominant price range, however, seems to be in the four digits and lower five digits range (Passaro et al., 2017; Watson, 2019).

Benefits for participants:

At the individual level, interviews with participants of different SUCs show, that the participation had positive effects on the recognized entrepreneurial skills of the participants. The participation helped the interviewees to gain experience of the entrepreneurship process, e.g. using awareness of what they have, who they know, and what they know (Watson et al., 2015). This, in combination with the SUC itself, helped the nascent entrepreneurs to meet people they would not otherwise have interacted with. The contacts made during the competition were subsequently used to explore new possibilities for the venture (Watson et al., 2015). SUCs produce 'very real business situations' which confront teams with challenges that might be beyond their previous knowledge (Wen & Chen, 2007, p. 361). These challenges led to situations where the teams had to adapt their ideas and engage with the environment, which trains their ability to solve problems (Silver et al., 2016; Wen & Chen, 2007). As a result, participants recognize their entrepreneurial related skills to be developed. This refers to skills like pitching, networking, business plan production and self-confidence (Watson et al., 2018). Similar results are shown by Russel, Atchison, & Brooks (2008): In terms of educational outcomes regarding entrepreneurship, the participants considered their level of skill in business planning to be increased most, followed by their knowledge of new venture creation. However, the skills gained were perceived to be more useful for the participation in other competitions than for the day-to-day business life as an entrepreneur. Yet, the possible future participation in other competitions was seen as an opportunity to gain value in terms of financing, marketing and networking (Watson et al., 2018). Regarding the most important benefits of SUCs, participants rated the access to mentors, the opportunity to win prices, workshops / training, and the advice / feedback of judges to be most important (Russell et al., 2008).

On the firm level, SUCs encourage the formation of teams with diverse characteristics and provide opportunities for individuals with diverse backgrounds to network with one another (Foo et al., 2005). Regarding the outcome of SUCs in terms of new venture creation, Gailly (2006) finds a significant positive correlation between the experts' evaluations and the probability of the venture to become commercially active (119 analyzed participants of an transnational SUC in Europe). He also finds that resubmitted business plans (in a second stage) were evaluated more positively by the judges than the first submissions. However, the second-stage evaluations were not significantly correlated to the start of commercial activity later (Gailly, 2006). Michelsen, Wolf, & Schwartz (2013) analyze 103 winners (biotech sector) of entrepreneurship awards in Germany. They can show significant positive effects on the probability of creating the venture (entry in commercial register) if the award won is nationwide and if the award is for the seed and not pre-seed phase (Schwartz et al., 2013). Klinger & Schündeln (2011) analyze 655 applicants of business plan competitions in central America and find the participation to have a positive effect on the probability to launch a business (for individuals without a business) and to expand their business (for individuals who already had a business). Winning the competition has a significant positive effect on the probability of launching a new business. They also found stage general business training in the competition to be more important for participants that expanded their business. Specific steps to develop the business plan that are targeted at the individuals business ideas were more important for the creation of a new business (Klinger & Schündeln, 2011).

3.4 Toward an integration of start-up competitions into the entrepreneurial ecosystem framework

The previous sections have stressed the core elements and processes of entrepreneurial ecosystems and start-up competitions. SUCs are frequently mentioned as a direct or indirect element of EEs. Additionally, actors, processes and potential benefits of SUCs are tanged to many elements and processes that have been found to be crucial for healthy EEs, like regional anchor events, entrepreneurial learning, entrepreneurial networks, or financing new ventures. Thus, integrating theoretical and empirical findings on SUCs could help to understand what role support programs in general, and specific instruments like competitions

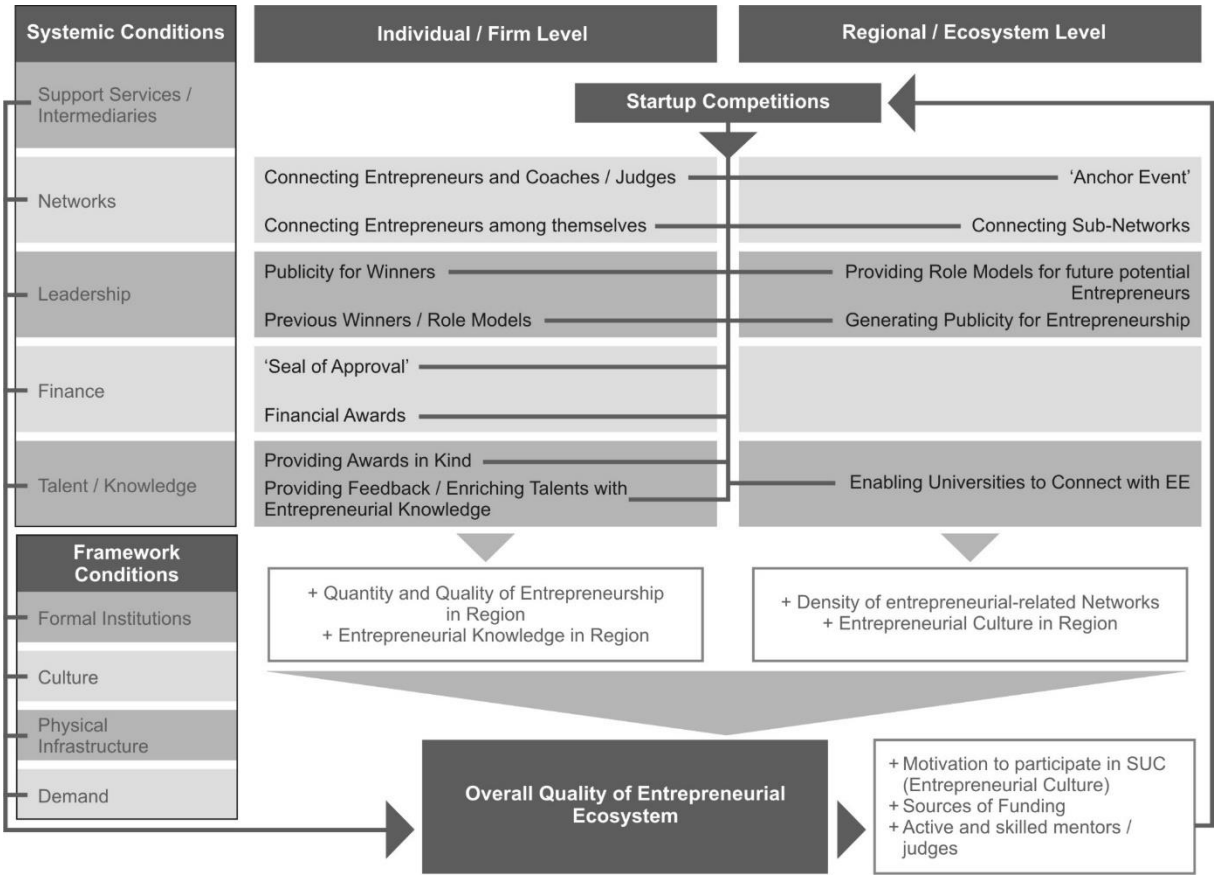
in particular, play in EEs and what impact they have on the actors and networks in the ecosystem. An aspect that further research is required on (Alvedalen & Boschma, 2017; Spigel, 2016, 2017).

As a contribution to achieve a better understanding of single instruments and events in EEs, the unique features of SUCs that have been worked out so far, and that can influence EEs, are now presented. The (potential) effects of SUCs on EEs are twofold: Those that influence the nascent entrepreneurs directly (chapter 3.4.1) and those regarding the overall quality or functionality of the ecosystem (chapter 3.4.2). Additional, it is argued that a well-functioning EE also supports the SUC (chapter 3.4.3). A synthesis of the effects of SUCs in entrepreneurial ecosystems is provided in figure 3.2. The figure builds on the conditions of the entrepreneurial ecosystem framework of Stam (2015). Stam's framework includes the main elements that EEs are argued to consist of. It also has been accepted and used in current studies that measure EEs empirically (Stam & van de Ven, 2021; Sternberg et al., 2019). This makes the presented integration of SUCs of particular value for further research.

Stam (2015) differentiates between systemic conditions (networks, leadership, finance, talent, knowledge, support services /intermediaries) and framework conditions (formal institutions, culture, physical infrastructure, demand) of entrepreneurial ecosystems. For this paper, SUCs are assigned to the systemic condition 'support services and intermediaries'. The framework conditions include the social and physical conditions enabling or constraining human interaction. 'The systemic conditions are heart of the ecosystem' (Stam, 2015, p. 1766), and are depicted in the rows in figure 3.2. According to Stam they determine the success of the ecosystem. All conditions are in interdependent relationships with each other and lead – in combination – to entrepreneurial activity in the region (output), what results in aggregate value creation (outcome). Stam argues that both the conditions and output and outcome are mutually reinforcing. In this paper, start-up competitions are pictured as a part of the systemic condition 'support services / intermediaries'. Their effects, which will be explained in detail in the following, are assigned to the systemic conditions that they have impact on (rows). These effects are also divided in those that have direct impact on entrepreneurship in the region and those that mainly influence the ecosystem (columns). In accordance with the literature (Spigel, 2017; Stam, 2015), it is assumed that all conditions (systemic and framework) influence each other and lead to the overall quality of the

ecosystem. It is argued that SUCs can provide further benefits for the particular EE: a) increasing the quality and quantity of entrepreneurship in the region, b) developing greater entrepreneurial knowledge in the region, c) increasing the density of entrepreneurial-related networks in the region, d) positively influence the regional entrepreneurial culture. This, in combination and by being connected with the systemic conditions, can add value to the overall quality of the EE (figure 3.2).

Figure 3.2 Interdependencies between start-up competitions and entrepreneurial ecosystems



Source: Own representation based on Stam's (2015) EE conditions

3.4.1 Effects on the individual and firm levels

Networks:

SUCs provide nascent entrepreneurs with the possibility to create networks to a) other entrepreneurs, and b) relevant actors, like bankers, venture capitalists, business angels, lawyers, consultants, etc. who participate in the SUC as judges or coaches (Russell et al., 2008;

Schwartz et al., 2013; Watson et al., 2018). This supports nascent entrepreneurs in various ways: Social ties and the integration in local networks of the above mentioned actors are important for recognizing market opportunities (Anderson & Miller, 2003), venture performance (Batjargal, 2003), becoming a nascent entrepreneur (Davidsson & Honig, 2003), and gaining access to additional resources (Semrau & Werner, 2014). In addition, the contact to other (successful) entrepreneurs (role models) is relevant for shaping the idea of proceeding as an entrepreneur (Bosma et al., 2012). It is argued that the network-effects are the core of the impact that SUCs have on the participants. However, due to the diversity of that influence (e.g. regarding financing, learning, and role models), the particular effects are explained in the other systemic conditions that they belong to.

Leadership:

According to Stam (2015), Leadership provides direction and role models for the entrepreneurial ecosystem. It involves visible entrepreneurial Leaders who are committed to the region. Related to the above mentioned network effects, SUCs can connect entrepreneurs with role models. They can be an important source of inspiration, motivation, and self-efficacy for potential and nascent entrepreneurs (BarNir et al., 2011; Bosma et al., 2012; Shepherd & Krueger, 2002; van Auken et al., 2006). In addition, the SUC can help the participants to become successful entrepreneurs and potential role models themselves through publicity. The impact of certain effects, like media coverage of winners, of SUCs on the participants has not been examined yet. Still, it can be argued that winning or reaching a final round of a SUC has advantages for the participants. For example, new ventures that are carrying out advertising endure better survival chances than other firms (Esteve-Pérez & Mañez-Castillejo, 2008). Also, in an ecosystem the publicity generated by media coverage can help entrepreneurs to get first customers (Motoyama & Knowlton, 2017). Winning or reaching a final round of a SUC could provide the participants with an opportunity of free media coverage. Also, many SUCs give away non-monetary prizes such as professional video-shootings. This could also help entrepreneurs in advertising their new ventures and generate an initial amount of ‘trust’ in the new venture. This effect could for example apply to potential customers or suppliers (Schwartz et al., 2013). Generally, trust in the local community is important for entrepreneurs to acquire entrepreneurial resources in EEs (Spigel & Harrison, 2018). Winning or reaching a final round of a SUC could provide an initial amount of that trust.

Finance:

A direct, yet often small, form of financing new ventures is given through the prices that SUCs provide (Passaro et al., 2017; Schwartz et al., 2013). Monetary prices and prices in kind both support the nascent entrepreneurs in early stages. A different factor, however, is potentially even more important for the nascent entrepreneurs. SUCs often have bankers, venture capitalists or business angels in their jury or as mentors (Schwartz et al., 2013). External financing is an important factor for establishment, survival and growth of new firms (Fotopoulos & Louri, 2000). Also, survival rates of new ventures are higher if they receive seed financing through angel investors (Kerr et al., 2014). Although studies suggest that SUCs provide nascent entrepreneurs with the possibility to connect with potential financiers (Russell et al., 2008), there is no empirical evidence on the actual effects of these connections after the competition ends. However, it can be argued that these connections can support the participants, since a constraint for receiving external financing are information asymmetries which can be reduced by social ties (Shane & Cable, 2002; Shane & Stuart, 2002). An additional benefit could be that SUCs mainly consist of regional actors. Venture capital investments are more likely to happen if geographical proximity is given (Lutz et al., 2013). Alongside these aspects, SUCs award promising business models or a good business planning which could provide a signal of quality to potential financers (‘seal of approval’).

Talent / knowledge:

SUCs provide a learning environment for nascent entrepreneurs in two ways: The entrepreneurs gather practical experience (business planning, pitching, adapting) and get feedback from coaches and judges (Passaro et al., 2017; Watson et al., 2015, 2018; Wen & Chen, 2007). These learning effects are important for nascent entrepreneurs, since they use specific learning methods to reach their goals and overcome obstacles (Honig, 2001). It is argued that this entrepreneurial learning, which is done by doing, borrowing and experimenting during the start-up process, is crucial for successful new venture creation (Aldrich & Yang, 2014). The knowledge generated in that process also helps to perform better in following entrepreneurial activities (Carbonara et al., 2020; Parker, 2013). Empirical evidence shows that learning in competitions can help entrepreneurs to expand an existing young business or found a new venture (Klinger & Schündeln, 2011). Also, the combination of entrepreneurial schooling (e.g. workshops regarding business administration) with basic

services (e.g. usage of coworking spaces, cash) can have a significant positive impact on new venture performance (Gonzalez-Uribe & Leatherbee, 2018). If a SUC is able to provide both (e.g. through additional workshops and monetary prices and prices in kind), similar results could occur.

Also, overconfidence plays an important role in an individual's decision to become an entrepreneur (see e.g. Bernoster et al., 2018; Forbes, 2005). However, there is evidence that overconfidence can lead to firm failure (Invernizzi et al., 2016; Koellinger et al., 2007). Feedback in a SUC could prevent overconfident nascent entrepreneurs from starting their business hasty or it could help them to rethink or pivot the business model. First evidence regarding this argumentation has been provided recently by Lovgren et al. (2020) who surveyed agri-food-entrepreneurs in Michigan, U.S. who participated in an entrepreneurial assistance program. Assistance and feedback led to positive effects in terms of ability to venture launch and survival. Also it helped entrepreneurs to better asses the risks of innovative new products (Lovgren et al., 2020).

Based on the above mentioned effects that SUCs have on the participants, it is argued that the competitions lead to an increase of quality and quantity of entrepreneurship in the region the SUC is located in. In addition, the entrepreneurial knowledge gathered in SUCs is retained in the region (if the entrepreneurs don't leave). Both would positively influence the ecosystem in the particular region (Stam, 2015).

3.4.2 Entrepreneurial ecosystem-related effects

Networks:

Entrepreneurial ecosystems are composed of a set of interdependent actors and factors (Stam, 2015). The density of their relationships determines the overall quality and functionality of the ecosystem (Spigel, 2017). Start-up events, e.g. meetups, conferences, expos, that take place in a specific region provide possibilities for the actors to connect and create or strengthen interrelations between them (Cukier & Kon, 2018). Such events would therefore increase the quality of the ecosystem. Related to that argument, some scholars argue that EEs consist of different sub-networks, e.g. financial, knowledge and business subsystems (Clarysse et al., 2014). The interconnection between the subnetworks has been identified as an important topic for research on EEs (Alvedalen & Boschma, 2017). SUCs could

not only connect entrepreneurs among themselves and with coaches and judges, but also these actors among themselves. This effect has not been analyzed in particular, but promises to be relevant for ecosystems. Recent contributions show that incubators could help to connect different subnetworks and strengthen network quality in an EE (van Rijnsoever, 2020).

Therefore, and in line with the results of existing studies on SUCs that have been presented above, it is argued that SUCs work as 'anchor events' in EEs. These are forums that allow different actors to connect. 'Anchor Events' are argued to be 'venues for the creation, maintenance, and rejuvenation of networks that constitute ecosystems' (Garud et al., 2014, p. 1183). Also they serve as important venues for the temporal coordination of different activities, both during the emergence of ecosystems and thereafter'(Garud et al., 2014, p. 1183).

Leadership:

A regional culture for entrepreneurship is a core element of the entrepreneurial ecosystem approach (Neck et al., 2004; Spigel, 2017; Stam, 2015). This culture can arise from historic start-up rates for example (Stuetzer et al., 2014). If SUCs help to rise these rates, as first contributions suggest (Gonzalez-Uribe & Leatherbee, 2018; Klinger & Schündeln, 2011), they could foster this culture. This is possible for a whole region or a specific part of the EE, for example universities (Feld, 2012). Also, they could create role models and provide publicity for entrepreneurship (e.g. media coverage of award winners). This would also foster the regional entrepreneurial culture. Feld (2012) sees entrepreneur-led initiatives as central to an ecosystem. However, Spigel (2016) argues that these initiatives led by entrepreneurs cannot be catalyzed by a supportive culture alone. This is where Spigel (2016) sees the role of entrepreneurial support organizations. Closely related to the arguments of SUCs as an 'anchor event' and hub of sub-networks, they can help to foster entrepreneurial culture by bringing together different actors that are related to entrepreneurship. While it is difficult to change the general culture in a region, Motoyama & Knowlton (2017) found mesa-level organizations to be able to adjust the way people interact with each other on a micro-level and therefore positively influence the overall entrepreneurial culture bottom up.

Talent / knowledge:

Probably the most obvious function of SUCs would be the integration of universities in the EE. University-based competitions have been the first SUCs (Katz, 2003) and have been argued to be important parts of EEs (Feld, 2012; Wright et al., 2017). This is due to the fact that universities are relevant actors in entrepreneurial ecosystems (Brown & Mason, 2017). They can provide research which leads to innovation and knowledge networks but also drive entrepreneurship directly, e.g. through university spin-offs (USOs), and indirectly, e.g. by providing skilled workers (Guerrero et al., 2016). Because of the distinct context for entrepreneurship in the university, the emergence of USOs requires universities to have specific capabilities that may differ from those of commercial organizations (Rasmussen & Borch, 2010). One obstacle in the process of becoming an USO is the decoupling from the academic setting and the integration into the commercial setting. This can be overcome by the use of incubators or science parks (Rasmussen & Borch, 2010). Additional, SUCs that are not directly affiliated to an university can still provide some universities, that do not have the capabilities to commercialize the ideas or to help nascent entrepreneurs founding their spin-off, with a possibility for entrepreneurs to test and improve their business idea in a more commercial context. Some SUCs thereby may have lower entry barriers than an incubator or accelerator which often require the attendees to have a complete business model or first customers.

Regarding these effects, that influence the ecosystem without the mediating role of the nascent entrepreneurs, it is argued that SUCs can increase the awareness of entrepreneurship in the region and work as ‘anchor events’ by connecting sub-networks of different entrepreneurial actors. This would increase the quality of the EE (Stam, 2015). In contrast to the direct effects on entrepreneurship, there is less evidence on these effects of SUCs. However, all mentioned effects are interdependent and influence each other, as it is the nature of ecosystems.

3.4.3 Effects of successful entrepreneurial ecosystems on start-up competitions

The influence of an entrepreneurial ecosystem on SUCs, that are located in it, has not been analyzed yet. However, it can be assumed that SUCs benefit from functioning EEs or even need a working EE to be successful. First of all, a functioning EE consists of a wide range of actors that are crucial to the SUC like coaches and judges. Without experienced judges a fair evaluation of the participants is not possible. Also, only experienced judges and coaches from

different professions guarantee high quality feedback regarding the business ideas – a key feature of SUCs (Schwartz et al., 2013). A functioning EE provides financial resources for entrepreneurs. These financial resources might also flow into a regional SUC. High prices support the SUC in attracting more and high quality, maybe even international, entrepreneurs, as it has been described for the RICE Business Plan Competition (Feld, 2012), which gives away more than $1.5 million in cash (RICE University, 2020). Finally, a strong entrepreneurial culture in the particular region that the EE is located in encourages more people to become entrepreneurs, what could lead to more participants and therefore strengthen the SUC. Additional, such an entrepreneurial culture could help to generate publicity for the SUC and appreciation of the participants and winners. In total, it is argued that a functioning EE would support regional SUC(s). This in turn would reinforce the effects SUCs have on entrepreneurship in general and on EE in particular.

3.5 Conclusion

The entrepreneurial ecosystem approach has enjoyed great approval from scholars over the past decade (Cavallo et al., 2019; Malecki, 2018). However, it has been criticized for, inter alia, the lack of knowledge on the importance of individual attributes and elements (e.g. support programs) of the ecosystems (Spigel, 2016; Spigel & Harrison, 2018). Whether, and if so how, these individual attributes function and interact with other elements in the ecosystem is crucial to understanding how the system works (Motoyama & Knowlton, 2017).

This paper contributes to research both on start-up competitions and entrepreneurial ecosystems by integrating existing research on start-up competitions into entrepreneurial ecosystems. By presenting the results of previous studies on SUCs, the current understanding of start-up competitions is enriched through an identification of their typical process and effects on nascent entrepreneurs. The results are then combined with core processes of entrepreneurial ecosystems. As a result, a novel framework of the role of start-up competitions in entrepreneurial ecosystems is provided. Basis for the integration in the EE approach is the framework of Stam (2015). The effects of SUCs that have been identified are assigned to the respective systemic conditions his framework. This makes the integration of

particular value for further research, since recent studies to measure EEs empirically are based on this framework (Stam & van de Ven, 2021; Sternberg et al., 2019).

The integration shows, that many aspects which have been identified as core processes of EEs, e.g. entrepreneurial learning, 'entrepreneurial recycling', distribution of entrepreneurial resources, or development of entrepreneurial networks (Alvedalen & Boschma, 2017; Spigel, 2016, 2017; Spigel & Harrison, 2018; Stam, 2015), can be initiated and supported by SUCs (Russell et al., 2008; Watson et al., 2018; Wen & Chen, 2007). Also, there are hints that SUCs can lead to higher start-up rates (Gailly, 2006; Klinger & Schündeln, 2011; Michelsen et al., 2013) what could lead to the emergence and persistence of EEs (Stam, 2015).

Based on these findings it is argued that SUCs can work as a hub in entrepreneurial ecosystems by connecting a) nascent entrepreneurs with themselves, b) nascent entrepreneurs with entrepreneurial professionals (e.g. coaches, financiers, lawyers, role models), and c) those professionals among themselves. Thus, SUCs would be important 'anchor events' in EEs (Clarysse et al., 2014). The quality and functionality of SUCs could benefit from a strong EE, e.g. in terms of experienced coaches and mentors, rich financial resources, and an entrepreneurial culture that leads to more participants and acceptance of the SUC.

However, the contribution is theoretical in nature. Apart from a few exceptions (Gonzalez-Uribe & Leatherbee, 2018; Klinger & Schündeln, 2011; McKenzie, 2017; McKenzie & Sansone, 2019), little empirical research on the actual impact of SUCs on new venture formation, survival and impact on EE has been done. No research exists on the influence of EEs on SUCs and if they can benefit from being well embedded in an EE. Further research on SUCs should empirically compare different competition types, groups of participants, and long-term effects on the participants and winners (Passaro et al., 2017; Schwartz et al., 2013). Especially for an effective entrepreneurship policy this deficit should be remedied. Regarding entrepreneurial ecosystems, further research should address the following aspects in particular:

- SUCs bring together different actors. Yet, there is no knowledge about the relationships between these actors at competitions. Further research should investigate if SUCs provide a platform for them to connect successfully. Insights on the relationships that may result from SUCs could be generated by analyzing the number and intensity of contacts at specific competitions, or if the relations remain active after the competition ends.

- The characteristics of EEs depend largely on the characteristics of the region they are located in. To better understand EEs, and in particular the role of SUCs in EEs, a comparison between different ecosystems (in terms of their size, maturity, core industries), each with comparable SUCs, is needed. The same applies to the other way round – different types of SUCs in comparable or in the same entrepreneurial ecosystem might provide new discoveries on their functionality.

- What happens to participants and winners of SUCs? Research is needed on the question whether the participants and winners stay in the region (as it is often intended by the organizers). Only then, SUCs would contribute to the regional EE. In addition to the above-mentioned requirement for empirical studies on the impact of SUCs, both qualitative and quantitative analysis of participants and winners of SUCs and their careers in the EE could be of great value (do they become role models, mentors, business angels?).

- Finally, research should investigate who participates and who wins SUCs. One could argue that some nascent entrepreneurs just participate to use windfall profits. They would start a successful venture anyway, but believe that there is a good chance for them to win prices in a SUC (with little effort). Also it is not clear if competitions attract or privilege specific entrepreneurs (e.g. teams vs. solo, specific industries, high ambitions vs. moderate ambitions). This again could affect the role of SUCs in EEs and their overall effectiveness.

The paper shows the potential of start-up competitions as an instrument for a deeper understanding of the sub-networks in entrepreneurial ecosystems and how single instruments influence them. Especially from a political point of view, further research should investigate whether the competitions are as effective as they are thought to be. This could be done through ex-post evaluations of cohorts of participants from existing competitions. In terms of entrepreneurial ecosystems, future research should analyze the connections between different actors that can be created through competitions. Also, scholars argue that the spatial level of entrepreneurial ecosystems and the differences in the impact of institutions, policy measures, and context that come with different spatial levels is not clear yet. Analyzing single policy instruments and events in different ecosystems on different spatial levels or in different

regions could provide the much needed insights on this particular topic. Start-up competitions appear to be a suitable starting point for further research.

4. Start-up competitions as anchor events in entrepreneurial ecosystems: First findings from two German regions

This chapter is a preprint of the following published article:

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Abstract: Entrepreneurial ecosystems (EEs) are currently a major theme of entrepreneurship research and policies designed to support entrepreneurship. However, the role of specific policy instruments in EEs often remains unclear. This paper contributes to research on that topic by analysing the role of start-up competitions (SUCs) in the contrasting German case study regions Berlin and Hannover. Based on 45 qualitative interviews with participants in two public SUCs, their organizers, and ecosystem experts, the role that the SUCs play in each EE is investigated. Both analysed SUCs serve as networking events that can be described as 'anchor events' for specific parts of their ecosystems. They provide strong support for participants and help local entrepreneurship support offices connect and allocate their resources efficiently. However, sub-networks of entrepreneurs and actors who are not connected to the SUCs are identified. The SUCs seem to work primarily for public actors, 'solid' entrepreneurs, and university spin-offs. International venture capitalists, wealthy business angels, and high growth firms are not involved in the competitions. Both analysed regions influence the perceived value of their competitions, e.g. in terms of the industrial expertise of jurors.

4.1 Introduction

Entrepreneurship is an important driver of job creation (Acs & Armington, 2004; Birch, 1987; Carree et al., 2015; Doran et al., 2016) and the renewal and growth of an economy (Acs et al., 2012; Andersson et al., 2012; van Stel et al., 2005). However, entrepreneurial activity differs strongly across countries (Blanchflower, 2000; Terjesen et al., 2010) and among sub-national regions (Davidsson & Wiklund, 1997; Fritsch et al., 2006; Sternberg, 2011b). A recent approach in understanding (regional) entrepreneurial activity is entrepreneurial ecosystems (EEs) (Audretsch, Cunningham, et al., 2019; Cavallo et al., 2019; Credit et al., 2018; Malecki, 2018). By emphasizing the importance of the economic and social context in the entrepreneurship process (Spigel, 2016), the approach follows earlier contributions that discuss the importance of (regional) context for new venture formation (Feldman, 2001; Spilling, 1996; van de Ven, 1993). The EE concept has quickly found its way into economic policy (see, e.g. World Bank 2018; World Economic Forum 2013), which may be accelerated by the fact that seminal works on EEs were created by and for practitioners (Feld, 2012; Isenberg, 2010).

Today, EE is referenced in a wide range of formal policy documents on supporting entrepreneurship and in practitioners' works in countries worldwide at all development stages. However, its conceptual ambiguity results in diverse perceptions of the concept and its adoption by policymakers (Brown & Mawson, 2019). Scholars have engaged in critical appraisals of the EE approach, for example, regarding the role of the institutional and political context of EE interactions and the spatial scales of their relevance (Alvedalen & Boschma, 2017). A key question is how policy can influence EE and what role single policy instruments play (Feldman et al., 2019; Spigel, 2016).

One instrument that public and private actors use to foster entrepreneurship in specific regions or sectors is start-up competitions (SUCs). With the emergence of the EE approach, SUCs also have been mentioned frequently as elements of EEs, both by practitioners (Feld, 2012; Harrington, 2016; Isenberg, 2011; World Economic Forum, 2013), and scholars (Mason et al., 2020; Motoyama & Knowlton, 2017; Wright et al., 2017). However, the role of SUCs in EEs has not been analysed more in-depth. This lack of attention is surprising, as the sheer quantity of such competitions calls for analysis. While comprehensive overviews do not exist, studies for single countries report 77 active SUCs in Italy (Passaro et al., 2017) and 71 in

Germany (Schwartz et al., 2013). Similar to these former studies, in this paper, 62 SUCs were identified in Germany in 2019. SUCs have comparatively lower requirements for participation than accelerators and incubators (Bliemel et al., 2016; Schwartz et al., 2013) and at the same time provide a wide range of further training and networking opportunities (Passaro et al., 2017; Schwartz et al., 2013; Watson et al., 2018). Hence, they are considered an important part of EEs, but their specific role remains unclear (Feld, 2012; Motoyama & Knowlton, 2017). Once this role is revealed, research and policy can draw on, improve, or adapt a widely used tool to support entrepreneurship and EEs.

This paper aims to explore the role such competitions play in EEs and thereby contribute to theory on specific policy instruments that foster regional entrepreneurship and ecosystems. To do so, case studies of two established SUCs in Germany are provided. Based on 45 face-to-face interviews with organizers, participants, and local entrepreneurship experts, the role of each SUC in its EE is explored. The remainder of this paper is structured as follows: First, the theory of EEs is presented in a theoretical section, where the potential role of events like SUCs is also discussed. The theory of anchor events and their role in EEs is presented as a basis for analysing the role of SUCs in such ecosystems. Subsequently, the method is explained, and an overview of SUCs in Germany is given. The case selection is demonstrated, and the two cases are described in detail. In the following empirical section, the interviews are analysed, and the findings are presented. In the next section, the results are discussed. The final section concludes and provides some implications for policy.

4.2 Theoretical basis

EEs are a relatively new theoretical concept in studies of entrepreneurial activities, but the number of publications on the subject has risen sharply in recent years (see e.g. the overviews of Cavallo et al., 2019; Malecki, 2018). This increase has a lot to do with the attractiveness of the concept for local policymakers, many of whom view EEs as the new ‘blockbuster’ of industrial policy (Brown & Mawson, 2019, p. 347). Despite its recent inception, many different adaptations of the EE concept can be found in the literature (for an overview, see Brown & Mawson, 2019).

Despite – or perhaps because of – the variety of publications regarding EEs, there is no generally accepted definition of an EE among scholars. This lack of consensus is primarily because the definitions are based on different elements of ecosystems, research designs, and spatial levels (Malecki, 2018). Nevertheless, most scholars agree that the essential characteristic of an entrepreneurial ecosystem is the interdependent relations among different actors and elements related to entrepreneurship (Cavallo et al., 2019; Malecki, 2018). Thus, in this paper, entrepreneurial ecosystems are defined as 'a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory' (Stam & Spigel, 2018, p. 407). Even though there are various spatial units of analysis for an EE, the majority of studies conceptualize EEs at the regional level (Malecki, 2018). Analogous to understanding entrepreneurship as a regional event (Feldman, 2001), this paper also examines EEs on a regional level.

The EE approach has some characteristics in common with other systemic concepts to support regional economic development that are or can be related to entrepreneurship, such as clusters (Delgado et al., 2010; Feldman et al., 2005) or innovation systems (Acs et al., 2014; Ylinenpää, 2009). A key difference is an explicit focus on the interdependent relations between entrepreneurs, related actors, and institutions, enabling the EE approach to solve the shortcomings of other related systemic concepts in which 'the role of entrepreneurs remains a black box' (Stam, 2015, p. 1760). While this sounds very promising for entrepreneurship scholars, the approach has drawn some criticism. Specific critiques argue that the EE concept is too similar to other approaches (Scaringella & Radziwon, 2018), there is a lack of clear reasoning regarding causes and effects (Stam, 2015), and the influence of institutional and political context on the interactions within the EE is unclear (Alvedalen & Boschma, 2017). Also, the role of individual elements like support programmes in the ecosystem remains unclear (Spigel, 2016). This paper focuses on the latter by analysing the role of SUCs in EEs. Thereby, this study addresses a gap in the research on the role of policy initiatives in such ecosystems (Feldman et al., 2019; Scaringella & Radziwon, 2018).

A central argument in EE research is that they comprise the creation and diffusion of 'entrepreneurial knowledge' in the region, which helps create and grow new ventures (Spigel & Harrison, 2018). This particular type of knowledge comes from experienced entrepreneurs and businessmen and thus diffuses horizontally (a vertical diffusion would take place within

the value chain). Scholars identify that horizontal knowledge diffusion in EEs occurs voluntarily, while in systems like clusters, it is normally based on competition (e.g. copying competitive practices) (Autio et al., 2018; Kuebart & Ibert, 2019). In this line of argumentation, 'the distinctive structural elements of entrepreneurial ecosystems, such as new venture accelerators, coworking spaces, and makerspaces, also serve as a forum for cultivating knowledge on effective business model experimentation and the horizontal sharing of it' (Autio et al., 2018, p. 80).

Long lists of such structural elements of EEs exist, including accelerators, incubators, makerspaces, pitch days, start-up weekends, networking events, boot camps, hackathons, university entrepreneurship offices, and public entrepreneurship support programmes (Autio et al., 2018; Spigel, 2017; Stam, 2015). An event included in many lists of such elements of EEs is the start-up competition (Harrington, 2016; Isenberg, 2011; Mason et al., 2020; World Economic Forum, 2013; Wright et al., 2017). SUC works as an umbrella term for various types of competitions, e.g. hackathons, pitch competitions, and business plan competitions (Watson, 2019). One common element among these competitions is their targeting of nascent entrepreneurs (Passaro et al., 2017; Schwartz et al., 2013). For this paper, they are defined as events in which (nascent) entrepreneurs compete for awards and prizes by submitting information (e.g. through business plans or pitch decks) on their (planned) business to a professional jury. This definition covers the core characteristics of such competitions, as descriptive studies of SUCs show (Passaro et al., 2017; Schwartz et al., 2013). Organizers of SUCs differ, but most commonly, SUCs are held by public or a mix of public and private organizations, with the goal to foster entrepreneurship in the region (Passaro et al., 2017; Schwartz et al., 2013).

From a theoretical point of view, SUCs could have various effects on EEs (an overview is provided by Stolz, 2020). First, they could directly influence entrepreneurs, who are the central point of EEs. Studies show that SUCs provide networking opportunities for participants (Russell et al., 2008; Schwartz et al., 2013; Watson et al., 2018). Such social ties are important for nascent entrepreneurship (Davidsson & Honig, 2003) or venture performance (Batjargal, 2003). Another effect would be increasing the quality of new ventures through feedback (Passaro et al., 2017; Watson et al., 2015; Wen & Chen, 2007). Empirical evidence shows that learning in competitions can help entrepreneurs expand a new business or start a new venture

(Klinger & Schündeln, 2011). Also, SUCs provide some, typically minimal, form of financing for new ventures through prizes (Passaro et al., 2017; Schwartz et al., 2013). External financing is an important factor for the survival and growth of new firms (Fotopoulos & Louri, 2000). Consequently, if SUCs help increase start-up rates (e.g. more start-ups or more start-ups that survive), they can impact the EE directly by funding more entrepreneurs or more successful entrepreneurs.

In addition to the direct impact, indirect influences are also possible. A regional culture for entrepreneurship is a core element of the EE approach (Neck et al., 2004; Stam, 2015), which could arise through historic start-up rates (Stuetzer et al., 2014). Also, skilled workers and the integration of universities and research institutions into EEs are central to their existence and development (Feld, 2012; Stam, 2015; Wright et al., 2017). However, university spin-offs require universities to have specific capabilities (Rasmussen & Borch, 2010). One obstacle for such spin-offs is the decoupling from the academic setting and the integration into the commercial setting (Rasmussen & Borch, 2010). SUCs, first developed at universities (Katz, 2003), could help overcome this hurdle.

Some empirical contributions show that SUCs positively influence the probability that the winners will start their new venture afterwards (Gailly, 2006; Klinger & Schündeln, 2011; Michelsen et al., 2013). However, little is known about their functionality. Instead, prior studies focus on the learning effects for the participants, revealing that the main benefits of SUCs for participants are to provide learning environments (Russell et al., 2008; Watson et al., 2015; Wen & Chen, 2007), networking opportunities (Foo et al., 2005; Russell et al., 2008; Watson et al., 2018), and prize money (M. Lee et al., 2015; Russell et al., 2008).

To date, however, no study has examined to whom the participants can be connected or what networks might be extended or made denser through SUCs. The role of SUCs in a broader regional and systemic context, which the EE approach emphasizes, remains unclear (Stolz, 2020). Thus, the following research question is derived for this paper: What role do start-up competitions play in entrepreneurial ecosystems?

Surely this question cannot be answered without examining a sufficient number of SUCs in different EEs and countries worldwide. Thus, this study focuses on insights for theory-building regarding the role of such an event-like element of entrepreneurial ecosystems.

SUCs differ from other elements in an EE that support entrepreneurs and provide networking opportunities due to their event-like character. Programmes such as accelerators and incubators combine financial support (such as subsidized office space and office services, including meeting rooms and cafeterias that function as meeting spaces) with learning or educational services through business advising or coaching (Amezcua et al., 2013; Schwartz, 2009; Tamásy, 2007). These entities often require attendees to have a scalable business model or initial customers already in place (Bliemel et al., 2016). By comparison, SUCs usually only take place once a year for a given period of time and have lower entry barriers (Ross & Byrd, 2011; Russell et al., 2008; Schwartz et al., 2013).

Further, SUCs require participants to submit a proposal, most commonly an elaborate business plan, a detailed pitch deck, or a similar document. The majority of SUCs give away monetary awards and non-cash prizes such as vouchers for coaching or office equipment (Passaro et al., 2017; Russell et al., 2008; Schwartz et al., 2013). To assess the participants and provide prizes, SUCs partner with a broad range of sponsors and judges (Schwartz et al., 2013). Studies report, inter alia, that the following actors are involved: experienced entrepreneurs, venture capitalists, bankers (Foo et al., 2005; Russell et al., 2008), start-up or business consultants (Gailly, 2006), academics, and university staff (Russell et al., 2008). This variety of actors could lead to vertical (e.g. participants and large companies that are potential clients) and horizontal (e.g. participants and other participants, sponsors and judges) networking in the ecosystem. SUCs could therefore fulfil the requirements of a field configuring event, e.g. providing unstructured opportunities for face-to-face social interaction (coaching session, participants meet-ups) as well as ceremonial and dramaturgical events (jury sessions, awarding ceremony) to actors from diverse backgrounds (Lampel & Meyer, 2008).

Studies suggest that EEs develop over time (Autio et al., 2018; Mack & Mayer, 2016; Spigel & Harrison, 2018), though this process takes place in different stages (Cukier et al., 2016; Cukier & Kon, 2018; Mack & Mayer, 2016; Thompson et al., 2018). Moreover, the transition between stages bears risks of failure or lock-in effects, e.g. due to the dependence on policy instruments (Cukier & Kon, 2018; Harima et al., 2021). Simultaneously, policy instruments like accelerators that inject various resources into a EE (e.g. money and international entrepreneurs) are needed for less developed ecosystems to reach the next stage of development (Harima et al., 2021). Such key organizations or events are referred to as ‘anchor

tenants' (Colombelli et al., 2019; Harima et al., 2021). This term stems from early research on the entrepreneurial context, which highlights the role of mega-events (Spilling, 1996) and the formation of anchor firms (Klepper, 2007) in the development of entrepreneurial activity in a region.

As SUCs take place regularly, and normally over many consecutive years, potentially injecting various resources to the EE (social, financial, knowledge), they could not only function as temporal events to support the EE but also have inter-temporal characteristics. In this context, Garud, Gehman, & Giuliani (2014) have introduced arguments related to 'anchored events', which are regularly-held events like conferences and state-sponsored entrepreneurship expositions (or 'expos'). Such anchor events would not only provide entrepreneurs with an opportunity for feedback and networking but also serve as platforms for different parts of ecosystems to coordinate their activities. Anchor events are defined as 'venues for the creation, maintenance, and rejuvenation of networks that constitute ecosystems' (Garud et al., 2014, p. 1183). They fulfil two conditions: first, they allow different actors to connect and integrate multiple constraints in a dynamic fashion; second, they serve as venues for the temporal coordination of different activities (Garud et al., 2014). Recent literature on EEs suggests the existence of different sub-networks of actors, e.g. financial, knowledge, and business subsystems (Clarysse et al., 2014; van Rijnsoever, 2020). Analysing the interconnection among the sub-networks is important for further research on EEs (Alvedalen & Boschma, 2017). As stated above, the variety of actors involved in a SUC could potentially connect such sub-networks horizontally, vertically, and over time. Based on these theoretical arguments, the following proposition for the empirical analysis is derived:

Start-up competitions function as anchor events in entrepreneurial ecosystems, as they regularly bring together actors of different sub-networks, help them coordinate their activities, and create, maintain, and rejuvenate their networks.

As highlighted above, the need for anchor tenants or events, particularly those held or sponsored by public entrepreneurship initiatives, depends strongly on the ecosystem. Seminal contributions on EEs emphasize the role of entrepreneurs in ecosystems and highlight that mature and resilient EEs are led by entrepreneurs and not policy initiatives (Feld, 2012; Isenberg, 2010; Stam, 2015). Also, prominent SUCs give large amounts of prize money, like the RICE Business Plan Competition (Feld, 2012) with $1.5 million in total prizes (RICE University,

2020). Such prizes could attract more entrepreneurs, even from other regions, but depend on the ecosystem, as not every region would have enough sponsors to fund such a large sum. Thus, the role of SUCs could have varying levels of importance in different ecosystems, for example, in terms of size and maturity, but also could be influenced by the ecosystem.

4.3 Method

For the purposes of this paper, exploratory case studies of two SUCs in German EEs were conducted. The case study approach helps to understand new phenomena characterized by a lack of (quantitative) empirical evidence and testable hypotheses, in particular with a range of (regional) economic influences (Flyvbjerg, 2006; Hassink et al., 2016), and allows for the differentiation between mechanisms that are unique to particular ecosystems and those that are standard to the entrepreneurship phenomena (Spigel, 2017). Therefore, this approach best suits the research question at the centre of this paper. To identify mechanisms that may apply to different SUCs or those that are universal, procedures applied by previous studies to identify all 'proper' SUCs in a given country were used (Passaro et al., 2017; Schwartz et al., 2013). Thus, all 196 German competitions (as of 2019) have been identified via internet research, and their websites and brochures were screened for information. Competitions that were no longer active, innovation competitions (where a prize is awarded for a particular innovation but not specifically to entrepreneurs or start-ups), or those competitions that were awarding outstanding businesspersons were excluded. As a result, 62 competitions served as the basis for the case selection. A map of all competitions, the type of organizer, and their location is provided in Figure 4.1.

Figure 4.1 Map of start-up competitions in Germany

Source: Own data. Illustration: Stephan Pohl

As stated in the theory section in this paper, entrepreneurship is understood as a regional event, and the influence of regional characteristics on EEs is presumed. Therefore, it is necessary to consider the potential regional influence on the role of the SUC in the EE. This was done by selecting SUCs in two German regions that differ regarding size, start-up rates, core industries, and GDP, hence using a contrasting case selection (Yin, 2009). Choosing contrasting cases is common in geography (Giblin, 2011) and entrepreneurship research (Swamidass, 2013). Also, it strengthens the findings if both cases support the hypothesized contrast (Yin, 2009). To select suitable contrasting cases, the SUCs located in the previous step were assigned to a NUTS-3 level. Using the city or region as the unit of analysis, often selected based on European NUTS levels, is broadly accepted in research on EEs (Schäfer, 2021; Stam & van de Ven, 2021). This assignment allowed for the addition of comparable data on employment, core industries, start-up rates, and GDP.

Based on that data, two SUCs in the regions of Berlin and Hannover have been selected. Both regions differ greatly regarding these indicators (see Table 4.1 and the following chapter for a detailed description of both regions). Moreover, Berlin is known as Germany's start-up hotspot (Kritikos, 2016) and ranks among the top EEs in the world (Florida & Hathaway, 2018). Hannover, in comparison, has a rather weak entrepreneurial culture, despite its strong university and technology position (Hesse & Sternberg, 2017). Therefore, the SUCs are expected to play a different role in each ecosystem, for example, due to different relevant players or simply because of the sheer mass of entrepreneurs and related actors in Berlin compared to Hannover.

The empirics are based on two SUCs: the Businessplan Wettbewerb Berlin Brandenburg (BPW) in Berlin and the Startup-Impuls (SI) in Hannover (Table 4.1). Both competitions rank among the oldest in Germany, take place once a year, and are structured similarly. For participants of both competitions, the (planned) location of the new venture has to be in the respective local region, and participants must register online. Then, some optional coaching takes place, followed by a period during which prospective participants can submit their documents. These documents will be evaluated, and feedback is given online. Then, the finalists are chosen. The award ceremonies are public events. Both competitions have additional coaching sessions and networking events throughout the entire event.

Table 4.1 Empirical overview of the regions and SUCs studied

Analysed region	**Berlin**	**Hannover Region**
Inhabitants (2018)	3,644,826	1,157,624
Inhabitants per km² (2018)	4,090	504
Size in km²	891.12	2,297.13
GDP (in Mil. €, 2016, current market prices)	138,907.71	51,089.13
Universities / Technical colleges	39	8
Students (2019)	188.347	49.619
Business registrations per 10.000 persons of employable age (2018)	188.4	125.5
Unemployment rate (in %, 2019)	7.8	6.3
Employees covered by social insurance (2019)	1,516,487	517,032
… of whom work in agriculture, forestry and fishery (in %)	0.04	0.23
… of whom work in the manufacturing industry (in %)	13.34	20.54
… of whom work in service industries (in %)	86.62	79.23

Analysed competition	**BPW Berlin Brandenburg**	**Start-up-Impuls**
Organiser	Investitionsbank Berlin (IBB) (Federal State Development Bank)	Hannoverimpuls (Regional Business Development Agency)
Founding year	1996	2003
Regional restriction for participants	New venture must be founded or located in Berlin or Brandenburg	New venture must be founded or located in Hannover Region
Age limit for participants venture	Venture is newly founded or founded in the past 12 months	Venture is newly founded or founded in the past 12 months
Active participants (2018)	428	128
Document to be submitted and assessed	Business plan or detailed Canvas	Pitch Deck including detailed financial plan
Highest amount of prize money to be achieved by one participant	15,000€ + 5,000€ (sustainability prize)	30,000€ + Trip to Silicon Valley / Tel Aviv

Sources: Destatis (2019); Eurostat (n.d.); Arbeitsagentur (2019); IfM Bonn (2018); Hochschulkompass (n.d.); Hannoverimpuls (2019); IBB (n.d.)

4.3.1 Situating the cases of Berlin and Hannover

Both regions differ significantly in terms of population, population density, and predominant industries, as well as their political and social significance. As Germany's capital city, Berlin is the base for federal ministries and the branches of numerous national and international corporations and organizations. Berlin is also home to 29 non-university research institutes and ten federal research institutes, compared to five non-university research institutes and four federal institutes in Hannover (BMBF, n.d.). However, in terms of their importance to the surrounding municipalities, they exhibit some similarities: both are the capital cities of federal states (Berlin for Berlin and the city of Hannover for Lower Saxony) and have the highest populations, as well as the most universities and students, compared with all surrounding regions.

Regarding entrepreneurship, Berlin shows more new business registrations per person than Hannover. Apart from these numbers, which include all kinds of new business, it also has a vibrant start-up scene that has produced some unicorns (e.g. Auto1, Delivery Hero, N26, Hypoport, Zalando, Rocket Internet). These firms have attracted a range of international venture capitalists,[7] a phenomenon that is still relatively rare for Germany. Berlin has attracted companies from all over the world to launch incubators and accelerators, e.g. Microsoft and Porsche.[8] The successful start-ups in Berlin led to the establishment of VC funds and business angel networks (for example, saarbrücker21[9]) that invest in new tech start-ups and hold entrepreneurial related events. Therefore, the ecosystem is relatively mature and could be described as entrepreneur-led or self-sustaining (Harima et al., 2021; Spigel & Harrison, 2018). Hannover, in comparison, is not well known as a location for start-ups. Lower Saxony is more rural and characterized by an industrial past with large corporations that remain active today (e.g. Volkswagen Nutzfahrzeuge, Continental, Komatsu Hanomag). The Hannover region is also home to TUI, Germany's biggest travel company, and different leading insurance companies (VHV Group, Talanx, and Hannover RE). Not many well-known start-ups

[7] See https://techcrunch.com/2019/07/17/banking-start-up-n26-raises-another-170-million-at-3-5-billion-valuation/ [last access: 27.09.2021].
[8] See https://news.microsoft.com/de-de/presskits/microsoft-scaleup-berlin/ [last access: 27.09.2021]; https://apx.ac/ [last access: 27.09.2021].
[9] https://www.sb21.de/ [last access: 27.09.2021].

exist in Hannover. In contrast to Berlin, in Hannover, there is only one private coworking space (with two locations), which has its own accelerator.

Concerning public support for entrepreneurship, both regions are home to active programmes with multiple similarities. For example, each has an economic development agency: Berlin Partner and Hannoverimpuls. These agencies are focal points for entrepreneurs and carry out consultancy work, help with promotional funds, and refer entrepreneurs to other organizations if needed. Also, both regions have entrepreneurship support offices at their universities. Both also serve as home to their federal state's public development banks (IBB in Berlin and NBank in Hannover). These banks carry out state-specific entrepreneurship support programmes that differ in some points but are mostly very similar. In general, support programmes for entrepreneurship, especially regarding finance, are very common in Germany and are evaluated positively by entrepreneurship experts, even in international comparisons (Bosma et al., 2020). These organizations not only carry out various entrepreneurship support programmes but also organize the SUCs that have been analysed. Hannoverimpuls organizes the SUC in Hannover, and the SUC in Berlin is organized by the IBB.

In both regions, the programmes also manifest in the form of public-owned coworking or office spaces. In Hannover, there is a publicly owned coworking space with an accelerator[10] and publicly supported office spaces and workshops for creatives.[11] As with start-ups, there are many more publicly supported offices in Berlin, for example, at universities[12] or provided via public economic development agencies.[13] Although both regions provide strong public support, Hannover has far fewer start-ups and entrepreneur-led initiatives; thus, its EE can be described as less mature than that in Berlin. Initial dynamics exist in Hannover, but it is unclear whether enough entrepreneurial activities and networks exist for the ecosystem to become self-sustaining.

[10] See https://venturevilla.de/ [last access: 27.09.2021].

[11] See https://www.wirtschaftsfoerderung-hannover.de/de/Gruendung/HALLE_96.php [last access: 27.09.2021].

[12] See https://humboldt-innovation.de/de [last access: 27.09.2021].

[13] See https://charlottenburg.wista.de/charlottenburger-innovations-centrum/ueber-uns/ [last access: 27.09.2021].

4.3.2 Interview data

In order to obtain comprehensive information on the SUCs and their role in both regions' EEs, qualitative interviews with participants, judges, and organizers of the SUCs, as well as local ecosystem experts, were conducted. Also, the award ceremonies were visited. A random sample of individuals who had participated in the last three years and were traceable via online research was contacted for interviews. However, participants who were mentioned online were mostly winners. Also, the organizers were not able to provide contact data on participants due to data protection regulations. To counterbalance that effect, a snowball approach was applied after the initial interviews were held. In total, 45 face-to-face interviews have been conducted from May 2019 to January 2020. Out of these interviews, 29 were participants, and 16 were ecosystem experts. Of the participants, 11 were winners, 15 did not win any money but somehow still profited (e.g. were mentioned on the website or received nominations for prizes, which included professional videotapes), and three won nothing at all. Out of these, 16 were participants in Berlin and 13 in Hannover. The interviewed organizers and experts were found via online research on relevant ecosystem actors, e.g. banks, entrepreneurship support offices at universities, business angels (Stam, 2015). Ten ecosystem experts in Berlin were interviewed and six in Hannover. The sampling process was stopped when theoretical saturation was achieved (Glaser & Strauss, 1967).

The average interview length was 49 minutes. The interviews were semi-guided, with open questions that were based on previous theoretical and empirical contributions and primarily related to the respective competition, the start-up climate, and important local stakeholders and networks. Anonymity was ensured for all interviewed persons, and all interviews were recorded and subsequently transcribed. To analyse the interviews, the method of structuring content analysis was applied (Kuckartz, 2016). It allows for the analysis of interview data by applying deductive codes (based on the proposition and their theoretical foundation) and complementing them with inductive codes based on the material, developed from newly found information (Kuckartz, 2016). The results were summarized and incrementally reduced to the essentials regarding the proposition. The analysis was conducted using the software MaxQDA.

4.4 Results

The analysis of the interviews with entrepreneurs (ENT) and ecosystem experts (EXP) illuminates two main layers of the role that both SUCs play in their EEs. First, SUCs function as an initial baptism of fire for participants and provide them and other actors with helpful feedback and networking opportunities. This layer is referred to as the role of the SUC within the ecosystem, since it directly impacts central elements of EEs: entrepreneurs, and the networks between relevant actors (Stam, 2015). This layer also represents the findings regarding the role of SUCs as anchor events, which was identified theoretically. Second, these effects depend on the size and structure of the corresponding region. There are differences between both regions and the position of the SUC in the respective ecosystems, for example, regarding the relevant industries and size of the ecosystem. This layer can be described as the impact of the EE on the SUC. The findings regarding both layers will be explained in detail below.

4.4.1 The role of SUCs in the EEs of Berlin and Hannover

The interviews show that for both regions, the SUCs are well known among people who actively search for entrepreneurship support and their peers, but not the entire population. The organizers are highly connected to other (semi-)public organizations that aim to foster entrepreneurship in the region. These other organizations promote the competitions when they advise nascent entrepreneurs. This detail was mentioned by entrepreneurs, consultants at university entrepreneurship offices and chambers of commerce, and the competitions' organizers. This approach leads to a situation where nearly every student entrepreneur in both regions who seeks information about entrepreneurship will sooner or later come across the SUC.

Organizers of both competitions said that one of their goals is to reach every (potential) entrepreneur and to be a central contact point for them due to their political objectives as public organizations. This initiative seems to be working since a wide range of participants were found in both SUCs, including self-employed tailors and start-ups developing a new device to treat heart failure. These cases are exemplary for two main groups of participants that could be identified: 1) self-employed entrepreneurs, who are craftsmen or have ideas for

small businesses; and 2) university or company spin-offs, mainly consisting of teams of students, PhDs, or experienced workers. During the analysis of the interviews, it became clear that these groups benefit differently from their participation. However, what both had in common was that they were able to network.

Networking in both SUCs occurs among these actors: a) entrepreneurs among themselves, b) entrepreneurs and judges/coaches, c) judges/coaches among themselves. The following groups of actors were actively and continuously involved in the SUCs: banks, chambers of commerce, entrepreneurship development agencies, corporations, venture capitalists, business angels, tax consultants, business consultants, and lawyers. They mainly contribute through sponsorship, participating in a jury, delegating coaches, or promoting the competition. Therefore, the involved actors are very similar to those found in other competitions (Foo et al., 2005; Gailly, 2006; Russell et al., 2008). Networking takes place in two different phases: the assessment phase and the award ceremony. In the assessment phase, participants can connect with coaches and judges (and vice versa) through individual coaching or possibly meet the judges after assessing the business documents. Here, the heterogeneity of judges, coaches, and participants leads to very different outcomes for the entrepreneurs. Another finding regarding the networks is that the assessment phase allows jury members to connect to entrepreneurs at a very early stage. As one investor stated:

> ‘We often take part in juries and generate many deals out of that, of course’. (EXP23, Berlin)

The first group of participants (i.e. the self-employed, less innovative start-ups) benefitted the most from connecting during the competition. They found it very motivating to connect with entrepreneurs in the second group (e.g. university spin-offs) who they usually would not have met. They learned a lot and experienced some kind of start-up atmosphere, which they had not encountered before. The second group of participants did not mention profiting much from these interactions yet found it pleasant to connect to peers in the second group.

The second phase that allows for contacts to develop is the award ceremonies. They include a full evening with numerous networking opportunities for entrepreneurs and related actors. The circle of participants at the ceremonies consists of actors involved in the competition, sponsors, and guests. The ceremony was described positively by participants, judges, and ecosystem experts, who noted that it might lead to first clients in some cases or to contacts

with executives or investors. An additional finding is that the networking effects seem more significant for winners. Based on the data, it is not clear whether the winners are more successful entrepreneurs than others or whether some early-stage start-ups, which would be successful otherwise, participate due to windfall profits. There were also indications that an award might signal future investors. As one entrepreneur said:

> 'Well, I mean, the interest of the fund clearly came because we won – and it already was the second competition that we won […]. If you win two competitions, it is like, "ok, this is more than just a blind chicken that finds corn every now and again". There has to be something to it. And then you get attention'. (ENT17, Berlin)

Other entrepreneurs expressed similar experiences (12, 13, 20 in Berlin; 35, 39 in Hannover). However, the interviewed investors disagreed with that point of view. While initial contacts could be made through the SUCs, and it was stated that it was easier to initiate a personal connection while having a beer at the award ceremony, for investors, it was the numbers and the documents that counted in terms of investment decisions. This finding highlights another role of the SUCs, as winners would feel more secure about their ability to launch a business successfully and to obtain (financial) resources after finding confirmation by winning the SUC. Moreover, prize money or its equivalent, like trips to Silicon Valley, were found helpful by entrepreneurs. Though the investors disagreed and mentioned their reliance on numbers alone, this is relevant in terms of anchoring entrepreneurship in a region because it drew attention to the competition and its winners.

The award ceremony is also one possibility for the groups of actors to connect. The interviewees found it to be a great networking opportunity but claimed that the people they would see at these events were already a part of their network. Thus, the connections primarily entailed the 'maintenance' of networks. Nevertheless, the SUC was described as an opportunity for new actors to connect with experienced actors, thus 'rejuvenating' the network:

> 'Definitely, the getting together of different actors brings new potential and additional links, because those who have been in the game longer, who are more courageous regarding that scene, they connect with those who are more conservative, and help to break the ice and integrate those people into the scene'. (EXP38, Hannover)

These findings highlight the role of the SUC as a networking event in the EE, bringing together a variety of actors for a short period of time in an environment where they feel comfortable. The combination of events like the jury assessments, coaching, and awards ceremony provides different opportunities for networking and actors to meet. A key finding here is that entrepreneurs often participate only once in a SUC, evolve, and change priorities, whereas coaches, judges, and sponsors participate many years in a row, which helps them strengthen their networks and integrate new actors into the network. This inter-temporal perspective shows that the SUCs anchor the activities of those actors. In the theory chapter, the proposition was developed that SUCs could function as anchor events in EEs. Regarding this proposition, the findings show that both competitions serve as anchor events for parts of the ecosystem, particularly the entrepreneurship support offices at local universities.

As many experts stated, universities play an important role in both ecosystems and are the origin of the majority of the second group of participants (innovative start-ups). In both ecosystems, the universities had entrepreneurship support offices to assist aspiring entrepreneurs. Consultants in these support offices strongly rely on the SUCs. Compared to the anchoring explained above, this involvement refers less to creating, maintaining, and rejuvenating networks than some type of outsourcing for the support offices. The reason is twofold: First, the competitions provide a learning environment for the entrepreneurs that is highly appreciated by the support organizations. While, from an ecosystem perspective, the creation and distribution of specific entrepreneurial knowledge are important (Stam & Spigel, 2018), no detailed analysis is provided here, as the findings are similar to previous studies that find that SUCs can bring specific knowledge to (some of) the participants (Russell et al., 2008; Watson et al., 2018). Second, in a result that strengthens the postulated anchor role, it was found that the SUCs provide a kind of obligation for their participants to deal with their businesses. The interviews with university entrepreneurship offices showed that they used SUCs to ‘force’ some of their teams to focus on business goals and find clients rather than getting stuck developing and improving a high-tech product or service.

For this role of SUCs as a knowledge hub for entrepreneurs, the type of SUC seems to be important. There are many SUCs in Germany, some for specific industries only (e.g. biotech, digital solutions), leading to more precise feedback for certain niche high-tech start-ups at

these competitions. According to one entrepreneur whose team also participated in a biotech SUC:

> 'the feedback we got at Science4Life, we really, really used. […] On the other side, at BPW, the feedback did not really help us, but we won €10,000€'. (ENT11, Berlin)

This finding indicates that such specific niche SUCs could be anchor events, but probably for a sector or a national EE rather than a regional EE. Also, the region influences the industrial expertise of the jury and coaches, a finding that will be discussed in the following section in detail.

In both regions, networks of entrepreneurs and actors seem to exist who are not connected to the SUC. Both competitions only get in touch with entrepreneurs who actively seek information, either via internet research or support organizations. Successful entrepreneurs who never searched for public support and, accordingly, were not in touch with the SUCs, were found in both regions. There is also another type of network in Berlin: wealthy entrepreneurs, who are now business angels and have their own elite business angel networks. Additionally, international venture capital funds are active. These players invest in high growth firms that they primarily recruit via private networks. As one investor noted:

> 'And this is another scene that has developed in that Berlin ecosystem. It is not typical for Germany; it is more American and a bit elitist […]. If you are in that small ecosystem, you can build extraordinary things. The big things do not run via such business plan competitions'. (EXP24, Berlin)

This section has highlighted the diverse role SUCs have in EEs. In both regions, they help local authorities and support offices in their work and networking. They are well-known among university spin-offs and help them gain attention and investment. Overall, they anchor the public support services for entrepreneurship by being a regularly held event that, unlike most expos or fairs, is represented by its own offices in the town the whole year. At the same time, there are (particularly in Berlin) sub-networks of actors that are very important for a mature and entrepreneur-led ecosystem, e.g. rich business angels, venture capital funds, and gazelle start-ups (Feld, 2012; Harima et al., 2021; Spigel, 2017; Stam, 2015). Thus, both SUCs only work as anchor events for specific parts of the EEs.

4.4.2 The influence of the regions on the SUCs and their role in the ecosystems

While both SUCs exhibit similarities regarding their structure, involved actors, and impact on the participants, some differences can be attributed to each region. The interview data shows that both competitions are dependent on their respective regions. The organizers state that the vast majority of participants come from the region, and the same applies to the judges and coaches. This factor influences the competitions in two ways. First, it affects the number of participants and how easy they are to find. In Berlin, with vastly more inhabitants, start-ups, and entrepreneurship-related actors, local experts, as well as the organizer of the SUC, found it easy to locate many participants yet noticed intense competition:

> 'Berlin is the hotspot […] we have the critical mass of entrepreneurs that we can address […]. It is a bit difficult. We noticed that we have a disadvantage because we are so old. It is not hip anymore to talk about it […]. There are big companies coming to Berlin with new events'. (EXP2)

In Hannover, in comparison, an interviewed local bank even closed its venture capital company due to a lack of promising investment cases. Interviewees found the local scene to be very small but, as a result, had the feeling they were connecting to relevant players through the competition.

Second, the local base of judges and coaches inherits a bias of expertise for certain sectors. In Berlin, several participants said that they missed judges with industrial expertise or visitors from large industrial corporations to connect with at the award ceremony. As one entrepreneur said:

> 'I mean, in Berlin, the scene is not known for its technology. I do not mean tech in the sense of a new platform, but like engineering'. (ENT17, Berlin)

There were no similar statements from participants in Hannover. Two interviewed participants even worked as engineers at Volkswagen. Another one, who founded an insurance tech start-up, said:

> 'Investors and contacts to the sector though – to the insurance sector. […] The judge was a business angel. He said he also had an expert with him. And the expert was from

> the industry and helped us. We decided against the investment later, but the contacts remain'. (ENT30)

This strong regional integration gives both competitions the advantage of being fairly well known in the local network (besides the sub-networks in Berlin). However, as Hannover's EE is smaller, both participants and actors from local support services felt they were able to connect to all important actors in the local network through the SUC. In contrast, people in Berlin knew from their daily experiences that there are other, unconnected networks in its far larger ecosystem.

The regional integration also affects the SUC's role in ecosystem development. Thus, although both competitions had successful start-ups, these are not at the level of unicorns or comparable fame. As the previous section showed, the majority are solo entrepreneurs or small, knowledge-intensive university spin-offs. As highlighted in the theory section, the integration of international actors plays an important role in EE development. In both regions, the SUCs had no contact with such actors. Nevertheless, while the interview data does not cover the early years of the SUCs, it still indicates that the SUCs help create the groundwork of an EE, i.e. bring many people, some of whom had little prior affinity for entrepreneurship, in contact with the topic. Further, SUCs provide less business-oriented people with an 'entrepreneurial spirit' that is elementary for ecosystems.

4.5 Discussion

The EE approach is suitable for understanding (regional) entrepreneurial activity, yet it is criticized for some issues. Scholars highlight that the role of (single) policy measures and the overall role of policy in ecosystems need further elaboration (Alvedalen & Boschma, 2017; Brown & Mason, 2017; Feldman et al., 2019; Spigel, 2016). This paper addresses this gap by analysing two SUCs in Germany. It contributes in two ways to the literature on EEs and the economic geography literature that researches EEs.

First, in lists that enumerate the elements of ecosystems, SUCs are included as often as comparatively similar policy instruments like incubators and entrepreneurship support events (Feld, 2012; Harrington, 2016; Isenberg, 2011; Mason et al., 2020; Motoyama & Knowlton, 2017; World Economic Forum, 2013; Wright et al., 2017). However, previous research has not

explicitly considered SUCs' role within the EE context (an exception is Motoyama & Knowlton, 2017). Analyses to date often focus on incubators, accelerators, and coworking spaces (Hochberg, 2016; Nicholls-Nixon et al., 2021; van Rijnsoever, 2020). Empirical studies mainly examine output in terms of new ventures, their survival rates, or perceived benefits from participation (Chan et al., 2020; Del Sarto et al., 2020; Gonzalez-Uribe & Leatherbee, 2018; Grimaldi & Grandi, 2005; Schwartz, 2009). This is also the case for research on SUCs that has been done apart from EEs (McKenzie, 2017; Russell et al., 2008; Watson et al., 2015, 2018). While this helps reveal their overall effectiveness, it does not look at their role and how these instruments are embedded in the ecosystem and its local network of actors. By using case studies and interviews with different actors, this study provides the view of participants and external experts. This approach reveals a more differentiated picture of the role of SUCs. They anchor the activities of local entrepreneurship support agencies by regularly connecting them and by helping them to fulfil their support functions for start-ups. However, both SUCs are publicly funded and are mainly connected to other public actors. Any integration of these networks into those with influential business angels, international venture capital funds, or particularly successful start-ups could not be found. This integration would be important because these actors are particularly relevant for the development of EEs.

Second, the chosen method of contrasting case studies allows comparisons of two similar SUCs in different regions with distinct ecosystems, which helps identify mechanisms that can be attributed to the particular regional ecosystem and those that can be attributed to the SUCs in general. The economic geography literature has proven the importance of location in individuals' decisions to become entrepreneurs, particularly regarding cities (Andersson & Larsson, 2016; Bosma & Sternberg, 2014). Regions can develop substantial entrepreneurial activities despite different circumstances if some generic functions are present, such as the creation and dissemination of knowledge (Saxenian, 1994; Spigel, 2017). The present study shows that SUCs as an element of public entrepreneurship support also have such functions (learning environment, networking opportunities, prize money), but their form is partly influenced by the region in which they are located. In particular, both SUCs function as regular events that connect public actors and bring them together with entrepreneurs, who also achieve some learning effects (for a detailed analysis of learning effects in SUCs, see Stolz & Sternberg, 2022). The findings highlight the heavy reliance of SUCs on regional resources (funding, coaches, participants) and reveal that their role in the ecosystem is partly perceived

differently depending on the regional circumstances. The local industry structure influences the composition of the jury and the coaches, which influences the perceived value of the feedback. Also, entrepreneurial networks exist that are not connected to the SUC.

It is not clear if the effects that were found also apply to SUCs in different surroundings, e.g. different legal frameworks in other countries. Although 45 interviews were conducted and two different ecosystems were included in the analysis, the results are limited in terms of generalizability due to a qualitative approach and a lack of complete information on all participants in both competitions. Therefore, no random sample out of all participants could be selected. While some participants were not successful in the competition, most interviewees were winners or nominated for an award. Further research with complete rosters of competition attendees is needed to expand the findings and could also provide information on the development of SUCs and EEs over time (Malecki, 2018). Regarding the debate about the development stages of EEs, no clear results could be achieved. While both SUCs play an important role for many actors, it is unclear if other events would fulfil this role if the SUCs were absent. The findings show that some actors are in touch with the SUCs every year, and thus, an inter-temporal anchoring occurs. However, longitudinal analysis is needed to understand the role of such events in the development of EEs. Finally, the analysed competitions are held by public organizations and sponsored by a mix of public, semi-public, and private actors. This characteristic applies to the majority of German SUCs (Schwartz et al., 2013) and is typical for the landscape of German entrepreneurship support, but it limits the results to comparable competitions and frameworks. Nevertheless, by examining two such different ecosystems, it was possible to identify some functions of the competitions that were the same in both ecosystems despite the different framework conditions.

4.6 Conclusion

This paper demonstrates the multifaceted role of two SUCs in their respective ecosystems in the German regions of Berlin and Hannover. The SUCs have a clear role in the local networks of different entrepreneurship support organizations, providing an important point of contact for other support services in the ecosystems, especially at universities. Consultants at such support offices would send their clients to the SUCs in order to ‘force’ them to focus on

business aspects and less on technical solutions. The SUCs served as anchor events for those support actors, helping to maintain networks and even rejuvenate them by integrating new actors. This added inter-temporal perspective shows that SUCs, through their continued presence, both through their work throughout the whole year and due to the continuity of the competitions over many years, anchor the other support organizations in the region. However, these functions are primarily important for networks of public or semi-public actors. While some investors from venture capital funds and business angels who participated in the SUCs were interviewed, active sub-networks of wealthy business angels and international venture capital funds exist that are not connected to the SUCs. Thus, the proposition developed in the theoretical section can only be partly confirmed, as the anchoring does not cover the whole ecosystem but is important for specific sub-networks.

An additional effect that is not directly connected to networks, but can still be referred to as an anchoring effect in the EE, is publicity and a kind of 'seal of approval' for the winners of the SUCs. While interviewed investors said they only rely on the business model and the numbers, the winners of both SUCs stated that the award led to investment offers and increased publicity. The findings highlight the different layers that interdependencies and networks in EEs have; for example, regional characteristics influence the individual benefits entrepreneurs obtain from SUCs. A smaller ecosystem makes it easier for the SUC to be well connected.

The results lead to valuable policy implications: Firstly, SUCs are helpful for early-stage entrepreneurs and entrepreneurship support offices. However, they lack connections to relevant ecosystem players. In line with scholars who call for more systemic approaches to foster EEs (Brown & Mason, 2017; Brown & Mawson, 2019), this paper demonstrates that politicians or SUC organizers should try to integrate those actors. This encouragement could happen through joint follow-up investments from private and public actors. A difficulty is the heterogeneity of the entrepreneurs who participate, which leads to the second policy implication: Feedback at SUCs often depends on the expertise of the judges and the technical level of the business. Entrepreneurs who also participate in SUCs that are active in specific fields (e.g., biotech), obtain more helpful technical feedback from them and are connected to relevant industry players. This finding could be applied by creating nationwide SUCs to anchor specific industries.

Another finding is that the SUCs in both ecosystems play an important role for local (university) entrepreneurship support offices, in particular by providing relevant knowledge and forcing the participants to focus on business aspects. Regions without competitions but with universities could learn from this and establish a SUC. Also, the EE of Berlin is already mature and can be described as entrepreneur-led. The interviews did not provide information on whether SUCs can help generate or support enough well-connected entrepreneurs to significantly foster the development of an ecosystem. The ecosystem in Hannover is not that developed yet, and so far, the competition has not been able to change that. However, participants and stakeholders found it essential to feel that something is happening and that these opportunities exist. Regularly bringing together different stakeholders can be mentioned as the primary function of the SUCs. Policymakers should ensure that competitions are run over many years to enable such 'anchoring'. The reality is that many competitions are abandoned or replaced by new ones, which prevents this continuity.

Finally, the empirical findings are limited in terms of generalizability due to the case study approach and the focus on qualitative data. Further research should consider SUCs in other regions and countries. Previous studies show that in Berlin, distinct entrepreneurs designate different locations as networking places and rely on personal networks more if they have higher levels of experience (Heebels & Van aalst, 2010). The present study found similar results for participants in the SUCs. Further research could analyse more in detail the locations where SUCs take place within cities, revealing whether the choice of locale influences the abilities of SUCs to connect with more than just public actors and entrepreneurs. Also, both analysed competitions are publicly-funded business plan competitions. Supplementary research should study private competitions or those only aimed at, for example, innovative start-ups to verify whether they affect the ecosystem similarly.

5. Do the winners really take it all? Exploring entrepreneurial learning in start-up competitions

This chapter is a preprint of the following published article:

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Abstract: Originating from business plan competitions at universities, Start-up Competitions (SUCs) are nowadays a widely used policy tool to foster entrepreneurial learning among a larger group of potential and nascent entrepreneurs. While the literature on entrepreneurial learning highlights the importance of participants' prior experiences, studies on learning in SUCs often ignore these experiences, but detect different perceptions of the learning outcomes from SUCs. To address this research gap, we explore configurations of prior experience and the participation routines of entrepreneurs at SUCs. To do so, we apply fuzzy-sets qualitative comparative analysis (fsQCA) to in-depth interview data from 26 participants at two German SUCs. Based on theories on entrepreneurial learning, insights from the interviews, and our empirical results from fsQCA, we identify both one necessary condition and two specific configurations of conditions that lead to the outcome. The absence of entrepreneurial knowledge was found the be a necessary condition for entrepreneurial learning in SUCs. Prior industry experience is part of both solutions, but whether the presence or absence of it is important depends on whether it is combined with active participation in the competition. We present implications for policymakers, entrepreneurs, and researchers.

5.1 Introduction

Fostering small and medium-sized enterprises (SMEs) and entrepreneurship has been a policy goal for decades (Gilbert et al., 2004; OECD, 2003). However, entrepreneurs are less tangible than SMEs; they may merely be pursuing an idea but have not yet founded a venture (Lundström & Stevenson, 2005; Raposo, 2009). Thus, supporting entrepreneurship requires systemic approaches that address both financial and 'soft' aspects, such as transmitting knowledge and entrepreneurial skills or providing network opportunities to other entrepreneurs (Audretsch, 2004; Lundström & Stevenson, 2005). The development of these skills is often embedded in programs for entrepreneurial education in schools and universities, either within the curriculum or extracurricular activities (Lundström & Stevenson, 2005; Mason et al., 2020) or combined with other support services in specific programs such as incubators (Amezcua et al., 2013; Schwartz, 2009).

A policy instrument that has gained popularity as a learning environment for entrepreneurs is start-up competitions (SUCs) (Passaro et al., 2017; Russell et al., 2008; Stolz, 2020; Watson et al., 2015). Rooted in business plan competitions at U.S. universities in the 1970s (Katz, 2003), SUCs have spread outside of universities and internationally quickly. While comprehensive overviews do not exist, studies for single countries reported 77 active SUCs in Italy (Passaro et al., 2017) or 71 in Germany (Schwartz et al., 2013), but in each case the majority of these are not associated with universities and they are aiming to support nascent entrepreneurs in the region. While the primary goal of SUCs is to provide evaluation and feedback regarding the business (or idea), they may also offer additional coaching and training sessions, as well as opportunities to pitch and network (Schwartz et al., 2013; Stolz, 2020). A rich body of research examines the learning processes that occur during participation in SUCs (Foo et al., 2005; Russell et al., 2008; Watson et al., 2015, 2018; Wen & Chen, 2007). However, the results are ambiguous. Various types of training during SUCs affect entrepreneurs differently (Klinger & Schündeln, 2011). Some learning effects are perceived as helpful for future competitions, rather than in the 'real' business world (Gailly, 2006; Watson et al., 2018). The effects differ among entrepreneurs (Russell et al., 2008; Thomas et al., 2014; Watson et al., 2018). Further research is needed on which types of entrepreneurs benefit from the learning effects in these competitions (Watson et al., 2018). Theory on entrepreneurial learning suggests that the

learning process for entrepreneurs is influenced by the outcome of previous events, as well as an individual's management, industry, and start-up experience (Minniti & Bygrave, 2001; Politis, 2005; Rae & Carswell, 2001). Prior studies on entrepreneurial learning in SUCs have not accounted for this. It is unclear whether the presence or absence of conditions such as prior management experience hinders or enhances learning in SUCs.

By considering these conditions, we present a novel approach to understanding learning in SUCs and event-like policy instruments to foster entrepreneurship. We draw on configurations theory to identify configurations of sets that lead to entrepreneurial learning in SUCs. We utilise a fuzzy-sets qualitative comparative analysis (fsQCA) based on interview data from 26 participants at two German SUCs. Qualitative comparative analysis (QCA) is a set-theoretic method that examines the relationships between the outcome of interest and all possible combinations of states of its predictors (Fiss, 2007; Ordanini et al., 2014). This approach is useful for complex phenomena like entrepreneurial learning because it allows for going back and forth and switching between cases and relevant theories (Rihoux & Ragin, 2009); thus, it can provide greater insight into a theoretical and practical understanding of the topic and the individual cases (Douglas et al., 2020; Şahin et al., 2019).

The remainder of this paper is structured as follows. First, we provide a literature overview on policy instruments to foster entrepreneurial learning. Next, we describe the research field of entrepreneurial learning in the context of SUCs and develop propositions for the fsQCA, based on prior theories on how entrepreneurs learn. We describe the sample and overview the method. The propositions are analysed using fsQCA, and the results are presented and discussed. We describe the implications for entrepreneurs (future participants of SUCs), policymakers, and further research.

5.2 Theoretical background

5.2.1 Policies to support entrepreneurship: The case for entrepreneurial learning

Behind public support for entrepreneurship stands the empirically based recognition that start-ups and small firms contribute substantially to job creation (Birch, 1987; J. C. Haltiwanger et al., 2012). While policies for small and medium-sized firms have existed since the 1950s,

policies aimed at entrepreneurship are a comparatively recent phenomenon (Audretsch, 2004). Policies for entrepreneurs are different from those that apply to SMEs (Audretsch, 2004; Lundström & Stevenson, 2005; Raposo, 2009). A key difference is the measures used to support these firms, due to the difficult target group that entrepreneurs comprise – they may not yet have a firm that could be supported, while SMEs are easily identifiable firms. Financial incentives or benefits can be applied to SMEs, while entrepreneurship policies may have to use nonfinancial levers, such as supporting and providing networks, support services, training, and education (Raposo, 2009). Among various policies that address the particular problems of (potential) entrepreneurs (e.g. administrative burdens and access to loan finance or equity capital) are policies that support the development of entrepreneurial skills (Audretsch, 2004; Lundström & Stevenson, 2005). These policies cover the further development of skills in existing small entrepreneurial firms or the general teaching of entrepreneurial skills – for example, through entrepreneurial education in universities (Audretsch, 2004). Entrepreneurial education can be conducted in schools and universities as part of the curriculum, as well as through extracurricular activities and programmes such as start-up competitions, entrepreneurship clubs, and bootcamps (Mason et al., 2020; Pittaway et al., 2011, 2015).

As part of these policies, notable approaches include accelerators, incubators, and SUCs (Albort-Morant & Oghazi, 2016; Amezcua et al., 2013; Hochberg, 2016; Schwartz et al., 2013). Programmes such as incubators combine financial support (such as subsidized office space and office services, including meeting rooms and cafeterias that function as meeting spaces) with learning or educational services through business advising or coaching (Amezcua et al., 2013; Schwartz, 2009; Tamásy, 2007). By comparison, SUCs are similar to events and normally have lower entry barriers, because incubators often require attendees to have a scalable business model or first customers already in place (Bliemel et al., 2016).

Compared to incubators, SUCs are a rather old tool for fostering entrepreneurship – they have been conducted for half a century in the United States (Katz, 2003). However, universities and politicians in other countries quickly adopted them to target and support entrepreneurs (Lundström & Stevenson, 2005). While SUCs are often associated with entrepreneurship in higher education (Lundström & Stevenson, 2005; Russell et al., 2008; Watson et al., 2015), more recent overviews show a broad range of competition types outside of universities, often

held by public organizations or as cooperative efforts between public and private organizations (Passaro et al., 2017; Schwartz et al., 2013). The goal behind SUCs is to increase awareness of entrepreneurial opportunities and entrepreneurship as an career path (Lundström & Stevenson, 2005), or more generally to increase the quality and quantity of entrepreneurship. This is accomplished by shaping individual decisions to become an entrepreneur and by providing individuals with relevant skills (Schwartz et al., 2013). The key feature of SUCs is the learning environment they provide to develop these skills; this has been discussed theoretically (Passaro et al., 2017; Stolz, 2020) and analysed empirically using both qualitative and quantitative methods (Klinger & Schündeln, 2011; Russell et al., 2008; Watson et al., 2015, 2018).

The results are twofold. While there is quantitative evidence that SUCs increase the probability that participants (particularly winners) will actually found a venture (Gailly, 2006; Klinger & Schündeln, 2011; Michelsen et al., 2013), it has also been reported that a significant portion of participants do not found a venture (Michelsen et al., 2013) and that the learning outcomes are also ambiguous (Klinger & Schündeln, 2011; Russell et al., 2008; Watson et al., 2018). A gap between the learning outcomes which intended to and obtained from exists (Watson et al., 2018). It is unclear whether some participants learn much more in these competitions than others and why that may be the case.

5.2.2 Entrepreneurial learning in SUCs

Ever since Knight (1921) theorised that entrepreneurs make profit due to the anticipation of what can be sold in the market in the future by applying calculations or past experience, knowledge and learning have been key aspects for analysing entrepreneurship. Kirzner (1973, 1979) sees entrepreneurs as people whose whole function in the economy is finding unknown opportunities. To do so, entrepreneurs need a specific kind of knowledge that is less concerned with knowing the market data and more focused on where to find the relevant data. Kirzner describes this as the alertness to find market data. He defines entrepreneurial knowledge as “a rarefied, abstract type of knowledge – the knowledge of where to obtain information (or other resources) and of how to deploy it” (Kirzner, 1979, p. 8). The literature suggests that this knowledge is generated in an iterative process: entrepreneurial learning (Minniti & Bygrave, 2001; Politis, 2005). Entrepreneurial learning has been analysed in three different contexts, as Wang & Chugh (2014) identify after examining the literature body: the

start-up environment, established firms, and general entrepreneurship (with no clear specification of the firm type or age). For this paper, only the first is relevant, because established firms – although they may behave entrepreneurially – are not the focus of SUCs (Schwartz et al., 2013). SUCs are aimed at nascent entrepreneurs and often even declare only nascent entrepreneurs with a specific stage of their idea to be eligible to apply (Passaro et al., 2017; Schwartz et al., 2013). With that focus on nascent entrepreneurs, SUCs are aimed at persons in the earliest stage of the entrepreneurial process (Davidsson & Honig, 2003). Studies suggest that SUCs contribute to the learning of such persons in three possible ways: 1) by providing direct feedback on the business idea (Russell et al., 2008; Watson et al., 2018); 2) by providing entrepreneurial education on specific topics such as marketing and accounting (Schwartz et al., 2013; Sekula et al., 2009); 3) by enabling interactions with other entrepreneurs or experienced judges or coaches (Passaro et al., 2017; Russell et al., 2008).

These possibilities of learning target different types of entrepreneurial knowledge. Scholars have emphasised market knowledge and general knowledge of "how to be entrepreneurial" (Minniti & Bygrave, 2001; Siegel & Renko, 2012). While the usefulness of static business planning has been critically discussed (Honig & Karlsson, 2004; Hopp, 2015; Karlsson & Honig, 2009; Kirsch et al., 2009), in SUCs it may provide specific market knowledge. Interview data suggests that participants find the planning process helpful (Russell et al., 2008). Interactions with others and activities such as pitching and networking could enhance knowledge on "how to be entrepreneurial". The latter is particularly relevant, as entrepreneurial learning should be experiemential (Minniti & Bygrave, 2001; Rae & Carswell, 2001).

Based on Sarasvathy's (2001) argumentation, scholars in the 21st century also emphasise entrepreneurial learning as an effectual process (Haneberg, 2019). In effectual entrepreneurship, the entrepreneurs take their stakeholders with them on their entrepreneurial journey to reduce uncertainty and eliminate barriers (Sarasvathy, 2001). While SUCs are clearly structured and appear to be a classically causational tool for entrepreneurial education and learning, their strong focus on networking could also help to facility effectual means, e.g. supporting entrepreneurs with regard to "who they know" and "what they know" (Watson et al., 2015).

Previous research on SUCs mainly focussed on the question how entrepreneurs could learn from SUCs and what they were learning (Gailly, 2006; Passaro et al., 2017; Russell et al., 2008;

Stolz, 2020; Thomas et al., 2014; Watson et al., 2015). However, literature on entrepreneurial learning highlights the importance of prior experiences for learning (Aldrich & Yang, 2014; Dahl & Sorenson, 2012; Hajizadeh & Zali, 2016). Studies on SUCs have not taken these into account, yet detecting differences in the learning outcomes (Watson et al., 2018).

Politis (2005) differentiates between entrepreneurial experience as an input of the learning process and entrepreneurial knowledge as an outcome. Based on Reuber, Dyke, and Fischer (1990), he argues that entrepreneurial experience refers to the direct observation of events associated with the creation of a new venture or to participation in that creation. Experiences may include prior management, industy-specific, or start-up experience (for an overview on prior experiences see also Hajizadeh & Zali, 2016). Studies suggest a positive effect on firm success or survival from all of these experience types: start-up experience (Dyke et al., 1992; Gimeno et al., 1997), management experience (Fuentes Fuentes et al., 2010; Gimeno et al., 1997), and industry-specific experience (Brüderl & Preisendörfer, 1998). Studies have also found an influence of prior experience on entrepreneurial learning (Markowska & Wiklund, 2020; Michelsen et al., 2013; Politis, 2008; Politis & Gabrielsson, 2005). Therefore, we argue that these prior experiences enhance the learning outcome of nascent entrepreneurs in SUCs. Unclear is, whether these experiences influence each other and if combinations of them might be more important for the learning than others. Also, some forms of experience may be substitutable (Mallon et al., 2018), a configuration that leads to learning effects might not include all of them. Taking this into account, we propose the following:

Proposition 1: A nascent entrepreneurs' start-up experience, management experience, and industry-specific experience are conditions that enhance the learning outcome (together and/or separately) of SUCs. The absence of one condition may be substitutable by the presence of another condition or combinations of others.

While the core process of entrepreneurial learning is performing entrepreneurial tasks and consolidating learning outcomes from experience, it is also important to apply or transfer one's own and others' learning outcomes when performing tasks (Wing Yan Man, 2012). Relationships and interacting with others play key roles in entrepreneurial learning (Cope & Watts, 2000; Rae & Carswell, 2001). Thus, we assume that interactions with others during the competition influence the learning outcome. Also, an active participation could, combined with specific prior experiences, lead to different outcomes. In SUCs, these interactions occur

in additional events such as coaching sessions, meetups, and networking events, where participation is voluntary (Passaro et al., 2017). Thus, we present the following proposition:

Proposition 2: Participating in additional coaching and having lively interaction with others during the competition is a condition that solely or in combination with other conditions enables the participants to accomplish a learning outcome.

One factor that may influence SUCs and their learning outcomes is the environment. Entrepreneurship is influenced by regional factors (Dahl & Sorenson, 2012; Feldman, 2001; Fritsch et al., 2006; Sternberg, 2009), and entrepreneurial knowledge plays an important role in the current debate on regional entrepreneurial ecosystems. It is argued that entrepreneurial knowledge positively influences other founders in the region through spillover effects (Spigel, 2017; Spigel & Harrison, 2018). This might influence the outcome, as SUCs juries, coaches, and visitors of awarding ceremonies often represent such actors as experienced entrepreneurs, venture capitalists, bankers and other financiers from the local start-up scene (Foo et al., 2005; Gailly, 2006; Schwartz et al., 2013; Stolz, 2020). A SUC in a vibrant start-up scene – or a region with ample support services – may exhibit different learning outcomes for participants than a SUC in a region with a less-developed entrepreneurial ecosystem. Thus, we posit the following:

Proposition 3: The outcome is subject to regional influence, and a SUC's learning effects are stronger if it is located in a developed ecosystem.

Ultimately, analysing the propositions generates a set of conditions that builds a profile of an entrepreneur who learns a lot through participation in a SUC. This is the appropriate field of application for configurations theory. It was originally used to develop the optimal profile of a high-performing firm (Ketchen et al., 1993; Vorhies & Morgan, 2003) but has been successfully applied to instruments similar to SUCs as well (Hughes et al., 2007). Configurations theory can be operationalised using QCA (Albort-Morant & Oghazi, 2016).

The previous studies on prior experiences of founders primarily examine its influence on new venture performance and survival. An overview of the conditions used to analyse our propositions, as well as studies that examine the influence of the respective condition on the learning behavior of entrepreneurs, is shown in Table 5.1.

Table 5.1 Relevant literature on the conditions studied and their influence on entrepreneurial learning

Condition	Method	Variables and Findings	Author(s)
Prior management experience	Correlation analysis, survey data	Management experience is significantly positively related to exploration methods of entrepreneurial learning	(Politis & Gabrielsson, 2005)
	Qualitative interviews	Entrepreneurs make use of prior marketing experience for improving marketing of current products	(Wing Yan Man, 2012)
Prior industry experience	Partial least squares structural equation modeling, survey data	Prior knowledge (consisting of market, customer and technology knowledge) has a significant positive influence on entrepreneurial learning possibilities	(Hajizadeh & Zali, 2016)
	Qualitative interviews	Experience in the industry helped the founders evaluate what other knowledge they needed to be successful	(Markowska & Wiklund, 2020)
Prior entrepreneurial experience	Correlation analysis, survey data	Start-up experience is significantly positively related to exploration methods of entrepreneurial learning	(Politis & Gabrielsson, 2005)
	Correlation analysis, survey data	Previous business ownership is significantly positively related to new business performance	(Dyke et al., 1992)
	Mann-Whitney-U, survey data	Experienced entrepreneurs see failure significantly more possitive than unexperienced entrepreneurs and try to learn from it	(Politis, 2008)
Active participation	Qualitative interviews	Active participation in training courses is a learning behaviour of entrepreneurs	(Wing Yan Man, 2012)
	Qualitative interviews	Active communication with other entrepreneurs is key for the learning process	(Rae & Carswell, 2001)
Location (Ecosystem SUC is located in)	Probit model, new venture data	The transition from participants of SUCs to new ventures is influenced by regional characteristics like regional start-up rates and distance to universities	(Michelsen et al., 2013)

Qualitative interviews	Learning in the competitions depends, inter alia, on exchanges with the judges. Their composition depends on the local environment	(Watson et al., 2018)

5.3 Methods and data

5.3.1 Qualitative comparative analysis

We investigate our propositions using QCA (Rihoux & Ragin, 2009; Schneider & Wagemann, 2012). This is a set-theoretic method that examines the relationships between the outcome of interest (the perceived learning effects for the winners of the SUCs) and all possible combinations of states of its predictors – the so-called conditions (Ordanini et al., 2014). QCA sees cases as combinations of attributes manifested by their set-memberships (Fiss, 2007). While it was originally developed for the political sciences in the 1980s (Rihoux & Ragin, 2009), it has gained attention in management science (Fiss, 2007; Ordanini et al., 2014) and has recently become popular in entrepreneurship research for investigating complex phenomena (Douglas et al., 2020; Kraus et al., 2018; Leppänen et al., 2019; Manfred Lehner & Weber, 2019; Muñoz, 2018; Roundy et al., 2018; Şahin et al., 2019; Vedula & Fitza, 2019).

The QCA method assumes a complex causality and enables researchers to exhaustively explain the phenomenon being investigated (Legewie, 2013). Due to its ability to generate new insight into the complementarities and substitutes in configurations (Fiss, 2007; Kraus et al., 2018; Rutten, 2020), QCA is the appropriate method for analysing our propositions regarding entrepreneurial learning in SUCs. Because our propositions suggest multiple as opposed to binomial possible outcomes, we apply an fsQCA (for example, an entrepreneur could have interactions with one team, another could have interactions with five other teams, and another could have no interactions despite attending all coaching sessions). Thus, the set-membership can be anywhere between zero and one (Schneider & Wagemann, 2012). The process of assigning the set-membership to individual cases is called calibration (Schneider & Wagemann, 2012).

Studies that use fsqca to examine entrepreneurship mostly use quantitative data (Beynon, Battisti, et al., 2021; Beynon, Jones, et al., 2021). In this paper, the fsQCA is based on

qualitative interview data. This allows for studying the cases in a more comprehensive way while focusing on contextual details (Tóth et al., 2017). This is particularly suitable for analysing learning as an outcome of participation in an SUC, as learning effects are perception-based and highly influenced by the context; thus, they have few quantitative anchor points that can be easily measured (Tóth et al., 2017). While the benefits of analysing qualitative data using fsQCA are clear, some pitfalls also exist. Previous studies have been particularly criticised for opaque calibration of interview data (Basurto & Speer, 2012; de Block & Vis, 2019; Tóth et al., 2017). To our knowledge, no fsQCA with interview data has previously been undertaken in the research on entrepreneurial learning. Thus, we devote particular attention to transparently explaining the calibration process and the analysis.

5.3.2 Sample

We utilise qualitative data from in-depth interviews with 26 participants at two SUCs. Sampling for a QCA requires maximal heterogeneity of cases, albeit from a group of cases that belongs to a wider area of homogeneity, to avoid comparing 'apples and oranges' (Rihoux & Ragin, 2009, p. 20). SUCs have relatively low entry barriers compared to other support events and programmes (Bliemel et al., 2016; Michelsen et al., 2013; Passaro et al., 2017). To reach the required level of homogeneity (that is, to avoid comparing entrepreneurs who had no real interest in the competitions to those who did), we only selected cases that put effort into their participation. This was operationalised by selecting participants who had at least been nominated for prizes but who differed strongly in their current status (successful or not), firm size (solopreneurs vs. teams), and innovativeness (e.g. a foldable bag vs. laser simulations). To make this selection, we used the websites of both competitions to identify participants that fulfilled the conditions, and contacted them via telephone. Only participants from 2016 and later were considered to reduce the risk of entrepreneurs over- or underestimating the learning effects if their participation had been too long ago. Out of 40 requests in Berlin, we conducted 14 interviews (35%); out of 32 requests in Hannover, 12 interviews were conducted (37,5%). To gain valid information on the learning effects – considering that some interviewees are still supported by, or applying for, support programs that might be related to the SUCs or their organisers – we ensured anonymity for all interviewees. The interviews were semi-structured, with open questions regarding personal background, idea/venture background and current state, competition participation, and the regional entrepreneurial ecosystem and

support. The interviews were held between July 2019 and January 2020. All interviews were held in person, recorded, and transcribed. An overview of the sample is provided in Table 5.2.

Table 5.2 Overview of the sample

	Interviews
BPW Berlin	14
Start-up Impuls Hannover	12
winners	11
participants	15
venture status per date of interview:	
… founded (team or with employees)	14
… founded solo, self-employed	4
… founded solo, part-time	1
… founding planned	3
… abandoned	4
number of interviews	26
average interview length (minutes)	46

We selected SUCs in two German regions for two reasons. First, considering entrepreneurs of only one SUC would raise the risk of identifying conditions and structures that are unique to that particular SUC. Second, entrepreneurship and entrepreneurial knowledge are influenced by regional factors. To account for these factors and assess Proposition 3, we selected comparable SUCs in different regions. One SUC is the *BPW* in Berlin – Germany's start-up hotspot (Kritikos, 2016), constituting a vibrant, world-class entrepreneurial ecosystem (Florida & Hathaway, 2018). The other SUC is the *Start-up Impuls* in Hannover, a city with a strong industrial past (e.g. Volkswagen Nutzfahrzeuge, HANOMAG, Continental) but a rather weak entrepreneurial culture, despite its strong university and technology environment (Hesse & Sternberg, 2017). Both SUCs are publicly funded and comparable in their organizer, age, structures, application procedures, additional coaching, and prizes.

Overall, the sample includes a wide range of entrepreneurs in both regions. Four winners had closed their business by the interview date. Two others had not yet founded their ventures and were otherwise employed. One had not yet founded the initial venture but had founded another. One was self-employed part-time. Four were self-employed full-time. Fourteen had founded a venture that remained active and had co-founders or employees. The entrepreneurs' businesses ranged from self-employed physiotherapists to teams of engineers and software developers. The venture size ranged from self-employed to 11 employees.

5.3.3 Coding and calibration

To commence the analytical process, we applied the procedure by Basurto and Speer (2012), which was developed for fsQCA, particularly with qualitative data. Thus, we first developed a list of preliminary measures of the outcome and conditions. While the outcome consists of all statements the participants made regarding learning, the conditions consist of statements concerning the propositions. The list that was conducted with this procedure can be changed, enhanced, or reduced during the fsQCA process (Basurto & Speer, 2012). Based on the preliminary list of measures, we developed an initial coding scheme. Then a structuring content analysis was applied to gain information on the conditions (Basurto & Speer, 2012). This method facilitates the analysis of interview data by applying deductive codes (based on the preliminary measures) and complementing them with inductive codes that are based on the material and consist of newly discovered information (Kuckartz, 2016). The coding scheme includes codes regarding the structure of the SUCs and the participation and had a particular focus on the effects on the participants (e.g., awards, networking, "force" to focus on improving and rethinking the business model, public relations and marketing effects, start-up atmosphere, learning effects). By extracting the quotations for each code and comparing them across cases, we found no biases in the responses for specific conditions (Basurto & Speer, 2012).

Next, we defined the precision of the fuzzy sets, along with their values. Because the interviews contain significant details on the entrepreneurs' backgrounds, we selected six-value fuzzy-sets. Thus, for each condition, one out of six values between 0 and 1 is assigned to each case: fully out [0], mostly out [0.2], more out than in [0.4], more in than out [0.6], mostly in [0.8], and fully in [1].

Identifying the degree of set membership is crucial for conducting the fsQCA because it determines the result. While most fsQCA studies are careful in establishing the degree of set membership, many are not transparent regarding how the qualitative data were used to calibrate the sets (de Block & Vis, 2019). To overcome this problem, we use the approach of Basurto and Speer (2012), thus constructing an imaginary ideal case for full membership (the fuzzy-set value equals 1) and for non-membership (the fuzzy-set value equals 0) for both the outcome and for each condition (Table 5.3). To provide a deeper understanding of the data and the calibration process, we provide illustrative quotes from the interviews and define their set-membership. To improve clarity, we provide only one example of the highest and lowest values for each condition. An overview of the membership scores for all cases is provided in the appendix.

Table 5.3 Ideal cases and calibration examples

Name	**Imaginary ideal cases**	**Example quote from interviews (interview number, [membership score])**
Learning Effects (LE) (outcome)	[0]: No learning effects stated, SUC was perceived negatively	"Feedback only at the day we pitched. There was no feedback, that's the problem. […] totally intransparent. […] I only learned to change the fonts in my powerpoint. […] I should have rather put that time into our product." (19, [0])
	[1]: Various learning effects stated, concrete examples of learning given (e.g. interactions, feedback), learning influenced venture	"It is really a great support. The critique, I don't get that today.[…] By going through all that documents you learn about yourself and your business and question everything. And that pitch training and the consulting… feedback from other perspective.. really helpful for my business." (21, [1])
Active Participation (IP)	[0]: did not participate in any coaching session, networking event, etc., no interactions with other participants or judges	"We only submitted the business plan, that's it." (8, [0])
	[1]: participated in every additional event / session, strong interactions with entrepreneurs, coaches, judges	"The additional coaching, that I took […] there were differend themed events that I could visit […] I gained contacts to a lot of people there." (18, [1])

Prior Entrepreneurial Experience (PEE)	[0]: never founded a venture before, no self-employment before, no entrepreneurs in family or friends	"I worked 30 years as an employee in telecommunication. Never founded before." (2, [0])
	[1]: serial entrepreneur who founded different venture before, strong network of entrepreneurs	"I already founded in 2006. A sound studio. Im also freelancer additionally. This was just the next step to do this." (5, [0.8])
Prior Industry Experience (PIE)	[0]: no experience in an industry related to the new venture, no contacts to that industry	"I studied political sciences. […] I just said I wanted to build something up. […] Then we founded during out studies" (start-up was about menstruation products). (4, [0])
	[1]: multiple years of working experience in relevant industry, highly connected among peers	"My colleague and I we studied physics together and then he did his PhD. We both worked in research ever since and worked with lasers. During that he developed the software that is our product now […]. We already had sales and then started the spin-off." (9, [1])
Prior Management Experience (PME)	[0]: no management experience or comparable positions in employed or self-employed labour	"I was studying and my father had that problem. […] and here was this student accelerator, that's when I started." (22, [0])
	[1]: multiple years in top / c-level management in large enterprises	"I was never an normal employee. I worked in telecommunications for 20 years, in sales, became executive very fast. Up to 150 employees under me, 100 million in revenues." (13, [1])
Competition / Region	[0]: Berlin [1]: Hannover	

5.4 Analysis and findings

5.4.1 Analysis of necessary conditions

Before analysing which configurations of conditions are relevant, we determine if there are necessary conditions for the outcome (Albort-Morant & Oghazi, 2016; Roig-Tierno et al., 2015). 'A condition X is necessary if, whenever the outcome Y is present, the condition X is also present' (Schneider & Wagemann, 2012, p. 69). For fuzzy-sets analysis, this means that the membership score in X must be equal to or greater than its fuzzy-set membership in

outcome Y (Schneider & Wagemann, 2012). To check for necessity, the consistency of each condition is calculated (see e.g. Rihoux & Ragin, 2009). Consistency here indicates the degree to which the causal condition is a superset of the outcome. All data analysis was completed using the software fs/QCA (see socsci.uci.edu/~cragin/ fsQCA/software). A threshold of at least 0.9 is applied for necessity analysis (Greckhamer et al., 2018). The results are presented in Table 5.4. Coverage shows the share of the sum of the membership in the outcome that each condition accounts for.

Table 5.4 Analysis of necessary conditions

	Learning		**~Learning**	
Condition	**Consistency**	**Coverage**	**Consistency**	**Coverage**
prior management experience	0.474576	0.571429	0.478873	0.693878
~ prior management experience	0.745763	0.543210	0.704225	0.617284
prior industry experience	0.627119	0.506849	0.760563	0.739726
~ prior industry experience	0.677966	0.701754	0.492958	0.614035
prior entrepreneurial experience	0.338983	0.555556	0.450704	0.888889
~ prior entrepreneurial experience	0.932203	0.585106	0.774648	0.585106
active participation	0.898305	0.736111	0.619718	0.611111
~active participation	0.525424	0.534483	0.732394	0.896552
competition: Hannover	0.542373	0.533333	0.394366	0.466667
~competition: Hannover (=Berlin)	0.457627	0.385714	0.605634	0.614286

With a consistency of 0.93, the absence of prior entrepreneurial experience is the only necessary condition for learning in a SUC. However, this condition also received a relatively high (0.77) consistency for the absence of the outcome. This is perhaps because exactly half of the interviewees had no prior entrepreneurial experience, and the other half was calibrated at 0.2 or higher based on their interviews (see appendix for all membership scores). The consistency of 0.89 for active participation closely approaches the required threshold. All other conditions rank lower, indicating that they are not necessary for the outcome.

Table 5.4 also shows that being in one competition and not in the other (Hannover vs. Berlin) is not relevant for the outcome. We verified this finding by examining relevant codes in the interview data. While we found strong information on the influences of each local entrepreneurial ecosystem on entrepreneurship in general, the interviewees' statements regarding learning through the competition were similar for both regions. Thus, we decided

to exclude that condition from further analysis. Researchers may do this in an iterative process during a QCA (Rihoux & Ragin, 2009).

5.4.2 Truth table

In QCA, all logical combinations of conditions and the outcome can be displayed in a matrix using Boolean algebra: The truth table (Rihoux & Ragin, 2009). It has 2^k rows, where *k* is the number of conditions used (Schneider & Wagemann, 2012). In our study, it has 16 rows. For each row, cases are assigned that fulfil the respective conditions: having a membership score higher than 0.5 for the conditions and a membership score of less than 0.5 for the negated sets (indicated by a tilde sign) (Rihoux & Ragin, 2009; Schneider & Wagemann, 2012).

For example, the notation ~IP*~PEE*~PIE*PME describes the logical combination of no active participation (AP), no prior entrepreneurial experience (PEE), no prior industrial experience (PIE), and prior management experience (PME). A case that is attributed to that particular truth table row would thus have membership scores of <0.5 for IP, PEE, and PIE and a membership score of >0.5 for PME.

Table 5.5 Truth table

No. of Cases	IP	PEE	PIE	PME	logical notation	raw consistency
1	0	0	0	0	~AP*~PEE*~PIE*~PME	0.818182
1	0	0	0	1	~AP*~PEE*~PIE*PME	0.8125
2	0	0	1	0	~AP*~PEE*PIE*~PME	0.703704
0	0	1	0	0	~AP*PEE*~PIE*~PME	
4	1	0	0	0	AP*~PEE*~PIE*~PME	0.848485
1	0	0	1	1	~AP*~PEE*PIE*PME	0.666667
3	0	1	1	0	~AP*PEE*PIE*~PME	0.631579
2	1	1	0	0	AP*PEE*~PIE*~PME	0.692308
2	1	0	0	1	AP*~PEE*~PIE*PME	0.904762
4	1	0	1	0	AP*~PEE*PIE*~PME	0.84375
0	0	1	0	1	~AP*PEE*~PIE*PME	
2	0	1	1	1	~AP*PEE*PIE*PME	0.466667
1	1	1	1	0	AP*PEE*PIE*~PME	0.857143
0	1	1	0	1	AP*PEE*~PIE*PME	
2	1	0	1	1	AP*~PEE*PIE*PME	0.695652
1	1	1	1	1	AP*PEE*PIE*PME	0.666667

The truth table is shown in Table 5.5. The logical combination of conditions that are used for further analysis are based on each configuration's frequency of cases. Because this study has 26 cases (a small-N QCA), a frequency threshold of one case is applied (Greckhamer et al., 2018). Thus, three configurations with zero cases – also referred to as logical remainders – are excluded from further analysis (Ordanini et al., 2014). Thus, we used the complex and not the parsimonious solution, meaning that logical remainders were not considered for the final analysis of sufficient configurations (Beynon et al., 2019).

The next step is to check for configurations that are consistent subsets of the outcome and those that are not. The consistency of each configuration (a row in the truth table) is calculated as mentioned previously. A configuration can be considered as sufficient for the outcome if its consistency measure statistically exceeds a minimum threshold (Ordanini et al., 2014). In line with QCA literature, we apply a consistency threshold of 0.75 (Kraus et al., 2018; Yoruk & Jones, 2020).

5.4.3 Analysis of configurations

The configurations in the truth table that are considered for the analysis are logically reduced using the Quine-McCluskey algorithm (Rihoux & Ragin, 2009; Schneider & Wagemann, 2012). Table 5.6 presents the solutions for learning through the competition. The first configuration, ~fs_Prior-Industry*~fs_Prior-Entrepreneurial, suggests that the absence of both prior industrial knowledge and prior entrepreneurial knowledge generates learning effects for entrepreneurs in start-up competitions. This solution has a raw coverage of 0.66, indicating that two-thirds of the participants with no prior industry or entrepreneurial experience learned from the competition.

The second solution for learning requires the absence of prior management experience, the presence of prior industry experience, and active participation in the competition's additional coaching and network events. This solution's raw coverage of 0.47 indicates that roughly half of the participants with no prior management experience (but with industry experience and active participation behaviour) learned from the competition.

The overall solution coverage (over 0.85) shows that a high degree of membership in the outcome is explained by the configuration terms. The solution consistency (over 0.75)

supports the model's strength. It measures the degree to which membership in the solution is a subset of membership in the outcome.

Table 5.6 Results of the complex solution of the fsQCA

	Raw coverage	**Unique coverage**	**Consistency**
~prior industry experience*~prior entrepreneurial experience	0.661017	0.38983	0.764706
~prior management experience*prior industry experience*active participation	0.474576	0.20339	0.848485
Solution coverage	0.864407		
Solution consistency	0.772727		

The results of the analysis of necessary conditions, as well as the results of the fsQCA intermediate solution, merit further attention. One strength of QCA with qualitative data is that it enriches the findings with quotations and interprets them in light of case knowledge. We add illustrative quotes to show typical cases for the configurations and necessary conditions.

The results presented in Tables 5.5 and 5.6 illustrate that the findings are partially contradictory to Proposition 1, which asserts the positive influence of all prior experience types on the learning effects. This contradiction was already indicated by the fact that the absence of prior entrepreneurial knowledge was a necessary condition for achieving learning effects through the SUC. However, the strength of the QCA is in finding configurations of conditions that accomplish the outcome. The absence of both entrepreneurial knowledge and industry experience predicts learning effects.

Entrepreneurial knowledge may hinder the learning effects because the feedback on the submitted business plans and pitch decks is based on common business knowledge for assessing such documents. An experienced entrepreneur may writes several business plans in his life and understands accounting and business forecasting from previous businesses. This can be illustrated by case seven, the founder of a software start-up that performs simulations. This entrepreneur previously owned a music studio and had been a freelancer. He knew what

he could achieve with a given input of work and thus assessed participation in the SUC critically:

> ‘Well, there was the prize money, even though it wasn’t much. The amount of work for that… we could put that into sales than we would have earned more […] You get an award. That’s it. Do you have good products or services for the client.. that’s important and not what award you have won.’ (Interview 5)

As we know, entrepreneurial activity is significantly correlated to overconfidence (Koellinger et al., 2007). This may also explain our findings – persons who have been entrepreneurially active before may evaluate their own knowledge as more important or correct than that of others and they may take feedback in the SUC less seriously:

> ‘It is a lot of show and many people who have no idea of starting a business or how to run a business.’ (Interview 5)

We have to keep in mind that this person won prize money and an award in that SUC. While the absence of industrial experience – combined with the absence of entrepreneurial experience – leads to the outcome, the presence of industrial experience also leads to learning if combined with active participation and the absence of managerial experience. This is interesting, in that the same condition combined with other conditions leads to a different outcome. The following quote illustrates such a case:

> ‘We went to the coach again with our whole plan and then we reduced it to its essentials […] so you brought the whole business model on point and that was definitely the big advantage. […] So that coaching was really intensive and achieved a lot. Just because he was an external observer and had no connections to the industry, it was ideal.’ (Interview 22)

This entrepreneur founded a start-up for herd management for farmers. He had prior knowledge in the industry from working on his parents’ farm. He also actively participated in several coaching sessions, as the quote indicates. His prior knowledge was enriched by an outside perspective. This was only achieved through active participation in the additional coaching sessions.

By comparison, a founder who had industrial work experience and did not participate in additional coaching sessions made the following statement:

> 'I only learned to change the fonts in my Powerpoint.' (Interview 19)

This person wished for more specific feedback. Other entrepreneurs who had industrial experience but did not participate actively said something quite similar:

> 'The feedback on the business plan didn't really help us because it was basically too good, and they had no idea of the technology.' (Interview 8)

Both of these participants also had no managerial experience, as the set of conditions (Table 5.6) indicates. Based on fsQCA and the interview data, we suggest that persons with industry experience but no managerial experience and no active participation expected precise feedback on their business, based on their business plan and pitch. They were uninterested in basic business knowledge as provided by coaching and thus were not participating actively. The competitions, whose judges are often business consultants or employees of local entrepreneurship support organizations (Stolz, 2020; Watson et al., 2018), might be unable to provide such industry-specific feedback. This is frustrating for the participants that do not attend the additional coaching sessions that cover general business topics. These participants thus feel that they have learned little.

This finding supports Proposition 2, which states that active participation would help achieve learning effects. The analysis of the necessary conditions and the configurations demonstrate this (Tables 5.5 and 5.6). This is also supported by some cases that are close to ideal imaginary cases: they had the highest membership scores for active participation and very low scores for all types of prior experience. Interestingly, these cases are very similar regarding other information we gained from the interviews. For example, cases 3, 18, and 21 are all women who founded their ventures alone or with one partner, with little prior experience, very active participation, and high learning outcomes. We interpret this as a group of very motivated women entrepreneurs who wanted to learn as much as possible:

> 'There was a lot. I was the geek. I attended all events. Found it extremely helpful. […] I often talked to the coaches again after an event and we looked at specific things that I wanted to improve.' (Interview 3)

We found no support for Proposition 3 because the raw interview material, as well as the analysis of necessary conditions, did not support regional differences or differences between the competitions regarding the learning effects for participants.

5.5 Discussion

In this paper, we use fsQCA based on qualitative data to reveal why learning effects in SUCs differ among participants. QCA in general is increasingly used in entrepreneurship research (for an literature overview see Kraus et al., 2018). Its applications are often based on quantitative statistics, for example on a country or state level (Beynon et al., 2019; Beynon, Battisti, et al., 2021). Other studies use survey data (Albort-Morant & Oghazi, 2016; Del Sarto et al., 2020; Rey-Martí et al., 2016; Roig-Tierno et al., 2015). While these contributions using QCA can enhance research on entrepreneurship (Douglas et al., 2020), QCA with qualitative data is rarely used, although some contributions have included qualitative data (see e.g. Yoruk & Jones, 2020). This is surprising, in that QCA with qualitative data has been discussed and applied in other disciplines (Basurto & Speer, 2012; de Block & Vis, 2019; McAlearney et al., 2016; Rantala & Hellström, 2001). By using data from 26 in-depth interviews of participants at two SUCs, we show the strengths of fsQCA with qualitative data and identify different outcomes of learning in SUCs that are influenced by the presence or absence of certain conditions, including prior experiences. Our results are limited due to a relatively small n. However, a strength of fsQCA is the detailed examination of studies with small numbers of cases (Beynon et al., 2020). Previous contributions have theoretically argued that SUCs provide strong learning environments (Passaro et al., 2017; Stolz, 2020). Empirical studies emphasise learning, although prior experiences and individual participation patterns have not been analysed further (Gailly, 2006; Klinger & Schündeln, 2011; Russell et al., 2008; Watson et al., 2018). Our analysis shows that the learning outcomes of SUCs are diverse and dependent on conditions such as prior entrepreneurial experience and active participation. The complexity of this phenomenon – and the strength of qualitative-based fsQCA as an appropriate research method – is supported by our finding that the presence of prior industrial experience hinders learning outcomes if prior entrepreneurial experience is present. If the presence of prior industrial experience is combined with active participation and the absence of managerial experience, the learning outcomes are accomplished.

Our findings provide novel insights on SUCs and highlight the importance of configurational approaches for understanding entrepreneurial learning (Hughes et al., 2007). A qualitative approach to investigating this phenomenon was selected intentionally. However, this limits the generalisability of our findings. While we examined two SUCs and considered potential regional differences, finding no effect on the learning outcome, SUCs in other countries or other types of SUCs may function differently. We focused on entrepreneurs that were at least nominated for prizes. While this gave us the opportunity to achieve sufficient homogeneity for a QCA sample (Rihoux & Ragin, 2009), it limits our findings to entrepreneurs that had a minimum level of quality in their application documents. However, the learning outcomes differ strongly in our sample and we interviewed winners who learned nothing, so we argue that our findings still provide important insights.

Calibration is a critical process in QCA because it determines the results (Rihoux & Ragin, 2009; Schneider & Wagemann, 2012). We adapted approaches from methodological papers on QCA from social sciences to mitigate potential pitfalls in the calibration process (Basurto & Speer, 2012; de Block & Vis, 2019; Tóth et al., 2017). By constructing imaginary ideal cases for the extremes of set-membership, and by providing quotations for associated cases, we have pursued maximal transparency. Still, the calibration procedure is limited to our case knowledge.

We argue that our findings and the use of this particular approach add relevant information to research on SUCs (in particular) and policy instruments for entrepreneurship (in general). As Douglas, Shepherd, & Prentice (2020, p. 15) report when describing the implications for fsQCA for entrepreneurship research, ‘A better understanding of the heterogeneity of entrepreneurial phenomena may lead to more focused prescriptions for policy action on multiple fronts, rather than a “one-size fits all” approach. For example, it may be a more productive use of public funds to support would-be entrepreneurs who exhibit particular configurations, rather than support a wider array of individuals’.

5.6 Conclusion

Using fsQCA, our paper investigates configurations of conditions that explain the strong differences in learning outcomes for winners of SUCs. Due to our application of fsQCA to

interview data, we were able to enrich this finding through case knowledge and quotations. We demonstrate that the absence of prior entrepreneurial experience is a necessary condition for learning as an outcome of participation in a SUC. Based on the interviews, we interpret this as follows: participants with prior entrepreneurial experience are more self-confident regarding their ideas or businesses and tend to ignore feedback. Our finding seems logical, considering that SUCs are aimed at an early stage in the entrepreneurial process – more experienced entrepreneurs may already have knowledge at that level. Furthermore, active participation was found to be important for learning in a SUC (close to necessary: consistency of 0.89; applied threshold of 0.9).

We found two configurations of conditions that lead to the outcome. The first is the absence of prior industry experience and prior entrepreneurial experience. This supports the previous finding. The second configuration is the absence of prior management experience combined with the presence of prior industry experience and active participation. Interestingly, prior industry experience appears in both configurations but changes the effect on the outcome if combined differently. Based on the interview data, we interpreted this as follows: entrepreneurs with strong industry knowledge often expected feedback to be on their technical level or to advance their product or service. However, SUCs are aimed more at feedback regarding entrepreneurial or business aspects, which generated disappointment for these participants. However, active participants realised their lack of knowledge on concrete entrepreneurial topics and tried to gain that knowledge by attending additional coaching sessions and having lively interactions.

While limited in generalisability (because our qualitative data come from only two competitions), our findings still provide important findings for stakeholders in SUCs and for research on entrepreneurial learning. Nascent entrepreneurs should gain information on the goals of the SUC prior to attending the competition.

If it is aimed at a broad range of entrepreneurs at early stages, participation is likely to have only little positive impact for participants with entrepreneurial experience. Also, the active participation in additional events is crucial and should be considered by experienced entrepreneurs, even if they think this will not help them, the findings show that it does.

Policymakers could add complementary events to provide best results for different target groups, e.g. for entrepreneurs who are still at an early stage in their venture, but who have

experience in industry or entrepreneurship. Also, competitions with higher hurdles, but also higher rewards could be a solution to support those entrepreneurs at later stages. From the point of view of an organiser of a SUC, ensuring quality feedback of the coaches, and also including some technical experts (not only business professionals) as coaches could help. Some participants criticised the lack of technical (e.g. engineering) feedback.

Further research should include prior experience of (potential) entrepreneurs in researching other types of entrepreneurship support events, e.g. hackathons, pitch competitions, or student business plan competitions. In addition to the empirical results, the paper provides a starting point for further use of the fsQCA method to analyse policy instruments for entrepreneurial learning. By using interview data to conduct the fsQCA, we faced various pitfalls that have been mentioned in the literature. We have aimed for maximum transparency regarding calibration and analysis, thus demonstrating how future research could apply fsQCA in this context.

6. Conclusion

6.1 Summary

The overall aim of this dissertation was to contribute to research on entrepreneurship, particularly on EEs and economic geography that researches entrepreneurship. In this dissertation, I focused on three research objectives: 1) synthesizing quantitative evidence on the antecedents of EA within the EE framework, 2) providing quantitative evidence for the relevance of individual EE elements on different spatial levels of analysis, and 3) analyzing the role SUCs play in EEs. Achieving these research objectives helps to close some of the main gaps prevailing in research on EEs, which can be briefly summarized as a lack of a clear empirical basis, disagreement about the spatial level of investigation, and a lack of understanding of the role of specific elements of EEs. To achieve the research objectives, this dissertation consists of four research articles with four different methods and foci.

The first article was a meta-analysis that synthesized prior empirical studies on the antecedents of EA (chapter 2). It aimed to achieve research objectives one and two. By extracting statistical data from these studies and by grouping the variables they included into the ten elements of Stam's (2015) EEs framework, this study provided the first overarching empirical basis for research on EEs. It differentiated based on spatial level of analysis as well as based on the type of entrepreneurship measured. It therefore provided a clear empirical foundation for determining which elements of EEs have significant relationships with EA and on which spatial level. In order to contribute to knowledge of the roles specific elements of EEs play within the overall system, the dissertation then included three papers that explicitly focused on SUCs, which can be seen as one part of an EE element, as a policy tool for supporting entrepreneurship, and it examined which roles SUCs play in EEs. These studies addressed research objective three. A conceptual paper (chapter 3) was presented that highlighted potential and proven relationships between SUCs and other parts of EEs and the whole ecosystem. This was followed by a study that examined a SUC in the EE Berlin and a SUC in the EE Hannover to conduct an in-depth investigation of the role these competitions play in specific ecosystems (chapter 4). This was done by analyzing 45 qualitative interviews with participants and local ecosystem experts using qualitative content analysis. A subset of

26 of the interviews with SUC participants was analyzed in the fourth study presented in this dissertation (chapter 5). This last study explicitly focused on participant learning during the competition and whether prior experiences affected it by applying fsQCA to the interview data.

The rationale behind the selection of the articles and their methods lied in the complexity of the EE approach. Fully analyzing multiple EEs and all of their elements in-depth to gain generalizable results is not possible within one dissertation. Therefore, a combination of one overarching quantitative approach, one conceptual approach, and two different qualitative methods was chosen. This triangulation provided several key findings that helped to close the identified research gaps. The main findings are presented in the following section.

6.2 Main findings

The meta-analysis (chapter 2) synthesized the findings of 545 quantitative empirical studies on EA. Each variable included in the studies that could be assigned to one element of Stam's (2015) framework was extracted and taken into account. The findings showed that most elements of EEs have significant relationships with EA. This is the first key finding of this dissertation, as it provides empirical support for the explanatory power of EEs for EA. However, the elements that are significant change if differentiated by spatial level or type of EA. This is the second key finding of this dissertation, as it provides the empirical proof that the spatial level of analysis affects the results of the same framework of EEs.

More specifically, the results showed that, in the total sample (all spatial levels, all types of EA), all EE elements except for networks had significant relationships with EA. Differentiated by spatial level, at the country level, all elements were significant except for leadership, knowledge, and culture. At the regional level, all elements were significant except for networks, knowledge, support services / intermediaries, and physical infrastructure. At the local level, all elements were significant except for networks, finance, knowledge, and support services / intermediaries. Differentiated by type of EA, the element knowledge had a significant relationship with productive EA but not with general EA. The opposite was true for support services / intermediaries and physical infrastructure. Networks showed no significant relationships with either type. All other elements were significant for both types.

Delving deeper into single elements of EEs, the conceptual paper in this dissertation (chapter 3) integrated theoretical and empirical contributions of different research streams into one conceptual framework for the (potential) role SUCs play in EEs. An overview of the literature on SUCs was provided, which highlighted the specifics of SUCs as a policy instrument for fostering entrepreneurship. The integration showed that, apart from effects on participants, not only an influence of SUCs on the ecosystem, but also an influence of the ecosystem (and with that also of the respective region) on the SUC and its role is possible (Stolz, 2020). This is the third key finding of this dissertation, which adds a more systemic view to the prior empirical analysis of the elements of EEs. Interdependent relationships of one political instrument like SUCs with other elements of the EE, but also with the entrepreneurs in the region could exist.

Guided by the aim of determining the specific role SUCs play in EEs, the first qualitative paper in this dissertation (chapter 4) showed that SUCs provide an (inter-temporal) anchoring function in EEs by regularly connecting specific actors and by being a tool for integrating new actors into the ecosystem. This is the fourth key finding of this dissertation, as it shows that the persistence of policies has a particular importance in ecosystems to constantly engage different actors. Using 45 qualitative interviews from Berlin and Hannover, the study also showed that this anchoring only works for specific, mostly public, entrepreneurship support organizations; while some sub-networks of international entrepreneurs, venture capital funds, and wealthy business angels exist, that were not connected to the SUCs. This was particularly true in Berlin. This is the fifth key finding, which shows that policies implemented by public institutions run the risk of being attractive only to other public institutions and of not involving (or being able to involve) private actors that are crucial for the ecosystem. Additionally, the region indeed influences the role an SUC plays, mostly in terms of the ease with which its organizers attract participants and judges, but also in terms of the of judges' expertise in industry-specific knowledge. Overall, both competitions provided a networking environment for participants and judges, and they helped local university entrepreneurship offices provide learning and support to their entrepreneurs (Stolz, 2022).

As previous studies on learning in and through SUCs have provided heterogeneous findings and have not examined participants' prior experiences, the second qualitative paper in this dissertation (chapter 5) explicitly focused on this topic by using a subset of the interview data

utilized in chapter 4. FsQCA was applied to the interview data to determine which entrepreneurs learned the most from the SUCs and how this outcome was influenced by their prior experiences. The key finding was that most participants with prior entrepreneurial experience did not learn from the competition. Interview data showed that these entrepreneurs were more self-confident and had more relevant knowledge; thus, they perceived the competition to be less helpful and learned less. Active participation was also a key condition that positively affected learning outcomes. Two configurations of conditions that led to the outcome were found. The first was the absence of prior industry experience and the absence of prior entrepreneurial experience. This supported the previous finding. The second configuration was the absence of prior management experience combined with the presence of prior industry experience and active participation. Interestingly, prior industry experience appeared in both configurations that led to the outcome, but it was absent in one configuration and present in the other. Based on the interview data, this can be interpreted as follows: Entrepreneurs with strong industry knowledge often expected feedback to be on their technical level or to advance their product or service. They get frustrated if these expectations are not fulfilled. However, if such entrepreneurs participated very actively, they felt supported in another way and benefited from their participation. It was also interesting that the region in which the competitions were located played no role in the overall learning outcomes. While industry-specific feedback can be influenced by the region's economic structure, individual-level learning experiences were not influenced by the region or the local EE (Stolz & Sternberg, 2022).

Overall, the findings of chapters 4 and 5 provide a first indication of the existence of some generic functions of elements (or parts of elements) of EEs (here: providing a learning environment for some entrepreneurs and connecting public entrepreneurship support offices). Results suggest that these are similar across regions but that there are some specific forms of these functions that differ based on elements of the regional EE (here: sub-networks of unconnected actors, industrial focus). Together, this provides further explanations for the results of chapter 2, which found that most elements of EEs have significant relationships with EA. This could be because there are generic functions that underlie these elements, such as providing knowledge and providing funding, but their form varies according to regional characteristics.

6.3 Contributions

In the introduction, this dissertation highlighted the strengths of the EE approach for understanding differences in the quality and quantity of EA. However, the EE approach has some shortcomings, and open questions remain. In particular, more research is required to understand the spatial levels of EEs and which of their elements are relevant on them. Additionally, the mechanisms underlying EEs and the roles of their elements within them remain largely unclear. This dissertation contributes to closing these research gaps in three ways.

First, it provided the, to the authors' knowledge, first meta-analysis on the determinants of EA. By grouping them into the elements defined by a widely used EE framework, this dissertation helped not only to provide empirical evidence for the explanatory power of the EE approach for EA but also to show which of its elements are relevant for which type of EA and on which spatial level. Adhering to the spatial multidimensionality of EEs (Credit et al., 2018), this work helped to answer the questions inherent in EE research regarding which spatial levels are appropriate for investigation and which EE elements are relevant at different spatial levels (Credit et al., 2018; Malecki, 2018). Recently, some scholars have argued that regional EEs are nested within frameworks at higher spatial scales, analogous to a "Russian doll phenomena" (Wurth et al., 2021, p. 20). Results of the meta-analysis provided empirical proof that the significant elements of EEs differ across spatial levels. Therefore, this dissertation offered an empirical starting point for further differentiating regional-level elements and overarching, country-level elements of ecosystems, or for nested approaches that conceptualize regional ecosystems as part of larger national ones.

Second, it provided in-depth analysis previous literature and of qualitative data on participants in and organizers of two SUCs as well as that of ecosystem experts in two EEs in Germany. SUCs, though mentioned as being parts of EEs in several publications, have not previously been analyzed in terms of their role in EEs. Case study analysis of comparable SUCs in two contrasting regions led to insights on the role these SUCs played in their respective regions. It also led to first indications of possible generalizable functions of such competitions, such as the networking of public actors. This contributed to a deeper understanding of the causal mechanisms within EEs, which have not yet been sufficiently explored (Cao & Shi, 2021; Wurth

et al., 2021). The results had several implications for researchers, practitioners, and policymakers.

Third, by combining four methods (i.e., meta-analysis, development of a conceptual framework, qualitative content analysis, qualitative comparative analysis), this dissertation provided a starting point for further analysis and understanding of EEs with a particular focus on their multidimensionality. The results indicated that the relevance and role of specific elements of EEs, or even of parts of these elements, change depending on the level of analysis. Identifying and understanding a specific, generic function that a particular part of an EE element has, independent of the other elements and the region in which the EE is located, required deep analysis of SUCs and entrepreneurial learning at the individual level.

6.4 Policy implications

The present dissertation is an explicitly scientific work, and the four research articles on which it is based were designed accordingly. Nevertheless, the results offered several policy implications, which are briefly presented below.

First, the meta-analysis presented in this thesis provided an empirical foundation for the EE approach as it showed the significance and effect sizes of the relationships between EE elements and EA. This has several policy implications. It showed that the EE approach can be used to empirically assess the antecedents of EA in a specific territory. It also showed that the elements that have significant relationships with EA differ across the local, regional, and country levels. Policymakers should take this into account and focus on the elements relevant at their administrative level. A specific example would be the leadership element, which only had significant relationships to EA at the local and regional levels. Policymakers should therefore try to establish local and regional structures to improve the availability and visibility of entrepreneurial leaders and role models. At the country level, policymakers should create overarching structures to allow local and regional actors to create these structures (e.g., through financing). Moreover, the knowledge element was insignificant at all spatial levels of analysis and also for general EA, but not when only its relationship with productive EA was examined. Because this type of entrepreneurship is particularly important for economic development, policy should emphasize this element of EEs. A deep insight here is that the

meta-analytical findings provided no support for the effect of patents and trademarks on this type of EA. Publications per researcher, however, did have a significant positive relationship with this type of EA. Thus, facilitating basic research by local higher education and research institutions could potentially help more than facilitating technology transfer or stimulating patenting. However, in all cases, ecosystems explicitly include the systemic and thus interdependent relationships among their components. A focus on individual elements must not be to the detriment of the systemic overall view.

Second, the specific focus on SUCs in chapters 3 to 5 has several additional implications. Qualitative analysis of the role of two SUCs in Germany, one in Berlin and one in Hannover, showed that such competitions can anchor entrepreneurship-related activities in a region. They connect relevant actors, particularly those working in entrepreneurship support offices, business development agencies, and chambers of commerce, and they also provide a learning environment for some entrepreneurs. However, both competitions only reached two groups of entrepreneurs: those who were self-employed and solo founders, and those who were university and company spin-offs. Though some of them were innovative and successful, no fast growing start-ups or scale-ups participated. In addition, most of the other actors that were involved in and connected through the competitions were employees of public organizations that support entrepreneurs in the region. Particularly in Berlin, sub-networks of business angels, international venture capitalists, and international entrepreneurs not connected to the SUC were found. Still, Berlin's EE is very successful in terms of both entrepreneurship quality and quantity. The study was not able to determine whether this would remain the case if the competition were absent. However, both SUCs helped to provide a local opportunity for entrepreneurs and entrepreneurship-related actors to connect, interact, and learn. Policymakers should keep in mind that such competitions *can* help to support the local ecosystem but that this depends on regional context and is not guaranteed.

Third, combining the results described in previous paragraph with detailed analysis based on the interviews yields further concrete policy recommendations. An SUC's success is determined by its participants and the quality and expertise of the jury or coaches. Interviewees often mentioned that some particular product-oriented, industrial-related feedback could help participants. Additionally, the findings showed that experienced entrepreneurs learned less from the competitions. Policymakers could introduce competitions

aimed at entrepreneurs in a specific sector and provide them with specific feedback; such competitions already exist in the biotech field (e.g., the Science4Life Venture Cup). Other competitions aimed only at start-ups in a later stage could provide more prize money and visibility for those entrepreneurs. A combination of these approaches with local competitions like the two that were analyzed could help to integrate actors on several levels.

6.5 Limitations and avenues for further research

The research articles that form the basis of this cumulative dissertation have limited generalizability in some aspects, and some other factors must also be considered critically. In the meta-analysis, an exhaustive process was used to identify relevant studies; 545 studies with a total of 5,475 variables were included. Thus, it can provide valid information on the current state of knowledge regarding statistical relationships between different variables and EA. However, the large number of these variables means that they must be highly aggregated in order to conduct meaningful analysis (in this case, variables were grouped into the ten elements of EEs defined by Stam (2015)). Despite various content, methodological, and statistical robustness checks, it must be noted that the grouping process directly affects the results. Another factor that influences the validity of the results is the operationalization of different theoretical concepts in the empirical studies included in the meta-analysis. For example, cultural aspects and their influence on EA are measured very differently. Some studies used direct measures of entrepreneurship culture, such as historical self-employment rates in the region, while others used higher-level measures such as individualism in the overall population. When these are combined in a meta-analysis, it can affect the results, and thus limit their significance – at least at this level of aggregation.

The examination of SUCs and their role in EEs was explanatory in nature as this has not previously been analyzed. Hence, a qualitative approach was chosen to study two competitions and the role they played in the ecosystems of Berlin and Hannover. The case study approach with qualitative interviews conducted in the regions provided novel findings and a basis for further theory-building, but these findings have limited generalizability. The studies in this dissertation cannot be used to make a generalizable statement regarding whether SUCs generate more or better EA in a region or what (measurable) role they play in

the emergence and development of EEs. Additionally, it must be noted that, despite an iterative sampling process and 45 interviews with diverse actors, only a fraction of the EEs (especially in Berlin) could be mapped.

Based on this dissertation's findings and limitations, further research should consider longitudinal analysis of events regularly held in EEs, such as SUCs. This could help to answer the open question of their relevance for the overall development and growth of EEs. Recently, other scholars presented findings similar to those of this dissertation regarding the sub-networks of Berlin's EE (Scheidgen, 2021). While this supports the findings of chapter 4, it also provides a promising starting point for further analyzing these sub-networks and learning about them in other ecosystems. Also, qualitative and quantitative analysis of the development of participants and their ventures over time would help to provide further knowledge of the impact of such competitions. However, such analysis would always focus on one or a few region(s) and EE(s). The meta-analysis in this dissertation provided a starting point for overarching approaches that gain stylized facts on the relevance of specific elements (and more importantly of specific mechanisms) that are inherent to EEs worldwide. Here, approaches that particularly emphasize the elements' interdependencies are needed. Models that use meta-analysis as a basis for synthesizing existing knowledge and then use either specific elements or groups of them (e.g., a group of core elements and a group of framework elements) to determine whether they moderate the influence of the other group on EA could be fruitful. Additionally, further analysis of whether some elements or whole ecosystems at a local or regional spatial scale are nested within larger national or even supra-national ecosystems would help to strengthen knowledge of EEs. Finally, the meta-analytical results showed that measures of general EA and productive EA are influenced by different EE elements. Further research should consider other specific types of entrepreneurship, like social or sustainable entrepreneurship, as output metrics.

In summary, in order to understand EEs, the complete individual behavior of people, as well as their behavior in groups, and the behavior of organizations in a region must be analyzed. To do so, aspects of sociology, business, economics, and economic geography must be taken into account. Creating complete network graphs of all entrepreneurs in a region and over time would be the ultimate goal. Despite many recent publications on the subject, basic research on this subject remains in its infancy.

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Appendices

Appendix A. Full search term

"entrepreneurial ecosystem" OR "entrepreneur ecosystem" OR "entrepreneurship ecosystem" OR "startup ecosystem" OR "start-up ecosystem" OR "entrepreneurial system" OR "entrepreneur system" OR "entrepreneurship system" OR "startup system" OR "start-up system" OR "entrepreneurial environment" OR "entrepreneur environment" OR "entrepreneurship environment" OR "startup environment" OR "start-up environment" OR "entrepreneurial infrastructure" OR "entrepreneur infrastructure" OR "entrepreneurship infrastructure" OR "startup infrastructure" OR "start-up infrastructure" OR "ecosystem for entrepreneurs" OR "ecosystem for entrepreneurship" OR "ecosystem for startups" OR "ecosystem for start-ups" OR "system for entrepreneurs" OR "system for entrepreneurship" OR "system for startups" OR "system for start-ups" OR "environment for entrepreneurs" OR "environment for entrepreneurship" OR "environment for startups" OR "environment for start-ups" OR "infrastructure for entrepreneurs" OR "infrastructure for entrepreneurship" OR "infrastructure for startups" OR "infrastructure for start-ups" OR "entrepreneurial activity" OR "startup activity" OR "start-up activity" OR "new venture activity" OR "new business activity" OR "new firm activity" OR "new business start-up activity" OR "entrepreneurial activities" OR "startup activities" OR "start-up activities" OR "new venture activities" OR "new business activities" OR "new firm activities" OR "new business start-up activities" OR "entrepreneurial entry" OR "startup entry" OR "start-up entry" OR "new venture entry" OR "new business entry" OR "new firm entry" OR "new business start-up entry" OR "entrepreneurial formation" OR "startup formation" OR "start-up formation" OR "new venture formation" OR "new business formation"

Appendix B. Countries

Argentina, Austria, Belgium, Brazil. Canada, Chile, China, Colombia, Czech Republic, Egypt, Estonia, Finland, France, Germany, Greece, India, Indonesia, Iran, Israel/West Bank, Italy, Japan, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Nigeria, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Slovak Republic, South Africa, South Korea, Spain, Sudan, Sweden, Switzerland, Thailand, Tunesia, Turkey, Uganda, United Arab Emirates, United Kingdom, USA, Uzbekistan, Vietnam

Appendix C. Variation of between study weights

Set	Independent Variable	K	N	$\hat{r}_{Fixed}$	p value	$\hat{r}_{Median}$	$\hat{r}_{Mean}$	p value	I^2
Total sample	Networks	126	128838	0.10	0.00	0.07	0.03	0.55	1.00
	Leadership	39	11872	0.16	0.00	0.17	0.14	0.02	0.98
	Finance	325	268125	0.08	0.00	0.11	0.14	0.00	0.99
	Talent	726	551897	0.14	0.00	0.10	0.14	0.00	0.99
	Knowledge	316	217030	0.12	0.00	0.04	0.06	0.02	0.99
	Support services/intermediaries	214	97587	0.11	0.00	0.05	0.11	0.00	1.00
	Formal institutions	379	244527	0.22	0.00	0.02	0.11	0.00	1.00
	Culture	386	348469	0.03	0.00	0.04	0.07	0.00	0.99
	Physical infrastructure	195	143535	0.30	0.00	0.00	0.05	0.11	1.00
	Demand	814	572230	0.25	0.00	0.11	0.15	0.00	0.99
Country level	Networks	24	4146	0.23	0.00	0.15	0.14	0.03	0.90
	Leadership	22	3521	-0.17	0.00	0.04	-0.01	0.92	0.95
	Finance	194	48394	0.17	0.00	0.12	0.14	0.00	0.97
	Talent	248	47513	0.15	0.00	0.08	0.12	0.00	0.98
	Knowledge	97	19911	0.11	0.00	-0.11	0.00	0.98	0.99
	Support services/intermediaries	133	32754	0.23	0.00	0.07	0.15	0.00	0.99
	Formal institutions	233	60288	0.06	0.00	0.00	0.05	0.08	0.99
	Culture	180	37989	-0.09	0.00	-0.02	-0.03	0.32	0.97
	Physical infrastructure	78	21341	0.26	0.00	-0.02	0.05	0.32	0.99
	Demand	352	77105	0.09	0.00	0.01	0.08	0.00	0.98
Regional level	Networks	75	53813	0.26	0.00	0.05	0.02	0.77	1.00
	Leadership	11	7040	0.25	0.00	0.26	0.29	0.00	0.99
	Finance	94	101968	0.07	0.00	0.08	0.15	0.00	1.00

	Talent	349	264014	0.11	0.00	0.07	0.11	0.00	1.00
	Knowledge	164	127935	0.11	0.00	0.11	0.09	0.01	0.99
	Support services/intermediaries	68	47165	0.16	0.00	0.04	0.05	0.45	1.00
	Formal institutions	101	105778	0.39	0.00	0.09	0.22	0.00	1.00
	Culture	144	138802	0.08	0.00	0.14	0.12	0.00	1.00
	Physical infrastructure	74	60376	0.07	0.00	0.00	0.01	0.84	1.00
	Demand	333	261828	0.18	0.00	0.13	0.17	0.00	0.99
Local level	Networks	27	70879	-0.03	0.00	-0.05	-0.04	0.70	1.00
	Leadership	6	1311	0.54	0.00	0.38	0.40	0.03	0.98
	Finance	37	117763	0.05	0.00	0.13	0.13	0.13	1.00
	Talent	129	240370	0.17	0.00	0.28	0.25	0.00	1.00
	Knowledge	55	69184	0.13	0.00	0.06	0.07	0.12	0.99
	Support services/intermediaries	13	17668	-0.27	0.00	0.22	0.10	0.27	1.00
	Formal institutions	45	78461	0.09	0.00	0.00	0.16	0.03	1.00
	Culture	62	171678	0.03	0.00	0.13	0.19	0.00	1.00
	Physical infrastructure	43	61818	0.50	0.00	0.08	0.13	0.06	1.00
	Demand	129	233297	0.36	0.00	0.25	0.26	0.00	1.00
General entrepreneurial activity	Networks	102	110023	0.06	0.00	0.10	0.03	0.52	1.00
	Leadership	35	9378	0.14	0.00	0.17	0.12	0.05	0.98
	Finance	273	245023	0.07	0.00	0.10	0.13	0.00	0.99
	Talent	589	455055	0.11	0.00	0.09	0.14	0.00	0.99
	Knowledge	231	147072	0.03	0.00	0.00	0.02	0.57	0.99
	Support services/intermediaries	172	72954	-0.02	0.00	0.03	0.10	0.00	0.99
	Formal institutions	339	223304	0.21	0.00	0.01	0.09	0.00	1.00
	Culture	342	320104	0.02	0.00	0.02	0.05	0.04	0.99
	Physical infrastructure	161	112795	0.37	0.00	0.00	0.06	0.12	1.00

	Demand	681	494796	0.24	0.00	0.09	0.13	0.00	0.99
Productive entrepreneurial activity	Networks	24	18815	0.35	0.00	-0.02	0.00	0.98	1.00
	Leadership	4	2494	0.25	0.00	0.25	0.34	0.16	0.99
	Finance	52	23102	0.22	0.00	0.16	0.21	0.00	0.98
	Talent	137	96842	0.29	0.00	0.12	0.14	0.00	0.99
	Knowledge	85	69958	0.30	0.00	0.19	0.17	0.00	0.99
	Support services/intermediaries	42	24633	0.45	0.00	0.20	0.15	0.03	1.00
	Formal institutions	40	21223	0.28	0.00	0.18	0.24	0.00	1.00
	Culture	44	28365	0.17	0.00	0.14	0.22	0.00	0.99
	Physical infrastructure	34	30740	-0.02	0.01	0.01	0.04	0.64	1.00
	Demand	133	77434	0.28	0.00	0.21	0.21	0.00	0.98

Note. $\hat{r}_{Fixed}$ =estimated population effect size, with a fixed effects model; $\hat{r}_{Median}$ = median population effect size; $\hat{r}_{Mean}$ = mean population effect size; K = number of studies; N = total sample size; I^2 = heterogeneity measure. Findings are rounded to two digits.

Appendix D. Random-effects model with different between study weights

Set	Independent Variable	K	N	$\hat{r}$	$\hat{r}_{SD}$	p value	95% CI		80% CV		I^2
							Lower limit	Upper limit	Lower limit	Upper limit	
	Networks	126	1701885	0.00	0.09	0.99	-0.17	0.16	-0.84	0.84	1.00
	Leadership	39	22318	0.17	0.08	0.03	0.02	0.32	-0.44	0.68	0.99
	Finance	325	483039	0.17	0.03	0.00	0.12	0.22	-0.43	0.67	1.00
	Talent	726	2596936	0.18	0.02	0.00	0.14	0.22	-0.51	0.73	1.00
Total	Knowledge	316	380978	0.07	0.03	0.05	0.00	0.14	-0.62	0.70	1.00
sample	Support services/intermediaries	214	184920	0.16	0.05	0.00	0.07	0.25	-0.63	0.79	1.00
	Formal institutions	379	1838491	0.21	0.04	0.00	0.14	0.28	-0.62	0.82	1.00
	Culture	386	2093351	0.10	0.03	0.00	0.03	0.16	-0.60	0.71	1.00
	Physical infrastructure	195	256178	0.12	0.06	0.04	0.01	0.22	-0.71	0.81	1.00
	Demand	814	2610590	0.21	0.02	0.00	0.17	0.25	-0.51	0.76	1.00
	Networks	24	1415186	0.16	0.08	0.04	0.01	0.30	-0.32	0.57	0.99
	Leadership	22	6997	-0.03	0.08	0.74	-0.18	0.13	-0.48	0.44	0.98
	Finance	194	85620	0.16	0.03	0.00	0.10	0.22	-0.36	0.61	0.98
	Talent	248	1497458	0.18	0.04	0.00	0.10	0.26	-0.54	0.75	1.00
Country	Knowledge	97	34118	0.07	0.07	0.30	-0.07	0.21	-0.68	0.76	0.99
level	Support services/intermediaries	133	56981	0.24	0.06	0.00	0.13	0.34	-0.54	0.79	0.99
	Formal institutions	233	1511585	0.10	0.04	0.01	0.02	0.18	-0.59	0.70	0.99
	Culture	180	1478236	-0.03	0.03	0.33	-0.09	0.03	-0.49	0.45	0.99
	Physical infrastructure	78	32278	0.16	0.08	0.06	-0.01	0.31	-0.67	0.81	1.00
	Demand	352	1545430	0.16	0.04	0.00	0.09	0.23	-0.61	0.77	0.99
Regional	Networks	75	149657	-0.04	0.12	0.76	-0.27	0.20	-0.88	0.87	1.00
level	Leadership	11	12803	0.39	0.18	0.02	0.06	0.65	-0.39	0.85	0.99

	Finance	94	141039	0.19	0.06	0.00	0.08	0.29	-0.47	0.71	1.00
	Talent	349	550466	0.14	0.03	0.00	0.08	0.20	-0.55	0.71	1.00
	Knowledge	164	245501	0.07	0.05	0.16	-0.03	0.16	-0.62	0.70	1.00
	Support services/intermediaries	68	87032	0.02	0.10	0.83	-0.18	0.22	-0.79	0.81	1.00
	Formal institutions	101	184875	0.39	0.09	0.00	0.24	0.52	-0.60	0.91	1.00
	Culture	144	278485	0.16	0.06	0.01	0.04	0.27	-0.67	0.81	1.00
	Physical infrastructure	74	115602	0.03	0.10	0.77	-0.17	0.23	-0.80	0.82	1.00
	Demand	333	517203	0.22	0.03	0.00	0.16	0.27	-0.43	0.72	1.00
Local level	Networks	27	137042	-0.05	0.21	0.82	-0.42	0.34	-0.90	0.88	1.00
	Leadership	6	2518	0.47	0.18	0.01	0.15	0.70	-0.21	0.85	0.98
	Finance	37	256380	0.16	0.11	0.17	-0.06	0.36	-0.64	0.79	1.00
	Talent	129	549012	0.29	0.04	0.00	0.21	0.36	-0.29	0.71	1.00
	Knowledge	55	101359	0.06	0.06	0.31	-0.05	0.17	-0.45	0.54	1.00
	Support services/intermediaries	13	40907	0.10	0.10	0.30	-0.09	0.29	-0.38	0.55	1.00
	Formal institutions	45	142031	0.34	0.13	0.01	0.09	0.55	-0.68	0.91	1.00
	Culture	62	336630	0.30	0.09	0.00	0.13	0.46	-0.55	0.85	1.00
	Physical infrastructure	43	108298	0.18	0.11	0.08	-0.02	0.38	-0.63	0.80	1.00
	Demand	129	547957	0.33	0.06	0.00	0.23	0.42	-0.44	0.82	1.00
General entrepreneurial activity	Networks	102	1664943	0.02	0.10	0.82	-0.17	0.21	-0.85	0.86	1.00
	Leadership	35	19327	0.14	0.08	0.09	-0.02	0.30	-0.46	0.66	0.99
	Finance	273	448138	0.16	0.03	0.00	0.10	0.22	-0.47	0.68	1.00
	Talent	589	2432887	0.19	0.02	0.00	0.14	0.23	-0.51	0.74	1.00
	Knowledge	231	265915	0.03	0.04	0.46	-0.05	0.11	-0.65	0.68	1.00
	Support services/intermediaries	172	151669	0.17	0.05	0.00	0.06	0.26	-0.62	0.79	1.00
	Formal institutions	339	1813742	0.19	0.04	0.00	0.11	0.26	-0.63	0.81	1.00
	Culture	342	2044610	0.07	0.03	0.03	0.01	0.14	-0.63	0.71	1.00

	Physical infrastructure	161	217308	0.13	0.06	0.03	0.01	0.25	-0.70	0.81	1.00
	Demand	681	2479600	0.21	0.02	0.00	0.16	0.25	-0.55	0.78	1.00
Productive entrepreneurial activity	Networks	24	36942	-0.10	0.18	0.57	-0.42	0.24	-0.85	0.79	1.00
	Leadership	4	2991	0.43	0.27	0.08	-0.05	0.76	-0.55	0.91	0.99
	Finance	52	34901	0.23	0.04	0.00	0.15	0.31	-0.16	0.56	0.99
	Talent	137	164049	0.16	0.05	0.00	0.07	0.24	-0.48	0.69	1.00
	Knowledge	85	115063	0.17	0.06	0.01	0.05	0.29	-0.53	0.73	0.99
	Support services/intermediaries	42	33251	0.15	0.12	0.22	-0.09	0.36	-0.70	0.82	1.00
	Formal institutions	40	24749	0.38	0.12	0.00	0.17	0.56	-0.52	0.88	1.00
	Culture	44	48741	0.27	0.07	0.00	0.14	0.39	-0.30	0.70	1.00
	Physical infrastructure	34	38870	0.04	0.14	0.80	-0.24	0.30	-0.78	0.81	1.00
	Demand	133	130990	0.23	0.04	0.00	0.17	0.30	-0.29	0.65	0.99

Note. $\hat{r}$ =estimated population effect size, with a random-effects model; $\hat{r}_{SD}$ is the standard deviation of estimated population effect size; k = subset of all the studies (K); N = total sample size; CI = confidence interval; CV = credibility interval; I^2 = heterogeneity measure. Findings are rounded to two digits.

Appendix E. Robustness table of the multi-layer random-effects model

Framework	Variable	Point estimate	95% confidence interval		p-value
			Lower limit	Upper limit	
Networks	Intercept	-0.81	-1.52	-0.09	0.03
	Publication Control	0.00	-0.22	0.22	0.98
	Country level	0.27	-0.06	0.60	0.11
	Local level	-0.04	-0.30	0.21	0.73
	High-growth ventures	0.56	-0.21	1.33	0.15
	Nascent Entrepreneur	0.63	-0.12	1.38	0.10
	New firm formation	0.90	0.18	1.62	0.01
	Self-employment	0.85	0.11	1.59	0.02
	Productive entrepreneurial activity	0.06	0.03	0.09	0.00
Leadership	Intercept	0.14	-0.40	0.68	0.60
	Publication Control	-0.18	-0.42	0.07	0.15
	Country level	-0.47	-0.84	-0.11	0.01
	Local level	-0.01	-0.38	0.36	0.96
	High-growth ventures	-0.19	-0.93	0.56	0.61
	Nascent Entrepreneur	0.42	-0.24	1.08	0.20
	New firm formation	0.35	-0.26	0.96	0.25
	Self-employment	0.27	-0.35	0.88	0.38
	Productive entrepreneurial activity	0.32	-0.08	0.73	0.11
Finance	Intercept	0.12	-0.10	0.33	0.29
	Publication Control	0.00	-0.12	0.12	0.97
	Country level	0.17	0.04	0.30	0.01
	Local level	0.00	-0.18	0.18	0.99
	High-growth ventures	0.18	-0.02	0.37	0.08
	Nascent Entrepreneur	-0.29	-0.49	-0.10	0.00
	New firm formation	0.09	-0.10	0.28	0.35
	Self-employment	-0.44	-0.64	-0.25	0.00
	Productive entrepreneurial activity	0.02	0.00	0.05	0.05
Talent	Intercept	0.16	0.05	0.28	0.01
	Publication Control	-0.02	-0.10	0.06	0.59
	Country level	0.10	0.01	0.18	0.03
	Local level	0.05	-0.05	0.16	0.29
	High-growth ventures	-0.07	-0.18	0.04	0.19
	Nascent Entrepreneur	-0.27	-0.38	-0.16	0.00
	New firm formation	0.00	-0.10	0.10	0.95
	Self-employment	-0.08	-0.19	0.02	0.13

	Productive entrepreneurial activity	0.12	0.11	0.13	0.00
Knowledge	Intercept	0.08	-0.19	0.35	0.56
	Publication Control	-0.08	-0.19	0.04	0.20
	Country level	0.10	-0.05	0.24	0.18
	Local level	-0.04	-0.19	0.12	0.63
	High-growth ventures	-0.20	-0.46	0.06	0.14
	Nascent Entrepreneur	-0.36	-0.63	-0.09	0.01
	New firm formation	-0.02	-0.28	0.24	0.86
	Self-employment	-0.13	-0.39	0.13	0.34
	Productive entrepreneurial activity	0.31	0.29	0.32	0.00
Support services / intermediaries	Intercept	0.34	-0.27	0.95	0.27
	Publication Control	0.07	-0.09	0.22	0.40
	Country level	0.18	0.01	0.35	0.04
	Local level	0.06	-0.22	0.34	0.67
	High-growth ventures	-0.29	-0.91	0.33	0.35
	Nascent Entrepreneur	-0.40	-1.02	0.21	0.20
	New firm formation	-0.46	-1.07	0.16	0.14
	Self-employment	-0.45	-1.07	0.16	0.15
	Productive entrepreneurial activity	0.23	0.20	0.25	0.00
Formal institutions	Intercept	0.27	0.12	0.43	0.00
	Publication Control	0.04	-0.08	0.16	0.53
	Country level	-0.07	-0.20	0.06	0.28
	Local level	-0.12	-0.32	0.07	0.20
	High-growth ventures	0.08	-0.07	0.22	0.28
	Nascent Entrepreneur	-0.26	-0.38	-0.14	0.00
	New firm formation	0.01	-0.11	0.12	0.92
	Self-employment	-0.31	-0.44	-0.19	0.00
	Productive entrepreneurial activity	0.02	-0.01	0.05	0.18
Culture	Intercept	0.15	-0.08	0.37	0.20
	Publication Control	-0.02	-0.13	0.08	0.67
	Country level	-0.19	-0.30	-0.08	0.00
	Local level	0.03	-0.11	0.17	0.65
	High-growth ventures	0.07	-0.15	0.29	0.54
	Nascent Entrepreneur	0.00	-0.22	0.23	0.97
	New firm formation	0.00	-0.22	0.22	0.98
	Self-employment	0.04	-0.18	0.26	0.69

	Productive entrepreneurial activity	0.11	0.09	0.14	0.00
Physical infrastructure	Intercept	-0.09	-0.31	0.12	0.41
	Publication Control	-0.03	-0.21	0.16	0.77
	Country level	0.06	-0.13	0.26	0.53
	Local level	0.12	-0.11	0.35	0.30
	High-growth ventures	0.71	0.53	0.88	0.00
	Nascent Entrepreneur	0.07	-0.11	0.25	0.43
	New firm formation	0.20	0.04	0.36	0.02
	Self-employment	0.16	-0.01	0.33	0.07
	Productive entrepreneurial activity	-0.06	-0.08	-0.03	0.00
Demand	Intercept	0.11	0.01	0.22	0.04
	Publication Control	-0.06	-0.13	0.01	0.09
	Country level	-0.08	-0.15	-0.01	0.03
	Local level	0.09	-0.01	0.18	0.07
	High-growth ventures	0.06	-0.04	0.16	0.23
	Nascent Entrepreneur	-0.01	-0.11	0.09	0.87
	New firm formation	0.10	0.01	0.19	0.04
	Self-employment	0.01	-0.08	0.11	0.80
	Productive entrepreneurial activity	0.09	0.08	0.11	0.00

Appendix F. Stam's original variables

Set	Independent Variable	K	N	$\hat{r}$	$\hat{r}_{SD}$	p value	95% CI		80% CV		I^2
							Lower limit	Upper limit	Lower limit	Upper limit	
	Networks	14	7660	0.25	0.15	0.10	-0.05	0.50	-0.47	0.77	0.97
	Leadership	21	2649	0.08	0.09	0.38	-0.10	0.26	-0.42	0.55	0.96
	Finance	64	43870	0.17	0.08	0.02	0.02	0.31	-0.54	0.74	0.99
	Talent	302	283535	0.26	0.05	0.00	0.17	0.34	-0.65	0.86	1.00
Total	Knowledge	110	60970	0.02	0.06	0.70	-0.10	0.15	-0.68	0.70	1.00
sample	Support services/intermediaries	33	20102	0.28	0.20	0.16	-0.12	0.60	-0.85	0.95	1.00
	Formal institutions	169	75845	-0.05	0.05	0.34	-0.14	0.05	-0.68	0.63	0.99
	Culture	90	88451	0.15	0.06	0.01	0.04	0.25	-0.49	0.68	0.99
	Physical infrastructure	44	34221	-0.10	0.12	0.44	-0.33	0.15	-0.82	0.75	1.00
	Demand	703	513175	0.23	0.03	0.00	0.18	0.28	-0.55	0.80	1.00

Note. $\hat{r}$ =estimated population effect size, with a random-effects model; $\hat{r}_{SD}$ is the standard deviation of estimated population effect size; K = number of studies; N = total sample size; CI = confidence interval; CV = credibility interval; I^2 = heterogeneity measure. Findings are rounded to two digits.

Appendix G. Rationales for categories of variables and their assignment to the ecosystem framework

Category	Number of Variables	Coding according to Stam (2015)	Min r	Max r	K	N	Point estimate	p-value	I^2	Spatially active on:	Rationale
Business Environment, Human Capital	6	Talent	-0.62	0.99	6	796	0.25	0.59	0.99	Country	Includes measures of human capital in the country. Human capital is key to the discovery or creation, and exploitation of entrepreneurial opportunities. Therefore, it can be related to entrepreneurial activity.
Business Environment, Start-Ups	90	Support Services / intermediaries	-0.81	0.98	90	47681	0.18	0.02	1.00	Country, Regional, Local	Includes variables on the "ease of doing business" and business freedom. Business regulations can influence new firm formation rates.
Business start-up procedure	40	Support Services / intermediaries	-0.85	0.81	40	12506	0.05	0.60	0.99	Country, Regional, Local	Includes variables on the procedures required to start a business. Business regulations can influence new firm formation rates.
Business start-up time	24	Support Services / intermediaries	-0.75	0.76	24	7007	0.23	0.01	0.98	Country, Local	Includes variables on the time required to start a business. Business regulations can influence new firm formation rates.
Business, Cost	49	Support Services / intermediaries	-0.84	0.97	49	13037	0.13	0.20	0.99	Country, Regional, Local	Includes variables on the cost to start a business. Business regulations can influence new firm formation rates.
Business, support services	54	Support Services / intermediaries	-0.94	0.74	54	49353	-0.06	0.46	1.00	Country, Regional, Local	Includes variables that measure support services for entrepreneurs, e.g. inubators, business support services. Support can help nascent entrepreneurs to overcome first hurdles, connect, and grow and therefore influence entrepreneurial activity.

Connectedness, Industry	22	Networks	-0.99	0.72	22	71129	-0.35	0.05	1.00	Country, Regional, Local	Includes variables the measure the geographical proximity to large companies and neighbouring regions with high industry density. Several dimensions of proximity to other actors are key for the entrepreneurial process.
Connectedness, Privat	44	Networks	-0.97	0.94	44	50586	0.01	0.90	1.00	Country, Regional, Local	Includes measures of the social capital. Social capital (aggregated) and networking (individual level) raises the chances of people becoming entrepreneurs and successfully allocating ressources and funding the venture.
Corruption, Measure	106	Formal institutions	-0.90	0.98	106	57139	-0.03	0.68	0.99	Country, Regional, Local	Includes measures of corruption. Corruption, as a part of the institutions, shapes the rules of the game and therefore influences entrepreneurial activity.
Country Development, Agricultural Share	13	Talent	-0.46	0.48	13	3346	0.04	0.63	0.94	Country, Regional, Local	The agricultural share of the economy determines the important sectors of the economy and therefore shapes the talent pool. Is is also a proxy for the economic structure. Both can influence entrepreneurship in the territory.
Country Development, HDI	32	Talent	-0.99	0.96	32	4497	0.27	0.07	0.94	Country, Local	HDI includes measures of economic development, education and health care. Therefore mainly is a proxy for the talent pool, thus the human capital in the given territory.
Country Development, Resources	7	Culture	-0.13	0.39	7	6405	0.21	0.01	0.96	Country, Local	Includes measures of the dependence on natural ressources. In our argumentation this belongs to culture, as it reflects how the country uses the natural resource rents (exploitation vs exploration) and the respective individual behaviours, which shapes the long-term culture. A second assignment is talent, as this requires and defines the level of human knowledge.
Country Development, Type	32	Physical infrastructure	-0.69	0.74	32	7224	-0.06	0.46	0.98	Country, Regional, Local	Includes different measures of the development status of countries, e.g. developing country binaries or measures of nighttime light. Directly represents the physical infrastructure. A second assignment is demand, as the development level also influences the availability and size of markets.
Country, History	62	Culture	-0.98	0.90	62	88150	-0.34	0.00	0.99	Country, Regional, Local	Includes different variables that take the history of the respective country into account, e.g. colonial history or socialism history. This mainly belongs to culture, as it shapes the values, beliefs, and behaviour of the population in our

											argumentation. A second assignment is formal institutions, as the history is influenced by those institutions and vice versa.
Country, Market Size	30	Demand	-0.48	0.94	30	56310	0.16	0.06	1.00	Country, Regional, Local	Several specific measures of the local market size. Are measures for demand.
Crime Rate	21	Culture	-0.79	0.94	21	58597	-0.06	0.71	0.99	Country, Regional, Local	Measures of the crime rate in the territory. Belongs to culture, as this shapes the level of uncertainty and security in the territory. A second assignment is formal institutions as these shape the framework for crime to happen or not.
Cultural and Social Norms	46	Culture	-0.94	0.98	46	29312	0.29	0.02	1.00	Country, Regional, Local	Includes several measure of cultural and social norms, e.g. not accepting bribes or social cynism. Reflects the culture.
culture, Assertiveness	6	Culture	-0.05	0.29	6	890	0.09	0.13	0.64	Country	Measures of assertiveness (from GLOBE). Reflects the culture.
culture, Conservatism	2	Culture	0.09	0.42	2	202	0.23	0.17	0.75	Country	Measures of conservatism (from Schwartz Value Survey). Reflects the culture.
culture, Creative class	22	Culture	-0.95	0.72	22	27853	-0.06	0.69	1.00	Regional, Local	Includes variables that measure the creative class. Reflects the culture. A second assignment is talent, as this also influences the availability of skilled workers.
culture, Egalitarianism vs. Hierarchy	8	Culture	-0.36	0.40	8	1414	0.07	0.51	0.93	Country, Regional	Measures of egalitarianism vs. hierarchy (mostly from Schwartz Value Survey). Reflects the culture.
culture, Embeddedness versus autonomy	6	Culture	-0.54	0.61	6	1551	0.09	0.75	0.98	Country	Measures the autonomy vs. embeddedness in the population. Reflects the culture.
Culture, Engagement	22	Culture	-0.91	0.97	22	86539	0.19	0.20	1.00	Country, Regional, Local	Measures of the engagement of individuals, e.g. in unions or parties. Reflects the culture. A second assignment is networks.
culture, Entrepreneurial culture	131	Culture	-0.97	0.98	131	100378	0.18	0.01	0.99	Country, Regional, Local	Includes several measure of entrepreneurial specific culture in the territory, e.g. prior self-employment rates. Reflects the culture. A second assignment is leadership as these variables could also influence the availability and visibility of entrepreneurial role models.
culture, Future Orientation	7	Culture	-0.29	0.40	7	805	0.09	0.41	0.91	Country	Includes future orientation (mainly from GLOBE). Reflects the culture.

culture, Gender	10	Culture	-0.78	0.97	10	5182	0.11	0.67	0.99	Country, Regional, Local	Includes gender egalitarianism (mainly from GLOBE). Reflects the culture.
culture, Harmony vs. Mastery	2	Culture	-0.45	-0.43	2	884	-0.44	0.00	0.00	Country	Includes harmony vs. mastery (Schwartz Value Survey). Reflects the culture.
Culture, HO: Humane Orientation	5	Culture	-0.43	0.53	5	497	0.08	0.63	0.85	Country	Includes humane orientation (mainly from GLOBE and Hofstede). Reflects the culture.
culture, Individualism - Collectivism	55	Culture	-0.75	0.74	55	9211	0.02	0.78	0.97	Country, Regional	Includes individualism vs. collectivism (mainly from GLOBE and Hofstede). Reflects the culture.
Culture, Indulgence	5	Culture	0.00	0.62	5	201	0.38	0.01	0.77	Country	Includes indulgence (mainly from GLOBE and Hofstede). Reflects the culture.
culture, Long-term Orientation	12	Culture	-0.57	0.77	12	1380	0.06	0.69	0.93	Country, Regional	Includes long-term orientation (mainly from GLOBE and Hofstede). Reflects the culture.
culture, Masculinity	30	Culture	-0.87	0.74	30	2743	0.13	0.05	0.83	Country, Regional	Includes masculinity (mainly from GLOBE and Hofstede). Reflects the culture.
culture, modernity	1	Culture	0.38	0.38	1	56	0.38	0.00		Country	Measures the degree of modernity (e.g. traditionalism vs. modernism). Reflects the culture.
culture, opportunism	1	Culture	0.10	0.10	1	297	0.10	0.10		Regional	Measures the opportunism. Reflects the culture in a territory.
culture, Performance Orientation	9	Culture	-0.01	0.41	9	1016	0.26	0.00	0.64	Country	Includes performance orientation (mainly from GLOBE and Hofstede). Reflects the culture.
culture, Postmaterialism	9	Culture	-0.68	-0.23	9	260	-0.41	0.00	0.00	Country	Includes measures of postmaterialism. Reflects the culture in a territory.
culture, Power distance	40	Culture	-0.53	0.84	40	3803	0.05	0.49	0.93	Country, Regional	Includes power distance (mainly from GLOBE and Hofstede). Reflects the culture.
culture, Satisfaction with your country	23	Culture	-0.56	0.98	23	4032	0.37	0.03	0.99	Country, Regional	Variables that measure the satisfaction with the country in the population. Belongs to culture.
culture, Subjective insecurity	4	Culture	-0.49	-0.39	4	720	-0.40	0.00	0.00	Country, Local	Variables that measure the perception of insecurity in the population. Belongs to culture.
culture, Trust	33	Culture	-0.95	0.99	33	3103	0.24	0.11	0.99	Country, Regional	Includes measure of the trust of the society in people and the government. Belongs to culture.

culture, Uncertainty avoidance	52	Culture	-0.65	0.99	52	7996	0.06	0.39	0.99	Country, Regional	Includes uncertainty avoidance (mainly from GLOBE and Hofstede). Reflects the culture.
Democracy, Direction	18	Culture	-0.97	0.97	18	21358	0.00	0.99	1.00	Country, Regional, Local	Measure right or left wing governments and election results. Reflects the culture in the territory. A second assignment is formal institutions.
Democracy, Institutions	32	Culture	-0.89	0.98	32	13265	-0.26	0.03	1.00	Country, Regional, Local	Includes mainly variables of "voice and accountability". Thus, captures the freedom of speech and elections and belongs to culture. A second assignment is formal institutions.
Democracy, Voting	8	Culture	-0.97	1.00	8	2508	0.91	0.01	1.00	Country, Regional, Local	Includes measures of the voting behaviour. Reflects how society shapes and interacts with the government. Thus, is assigned to culture. A second assignment is formal institutions.
Demography, Age composition	137	Talent	-0.93	1.00	137	70722	0.47	0.00	1.00	Country, Regional, Local	Includes measure of the age composition, e.g. percentage of population in a specific age group. This directly influences the availability of working age population and thus belongs to talent. As older and younger people behave differently, a second assignment is culture.
Demography, Diversity/Migration	194	Talent	-0.99	1.00	194	150977	0.17	0.00	1.00	Country, Regional, Local	This category includes measures of the percentage of inhabints with a migration background, and migration inflows. Therefore, it influences the available pool of diverse knowledge and the availability of workers. Also, migration shapes the demographic structure as well as the society, why we argue that the second assignment is culture.
Demography, Population	148	Demand	-0.92	1.00	148	177457	0.40	0.00	1.00	Country, Regional, Local	Population (total). Is a proxy for the market size and thus belongs to demand.
Demography, Population Density	245	Demand	-0.99	0.98	245	230290	0.19	0.00	1.00	Country, Regional, Local	Population density. Is a proxy for the market size and thus belongs to demand. A second assignment is networks as this density measure also influences the probability of interaction.
Demography, Population growth	95	Demand	-0.97	0.91	95	61622	-0.12	0.11	1.00	Country, Regional, Local	Population growth. Is a proxy for the market size and thus belongs to demand.

Demography, Religion	41	Culture	-0.97	0.54	41	33474	-0.19	0.04	0.97	Country, Regional, Local	This includes measure of the distribution of religions and the share of religious people. We argue that this shapes society and therefore belongs to culture. A second assignment could be talent, as this at the same time increases the available pool of diverse knowledge and ideas.
Demography, Retire	17	Talent	-0.87	1.00	17	6258	0.68	0.01	1.00	Country, Regional, Local	This includes variables that capture the ratio of population in the retirement age. Thus, it reflects human capital potential, while with more younger people represent more diversity and adaptability, and therefore belongs to talent.
Education, costs	4	Talent	-0.45	0.85	4	889	0.38	0.32	0.99	Country, Regional, Local	Cost of or expenditures for education influence the skill level of the workers and thus belongs to talent. In a second argumentation, this is a measure for the size and cost of educational institutions and therefore of the formal institutions enabling human interactions.
Education, Entrepreneurship	15	Leadership	-0.21	0.64	15	2748	0.09	0.25	0.93	Country, Local	Includes variables that reflect the specific entrepreneurship education, e.g. measured through the GEM expert survey on country-level. This is assigned to leadership, as it influences the availability and visibility of entrepreneurship, entrepreneurial role models, and entrepeneurial knowledge. A second assignment is talent, as it influences the skills in the population related to entrepreneurship.
Education, Job related	33	Talent	-0.97	0.99	33	13333	-0.18	0.45	1.00	Country, Regional, Local	Percentage of the population with a job specific education or skills. Directly influences talent as it reflects the skill-level of the workforce.
Education, primary	61	Talent	-0.95	0.98	61	27888	0.15	0.17	0.99	Country, Regional, Local	Percentage of the population with a primary education. Directly influences talent as it reflects the education of the workforce.
Education, secondary	66	Talent	-0.92	1.00	66	32486	0.31	0.01	1.00	Country, Regional, Local	Percentage of the population with a secondary education. Directly influences talent as it reflects the education of the workforce.
Education, teritary	348	Talent	-0.98	0.99	348	336072	0.27	0.00	1.00	Country, Regional, Local	Percentage of the population with a tertiary education. Directly influences talent as it reflects the education of the workforce.

Employment, Change	44	Talent	-0.95	0.52	44	29939	-0.23	0.02	1.00	Country, Regional, Local	Change of employment, e.g. captured through the job growth rate. This directly belongs to talent as it reflects the availability of workers.
Employment, Construction	7	Talent	-0.97	0.02	7	6185	-0.72	0.02	0.99	Regional	Employment in the construction sector. Therefore, directly belongs to the element talent.
Employment, Gender	19	Talent	-0.94	1.00	19	6620	0.53	0.06	1.00	Country, Regional, Local	Measure of the gender distribution in the workforce. Mainly influences the availability of workers and thus belongs to talent. A second assignment is culture, as this reflects how the society see gender roles and how many woman participate in the workforce.
Employment, High Skill	115	Talent	-0.76	0.99	115	165117	0.08	0.18	1.00	Country, Regional, Local	Includes measures of the employment in high-skill sectors and of high skilled wokers. Hence, this directly belongs to the element talent. Also, it can be assigned to knowledge as it is a proxy for the knowledge output in a territory.
Employment, Labor Force	167	Talent	-0.68	1.00	167	113553	0.61	0.00	1.00	Country, Regional, Local	Includes variables like the employment rate, total employment, and population in the working age. Therefore, this category directly reflects the availability of wokers and thus belongs to the element talent.
Employment, Low Skill	1	Talent	-0.70	-0.70	1	11	-0.70	0.01	NA	Regional	Employment in low skill sectors. Therefore, directly belongs to the element talent.
Employment, Manufacturing	122	Talent	-0.95	0.99	122	87358	0.13	0.08	1.00	Country, Regional, Local	Employment in the manufacturing sector. Therefore, directly belongs to the element talent.
Employment, Mining/Agriculture	23	Talent	-0.85	0.58	23	26137	0.05	0.64	0.99	Country, Regional, Local	Employment in the mining and agricultural sector. Therefore, directly belongs to the element talent.
Employment, Research	109	Talent	-0.97	0.97	109	103410	-0.09	0.21	1.00	Country, Regional, Local	Employment in research. Directly belongs to the element talent. A second assignment is knowledge, as this also is a proxy for the research output in a territory.
Employment, Services	45	Talent	-0.97	0.99	45	72420	0.53	0.00	1.00	Country, Regional, Local	Employment in the services sector. Therefore, directly belongs to the element talent.

Employment, Structure	14	Talent	-0.18	0.98	14	3974	0.68	0.00	1.00	Country, Regional, Local	Measure of the structure of the employment, e.g. in specific sectors. Therefore, directly belongs to the element talent.
Employment, Vacancy rate	4	Talent	-0.44	0.06	4	5967	-0.20	0.06	0.93	Regional	Includes measure of the job vacancies per worker. Thus, directly belongs to talent as it measure the available workforce. A second assignment is demand, as it refers to employment rates and thus shapes the income and local demand.
FDI	17	Demand	-0.93	0.35	17	28387	-0.24	0.08	0.98	Country, Regional, Local	General measures of FDI. Brownfield & Greenfield investments build markets and generate markets / opportunities while also increase investments. Thus, this directly reflects demand. It also measure the availability of investments and therefore a second assignment is finance.
FDI Research	13	Finance	-0.13	0.38	13	9762	0.20	0.00	0.87	Country, Regional, Local	Includes variables that measure knowledge spillovers related to FDIs and FDIs in specific sectors. Influences finance as it captures direct investment effects. A second assignment is knowledge as these variables also capture potential knowledge exchange.
FDI, Aid	13	Demand	-0.81	0.50	13	2968	-0.48	0.00	0.98	Country	Foreign aids. Similar to inward FDI, this directly influences the demand. A second assignment is finance because of potential investments.
FDI, Inward	67	Demand	-0.61	0.81	67	23963	0.04	0.36	0.97	Country, Local	Inward FDI. Represents capital inflows for investments. Brownfield & Greenfield investments build markets and generate markets / opportunities while also increase investments. Thus, this directly reflects demand. It also measure the availability of investments and therefore a second assignment is finance.
FDI, Outward	8	Finance	-0.41	0.19	8	2084	-0.15	0.06	0.93	Country	Outward FDI. Represents financial flows and thus finance. At the same time it most likely represents a capital drain. Hence, a second assignment is demand.
Finance, Access	15	Finance	-0.86	0.95	15	7293	0.47	0.05	1.00	Country, Regional	Measure of the access of finance, e.g. ease of access to loans. Direct measure of finance.
Finance, Bank concentration	40	Finance	-0.94	0.97	40	17116	0.27	0.04	1.00	Country, Regional, Local	Measure of the bank concentration and competition. Influences finance by reflecting the avaliability of banks. Also, by providing density measures, this

											reflects the potential for entrepreneurs to meet with local banks and thus a second assignment is support services / intermediaries.
Finance, Capital	156	Finance	-0.92	0.99	156	75194	0.27	0.00	1.00	Country, Regional, Local	Includes measures for the capital stock in the territory. Directly belongs to finance.
Finance, Credit	77	Finance	-0.99	0.86	77	27246	0.15	0.04	0.99	Country, Regional, Local	Includes variables that measure the availability of credit and the credits as percentage of GDP. Directly measure the access to financing and thus belongs to the element finance.
Finance, dividends/interest/rent	40	Finance	-0.99	0.95	40	12011	-0.06	0.65	1.00	Country, Regional, Local	Measure for dividends and interests. Influences the amount of capital and thus finance. Also influences the demand.
Finance, Entrepreneurship Support	33	Finance	-0.95	0.95	33	86645	-0.02	0.90	1.00	Country, Regional, Local	Includes specific measure for entrepreneurial related financing, e.g. startup funding or indizes for the availability of finance for entrepreneurs. Therefore belongs to finance, but similar to VC investments a second assignment to support services / intermediaries is possible.
Finance, Environment	169	Finance	-0.97	0.99	169	148136	0.14	0.02	1.00	Country, Regional, Local	Includes measure for the overall financial environment, e.g. financial freedom. Directly belongs to the element finance. A second assignment is formal institutions as these measures also reflect the rules of the game for investments.
Finance, Exchange Rate	17	Demand	-0.82	0.23	17	2597	-0.11	0.28	0.90	Country, Local	The exchange rate reflects the markets (import and export) and thus demand. A second assignment is finance as it influences the availability of financial investments.
Finance, VC	95	Finance	-0.97	0.96	95	56485	0.16	0.00	0.99	Country, Regional, Local	Includes measures for the available venture capital and numbers of vc investors. Directly reflects the element finance. As venture capital investments have a specific focus on entrepreneurs and VC investors often have specific knowledge and support regarding entrepreneurship, a second assignment is support services / intermediaries.
GDP	79	Demand	-0.86	1.00	79	32239	0.31	0.00	1.00	Country, Regional, Local	Reflects the market size. Direct measure for demand.

GDP per capita	346	Demand	-0.93	1.00	346	140002	0.32	0.00	0.99	Country, Regional, Local	Reflects the market size. Direct measure for demand.
GDP, change	165	Demand	-0.91	0.99	165	60095	0.03	0.39	0.99	Country, Regional, Local	Reflects the market size. Direct measure for demand.
Gini Coefficient	53	Culture	-0.73	0.98	53	53319	0.28	0.00	1.00	Country, Regional, Local	Gini coefficient measure the inequality.Society accepts a certain level of inequality but it also implies strong wealth inequality which directly influences demand (e.g. Giffen Good; Consumtiopn Behavior). This mainly reflects the culture. A second assignment is demand as it influences the availability of financial capital in the population.
Government, Consumption	103	Demand	-0.97	1.00	103	95652	0.24	0.00	1.00	Country, Regional, Local	Captures the government consumption (e.g. military expenses, public spendings). Therefore shapes the demand. A second assignment is formal institutions, as it reflects the importance of the government for the economy and reflects its influence.
Government, Economic Regulations	226	Formal institutions	-0.94	0.99	226	228193	0.25	0.00	1.00	Country, Regional, Local	Includes variables like economic freedom and trade freedom. Therefore directly frames the firm operations and belongs to formal institutions.
Government, Employment	26	Formal institutions	-0.40	0.97	26	23300	0.27	0.02	0.99	Regional, Local	Includes variables the capture the employment in the government or public sector. Therefore belogs to formal institutions. A second assignment is culture, as this reflects the values like the risk behaviour of the population.
Government, Entrepreneurship	20	Support Services / intermediaries	-0.48	1.00	20	5216	0.30	0.11	0.99	Country, Regional, Local	Variables the captures the entrepreneurship policies and subsidies for new businesses. Directly belongs to support services / intermediaries as it measure the government support for entrepreneurs and captures, e.g. funding for business support. A second assignment would be formal institutions.
Government, Governance	128	Formal institutions	-0.83	0.97	128	78447	0.02	0.78	0.99	Country, Regional, Local	Includes variables like the regulatory quality or government effectiveness. Is a direct measure for the quality of the formal institutions.

Government, Income	29	Formal institutions	-0.75	0.65	29	12128	0.19	0.04	0.99	Country, Regional, Local	Government income based on taxe, e.g. fiscal revenue. Directly belongs to formal institutions, as it both shapes the rules of the game for the businesses but also influences the power and status of the government.
Government, Law	21	Formal institutions	-0.59	0.85	21	9775	0.03	0.80	0.99	Country, Regional, Local	Measure for the type of the law system, and the number of business (un-)friendly laws. Directly belongs to formal institutions.
Government, Operations	50	Formal institutions	-0.96	0.99	50	22734	0.53	0.00	1.00	Country, Regional, Local	Includes measure for the quality and efficiency of the government operations, e.g. procedures needed to build a warehouse. This shapes the rules of the game, thus reflects the formal institutions. A second assingment could be support services / intermediaries, as this directly influences the way (new) business can operate.
Government, Property Regulations	57	Formal institutions	-0.84	0.96	57	12066	0.39	0.00	0.99	Country, Regional	Includes measure for the property rights. This shapes the rules of the game, thus reflects the formal institutions. A second assingment could be support services / intermediaries, as this directly influences the way (new) business can operate.
Government, Rule of Law	63	Formal institutions	-0.89	0.91	63	20997	-0.16	0.03	0.99	Country, Regional, Local	Measure of the rule of law (e.g. World Bank). Directly measure the formal institutions. A second assignment is culture as this also reflects the relationships between the government and the population.
Government, Size	34	Formal institutions	-0.85	0.98	34	60171	0.25	0.02	1.00	Country, Regional, Local	Size of the government. Directly influences formal institutions. A second assignment is culture, as this measure is influenced by the will of the inhabitants and influences the culture by representing the part of the workforce that is working for the government.
Government, Stability	46	Culture	-0.89	0.72	46	19556	-0.21	0.01	0.99	Country, Local	Includes variables that measure the policitcal and governmental stability. Reflects the culture of the country or region. Also can be assigned to formal institutions.
Government, Transfers	54	Demand	-0.46	0.82	54	65920	0.18	0.00	0.98	Country, Regional, Local	Government transfers (e.g. aids, subsidies, transfers). Directly influences the available capital and thus the market sizes and demand. A second assignment is formal institutions as this is a governmental action.

High-growth firms	8	Leadership	0.05	0.97	8	6720	0.58	0.01	0.99	Regional, Local	Share of high-growing firms in the firm population. Directly influences leadership through the availability of role models and visible entrepreneurial success. A second asignment is talent, as it influences the presence of high skilled workers with innovative or entrepreneurial knowledge.
industry, Business Density	70	Networks	-0.99	0.99	70	66002	0.05	0.70	1.00	Country, Regional, Local	Includes measures for the business density (e.g. per kilometer). Therefore directly measure the potential for networks. A second assignment could be talent as it influences the availability of skilled workers in relevant sectors in a region.
Industry, Cluster	16	Networks	-0.93	0.27	16	25601	-0.03	0.83	0.99	Country, Regional, Local	Includes cluster measures. Therefore directly measure the potential for networks. A second assignment could be talent as it influences the availability of skilled workers in relevant sectors in a region.
Industry, Economic Structure	199	Talent	-0.99	1.00	199	226998	0.26	0.00	1.00	Country, Regional, Local	Includes different variables for the economic structure, e.g. the number of incumbent firms and their diversity. Therefore directly influences the pool of skilled labor in relevant sectors. A second assignment could be demand, as this also infleuces the creation and size of B2B markets.
Industry, Entrepreneurship Support	36	Support Services / intermediaries	-0.99	0.99	36	21307	0.18	0.34	1.00	Regional, Local	Includes variables that measure the support for entrepreneurs, measure through business service firms in the region (coming from Stam & van de Ven 2021). A second assignment could be talent as it influences the availability of people with entrepreneurial knowledge (Spigel & Harrison 2018) in the region.
industry, Firm Exit	49	Culture	-0.65	1.00	49	58474	0.35	0.00	1.00	Country, Regional, Local	Includes variables that measure the number of firm closures and exit rates. Therefore influence the culture, as it could influence the fear of failure and the availability of role models. A second argumentation is that exits free labor and thus this refers to the workforce and the element talent.
industry, Firm Structure	189	Talent	-1.00	1.00	189	220435	0.37	0.00	1.00	Country, Regional, Local	Includes measure for the structure of the economy in terms of firm size. Therefore directly influences the pool of skilled labor in relevant sectors. A

											second assignment could be demand, as this also infleuces the creation and size of B2B markets.
industry, Heterogeneity	174	Talent	-0.98	1.00	174	324499	-0.14	0.11	1.00	Country, Regional, Local	Includes measure for specialization and diversity of the industry in the given territory. Therefore directly influences the pool of skilled labor in relevant sectors. A second assignment could be demand, as this also infleuces the creation and size of B2B markets.
Industry, High Tech	36	Knowledge	-0.95	0.84	36	36626	-0.17	0.11	1.00	Country, Regional, Local	Includes variables like the number of high tech firms in the region. Therefore directly measures the local knowledge availability. Can also be assigned to talent as it influences the local pool of skilled labor.
Industry, margin	11	Demand	-0.76	0.24	11	6183	-0.24	0.06	0.98	Country, Regional, Local	Profitability influences the market pull and demand and thus belongs to the element demand. Also, it can be assigned to finance as it influences the available pool of capital for (re)investments.
industry, Market conditions	94	Demand	-0.94	1.00	94	72489	0.08	0.32	1.00	Country, Regional, Local	Includes variables like the HHI. Primarily influences the market size and market demand (Supply Demand Equilibrium). But it also impacts market structure and the thus the pool of skilled talent.
Inflation rate	44	Demand	-0.84	0.55	44	9730	-0.02	0.70	0.95	Country, Local	Inflation rate. Is a proxy for demand.
Infrastructure, Cost	12	Physical infrastructure	-0.23	0.24	12	10314	-0.05	0.28	0.96	Country, Regional, Local	Measure the cost of infrastructure, e.g. cost for mobile phone connections or for electricity. Therefore directly reflects the availability and usability of the physical infrastructure.
infrastructure, Energy	7	Physical infrastructure	-0.08	0.94	7	16050	0.59	0.01	0.99	Country, Regional, Local	Includes variables like the availability of different types of energy. Therefore reflects the physical infrastructure.
infrastructure, General	36	Physical infrastructure	-0.57	0.94	36	12805	0.21	0.07	0.99	Country, Regional, Local	General measure of the physical infrastructure, e.g. composed indizes.
Infrastructure, ICT	70	Physical infrastructure	-0.60	1.00	70	40044	0.21	0.01	0.99	Country, Regional, Local	Includes measure for the availability of ICT like broadband access or mobile telephone users. Therefore directly reflects the physical infrastructure.

Infrastructure, Mobility	69	Physical infrastructure	-0.98	0.97	69	52602	-0.13	0.14	1.00	Country, Regional, Local	Includes variables like rail connections, road density, airports. Directly reflects the accessibility and transportation and thus the physical infrastructure.
knowledge coherence	9	Knowledge	-0.18	1.00	9	8988	0.47	0.20	1.00	Regional	Knowledge coherence based on patents. Refers to the avaiable knowledge.
knowledge variety	29	Knowledge	-0.32	0.98	29	31153	0.35	0.01	1.00	Regional	Knowledge variety based on patents. Refers to the avaiable knowledge.
Knowledge, distance	7	Knowledge	-0.72	0.99	7	7591	0.23	0.61	1.00	Regional	Cognitive distance based on patents. Refers to the avaiable knowledge.
Knowledge, Publications/researcher	42	Knowledge	-0.44	0.82	42	26618	0.16	0.00	0.97	Country, Regional, Local	Includes the publications per researcher. Belongs to the element knowledge as it reflects the available knowledge. A second assignment is talent, as it directly measures the knowledge generated by individuals.
Life Expectancy	12	Physical infrastructure	-0.65	0.99	12	3536	0.71	0.01	1.00	Country	Life expectancy. Is mainly depending on the overall development of the economy and country and is directly influenced by the physical infrastructure (sanitation, housing, etc.). Therefore was assigned to physical infrastructure. A second assignment is demand, as it influences the local demand markets.
Patents / Trademarks	166	Knowledge	-0.99	0.99	166	136093	0.07	0.17	1.00	Country, Regional, Local	Includes measure for the number of patents and trademarks. Therefore directly reflects the available knowledge.
Patents, Density	22	Knowledge	-0.36	0.74	22	7129	0.18	0.04	0.98	Country, Regional, Local	Patent density per kilometer, etc. Reflects knowledge in the territory. A second assignment is networks, as it is a density measure for the knowledge and therefore also influences the probability of knowledge exchance in the territory.
People, Management	31	Leadership	-0.67	0.68	31	3615	0.04	0.66	0.97	Country, Regional, Local	Includes variables that capture the perceptions of leadership as well as leadership behaviour in the population. Therefore belongs to leadership as it shapes the availability and visibility of (entrepreneurial) leaders in the territory.
Research, collaboration	16	Networks	-0.55	0.87	16	12050	0.22	0.09	0.97	Country, Regional, Local	Includes direct measures of research collaborations. Thus belongs to networks first, but can also be assigned to knowledge.
Research, Diffusion/Transfer	21	Knowledge	-0.56	0.98	21	5894	0.29	0.15	0.99	Country	Measures r&d transfer. Thus first belongs to knowledge, but can also be assigned to networks.

Research, Environment	40	Knowledge	-0.71	1.00	40	4660	0.31	0.02	0.99	Country, Regional, Local	Includes variables like innovation indizes. Influence the knowledge creation. A second assignment is formal institutions as it also reflects the environment for innovations shaped by the institutional framework.
Research, Expenditure	125	Knowledge	-0.99	0.99	125	64287	0.06	0.31	0.99	Country, Regional, Local	Research and development expenditures. Is a proxy for the knowledge creation and thus influences entrepreneurship.
Research, Facilities	123	Knowledge	-0.96	0.78	123	150263	-0.03	0.60	1.00	Country, Regional, Local	Includes variables like number of universities in the region. Thus is a proxy for generation of knowledge as well as for research collaboration / interaction per spatial area. Thus belongs to the element knowledge. A second assignment could be networks, as number of research facilities in a given area is a density measure.
Research, Support	7	Support Services / intermediaries	-0.02	0.68	7	7022	0.31	0.01	0.97	Local	Captures technology transfer and support for such practices. Therefore belongs to support services / intermediaries, as reflects the support for economically using the generated knowledge.
Tax, Corporate	60	Formal institutions	-0.83	0.98	60	20894	0.31	0.00	1.00	Country, Regional, Local	Corporate tax rate. Is part of the government regulations and thus formal institutions that shape the rules of the game and influence entrepreneurial activity. As second assignment is support services / intermediaries, as it is a direct influence on the competitiveness and can be used as a support or barrier for new businesses.
Tax, Personal	43	Formal institutions	-0.52	1.00	43	14979	0.23	0.09	1.00	Country, Regional, Local	Includes income tax rates. Is part of the government regulations and thus formal institutions that shape the rules of the game and influence entrepreneurial activity. Also shapes personal demand through reducing the available consumption budged.
Tax, Property	7	Formal institutions	-0.22	0.76	7	2424	0.21	0.14	0.95	Regional, Local	Property tax. Is part of the government regulations and thus formal institutions that shape the rules of the game and influence entrepreneurial activity. A second assignment could be finance as it influences individual choices for investments and capital accumulation.

Tax, Total	42	Formal institutions	-0.78	1.00	42	39398	0.24	0.06	1.00	Country, Regional, Local	Total tax. Is part of the government regulations and thus formal institutions that shape the rules of the game and influence entrepreneurial activity. A second assignment could be demand, as higher taxed could negatively influence the sales through higher prices compared to other territories, or by shaping personal demand through reducing the available consumption budged.
Trade, Export	30	Demand	-0.43	0.69	30	11026	0.04	0.61	0.99	Country, Regional, Local	Exporttrade. Is a proxy for the demand pillar, created through export.
Trade, Import	9	Demand	-0.30	0.55	9	5692	0.04	0.74	0.97	Country, Regional	Importtrade. Reflects the demand as it is a proxy for foreign market sizes and potential subsitutes for the own products.
Trade, Total	51	Demand	-0.99	0.80	51	20105	0.01	0.89	0.99	Country, Regional, Local	Includes variables the measure the trade oppenness and total trade as a share of gdp. Reflects the available markets and their size (demand).
Unemployment, Change	14	Talent	-0.65	0.32	14	5532	-0.05	0.48	0.98	Regional, Local	Change of the unemployment rate. Gives information about the change of the available talent pool and it's skill.
Unemployment, Gender	6	Talent	-0.74	-0.06	6	2122	-0.27	0.05	0.98	Country	Gender distribution of the unemployment. Mainly reflects the talent pool, but also refers to culture as it is a proxy for gender equality in the labor market.
Unemployment, Rate	344	Talent	-0.95	0.97	344	261075	0.04	0.26	1.00	Country, Regional, Local	Unemployment rates. Gives information about the available talent pool and it's skill.
Unemployment, Skill	11	Talent	-0.44	0.94	11	1235	0.19	0.28	0.99	Regional	Skill levels of the unemployed. Gives information about the skilled talent pool available.
Urban, connectedness	48	Physical infrastructure	-0.94	0.97	48	39690	0.03	0.77	1.00	Regional, Local	Includes measures for the distance to the next urban centre. Therefore mainly reflects the physical infrastructure of the region. Also, refers to networks as it is a measure for the proximity to others.
urban, Living Conditions	26	Culture	-0.73	0.97	26	21773	0.15	0.29	1.00	Country, Regional, Local	Includes variables that captures museums, theaters, restaurants, etc. Captures the culture in a territory. A second assignment could be physical infrastructure as these require a certain amount of infrastructure.

urban, Settlement structure	33	Physical infrastructure	-0.93	0.96	33	37330	0.16	0.19	1.00	Regional, Local	Variables that take into account the settlement structure based on the structure. Mainly captures the physical infrastructure. A second assignment is demand, as it also reflects urbanization and therefore local market sizes.
Urbanisation, Population	48	Demand	-0.91	0.98	48	60765	0.16	0.16	1.00	Country, Regional, Local	Includes measure of degrees of urbanization based on population measures. Therefore is a proxy for the local market size (demand) but also for the population density (networks).
Value Added	57	Demand	-0.99	1.00	57	35177	0.31	0.02	1.00	Country, Regional, Local	Market size as well as the labor skill to achieve high shares of value added influence the demand and the talent pool.
Wealth, Assets	60	Demand	-0.95	1.00	60	19440	0.51	0.00	1.00	Regional, Local	Captures the wealth and therefore available capital through asset prices. Influences demand and finance similar to the income related variables.
Wealth, Change	39	Demand	-0.93	0.93	39	30398	0.04	0.64	1.00	Regional, Local	Captures the change of the wealth and income. Therefore, similar to income, influences demand and finance as elements of entrepreneurial ecosystems.
Wealth, Entrepreneur	9	Culture	-0.92	0.96	9	3463	-0.20	0.67	1.00	Regional, Local	Includes variables that capture the income share of entrepreneurs compared to normal wages. Therefore influences the monetary value that the society gives to entrepreneurship, thus the culture. As a second assignment, it could be attributed to demand as it influences the wealth of individuals.
Wealth, Income/Wages	246	Demand	-0.96	1.00	246	230408	0.47	0.00	1.00	Country, Regional, Local	Includes variables that capture the income / household income. Therefore influences demand through comsumption but also potential (angel) investments.
Wealth, Poverty	38	Culture	-0.85	1.00	38	61870	0.23	0.15	1.00	Country, Regional, Local	The measures included in this group reflect percentages of the population living in poverty. This is similar to the Gini coefficient, and accounts for the cultural and political acceptance and definitions of poverty. Therefore, it reflects the cultuture. It also influences the demand in the territory.

Appendix H. List of studies included in the meta-analysis

Author	Year	Titel	Journal	DOI
Mickiewicz, Tomasz; Stephan, Ute; Shami, Muntasir	2021	The consequences of short-term institutional change in the rule of law for entrepreneurship	Global Strategy Journal	10.1002/gsj.1413
Patel, Pankaj C.; Devaraj, Srikant	2021	The state-level exemption changes in Chapter 7 protection and entrepreneurial activity in the United States	Manage Decis Econ (Managerial and Decision Economics)	10.1002/mde.3293
Schlattau, Michael	2021	Institutions and Entrepreneurial Activity: A Quantitative Empirical Analysis		10.1007/978-3-030-54909-1_5
Lougui, Monia; Broström, Anders	2021	New firm formation in the wake of mergers and acquisitions: An exploration of push and pull factors	J Evol Econ (Journal of Evolutionary Economics)	10.1007/s00191-020-00678-4
Nica, Mihai	2021	Economic development and business creation	Econ Change Restruct (Economic Change and Restructuring)	10.1007/s10644-020-09274-9
Svetek, Mojca; Drnovsek, Mateja	2021	Exploring the Effects of Types of Early-Stage Entrepreneurial Activity on Subjective Well-Being	J Happiness Stud (Journal of Happiness Studies)	10.1007/s10902-021-00392-3
Audretsch, David B.; Lehmann, Erik E.; Seitz, Nikolaus	2021	Amenities, subcultures, and entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00190-5
Colombelli, Alessandra; Orsatti, Gianluca; Quatraro, Francesco	2021	Local knowledge composition and the emergence of entrepreneurial activities across industries: evidence from Italian NUTS-3 regions	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00192-3
Tsvetkova, Alexandra; Partridge, Mark	2021	Knowledge-based service economy and firm entry: an alternative to the knowledge spillover theory of entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00193-2
Braunerhjelm, Pontus; Eklund, Johan E.; Thulin, Per	2021	Taxes, the tax administrative burden and the entrepreneurial life cycle	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00195-0
Bennett, Daniel L.	2021	Local economic freedom and creative destruction in America	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00222-0
Brieger, Steven A.; Gielnik, Michael M.	2021	Understanding the gender gap in immigrant entrepreneurship: a multi-country study of immigrants' embeddedness in economic, social, and institutional contexts	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00314-x
Munemo, Jonathan	2021	Do African resource rents promote rent-seeking at the expense of entrepreneurship?	Small Bus Econ (Small Business Economics)	10.1007/s11187-021-00461-0
Yavuz, R. Isil; Bahadir, Berrak	2021	Remittances, ethnic diversity, and entrepreneurship in developing countries	Small Bus Econ (Small Business Economics)	10.1007/s11187-021-00490-9

Wei, Fangqing; Yang, Yi; Chen, Yao; Yang, Feng	2021	The effects of venture capital investments on industrial innovative opportunities and technological arbitrage opportunities	Small Bus Econ (Small Business Economics)	10.1007/s11187-021-00511-7
Laing, Elaine; van Stel, André; Storey, David J.	2021	Formal and informal entrepreneurship: a cross-country policy perspective	Small Bus Econ (Small Business Economics)	10.1007/s11187-021-00548-8
Sansone, Giuliano; Battaglia, Daniele; Landoni, Paolo; Paolucci, Emilio	2021	Academic spinoffs: the role of entrepreneurship education	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-019-00601-9
Novejarque Civera, Josefina; Pisá Bó, Mabel; López-Muñoz, José Fernando	2021	Do contextual factors influence entrepreneurship? Spain's regional evidences	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-019-00625-1
Díez-Martín, Francisco; Blanco-González, Alicia; Miotto, Giorgia	2021	The impact of state legitimacy on entrepreneurial activity	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-020-00724-4
Sweidan, Osama D.	2021	Economic Freedom and Entrepreneurship Rate: Evidence from the U.S. States After the Great Recession	J Knowl Econ (Journal of the Knowledge Economy)	10.1007/s13132-020-00714-5
Solomon, Shelby J.; Bendickson, Joshua S.; Marvel, Matt R.; McDowell, William C.; Mahto, Raj	2021	Agency theory and entrepreneurship: A cross-country analysis	Journal of Business Research	10.1016/j.jbusres.2020.09.003
Naldi, Lucia; Nilsson, Pia; Westlund, Hans; Wixe, Sofia	2021	Amenities and new firm formation in rural areas	Journal of Rural Studies	10.1016/j.jrurstud.2021.05.023
Piteli, Eleni E.N.; Kafouros, Mario; Pitelis, Christos N.	2021	Follow the people and the money: Effects of inward FDI on migrant remittances and the contingent role of new firm creation and institutional infrastructure in emerging economies	Journal of World Business	10.1016/j.jwb.2020.101178
Crecente, Fernando; Sarabia, María; Del Teresa Val, María	2021	Climate change policy and entrepreneurial opportunities	Technological Forecasting and Social Change	10.1016/j.techfore.2020.120446
Audretsch, David B.; Belitski, Maksim	2021	Towards an entrepreneurial ecosystem typology for regional economic development: the role of creative class and entrepreneurship	Regional Studies	10.1080/00343404.2020.1854711
Kalisz, David; Schiavone, Francesco; Rivieccio, Giorgia; Viala, Céline; Chen, Junsong	2021	Analyzing the macro-level determinants of user entrepreneurship. The moderating role of the national culture	Entrepreneurship & Regional Development	10.1080/08985626.2021.1872934
Iacobucci, Donato; Perugini, Francesco	2021	Entrepreneurial ecosystems and economic resilience at local level	Entrepreneurship & Regional Development	10.1080/08985626.2021.1888318

Demirdag, Ismail; Eraydin, Ayda	2021	Explaining regional differences in firm formation rates: how far are government policies important for entrepreneurship?	JEEE (Journal of Entrepreneurship in Emerging Economies)	10.1108/JEEE-02-2020-0040
Harraf, Arezou; Ghura, Hasan; Hamdan, Allam; Li, Xiaoqing	2021	Formal institutions and the development of entrepreneurial activity – the contingent role of corruption in emerging economies	JEPP (Journal of Entrepreneurship and Public Policy)	10.1108/JEPP-06-2020-0033
Amorós, José Ernesto; RAMÍREZ, LIZBETH MARTÍNEZ; RODRÍGUEZ-ACEVES, LUCÍA; RUIZ, LINDA ELIZABETH	2021	REVISITING POVERTY AND ENTREPRENEURSHIP IN DEVELOPING COUNTRIES	J. Dev. Entrepreneurship (Journal of Developmental Entrepreneurship)	10.1142/S1084946721500084
Liu, Shiqin; Qian, Haifeng; Haynes, Kingsley E.	2021	Entrepreneurship in Small Cities: Evidence From U.S. Micropolitan Areas	Economic Development Quarterly	10.1177/0891242420941927
Damaraju, Naga Lakshmi; Barney, Jay B.; Dess, Gregory G.	2021	Do Stringent Bankruptcy Laws Always Deter Entrepreneurial Activities? A Study of Cultural Influences	Entrepreneurship Theory and Practice	10.1177/1042258720913017
Ha, Tung Son; Chu, Vu Tuan; Nguyen, Mai Tuyet Thi; Nguyen, Dung Hoai Thi; Nguyen, Anh Ngoc Thi	2021	The impact of Greenfield investment on domestic entrepreneurship	J Innov Entrep (Journal of Innovation and Entrepreneurship)	10.1186/s13731-021-00164-6
Leitão, João; Capucho, João	2021	Institutional, Economic, and Socio-Economic Determinants of the Entrepreneurial Activity of Nations	Administrative Sciences	10.3390/admsci11010026
Alwakid, Wafa; Aparicio, Sebastian; Urbano, David	2021	The Influence of Green Entrepreneurship on Sustainable Development in Saudi Arabia: The Role of Formal Institutions	International journal of environmental research and public health	10.3390/ijerph18105433
Gawel, Aleksandra	2021	International Trade in the High-Tech Sector—Support or Obstacle to Start-Up Processes at the Macro Level in European Union Countries?	JTAER (Journal of Theoretical and Applied Electronic Commerce Research)	10.3390/jtaer16050105
Zhou, Yan; Park, Sangmoon	2021	The Regional Determinants of the New Venture Formation in China's Car-Sharing Economy	Sustainability	10.3390/su13010074
Carriles-Alberdi, Maria; Lopez-Gutierrez, Carlos; Fernandez-Laviada, Ana	2021	The Influence of the Ecosystem on the Motivation of Social Entrepreneurs	Sustainability	10.3390/su13020922
Burchi, Alberto; Wlodarczyk, Bogdan; Szturo, Marek; Martelli, Duccio	2021	The Effects of Financial Literacy on Sustainable Entrepreneurship	Sustainability	10.3390/su13095070
Shrivastava, Utkarsh; Ofstein, Laurel; Golhar, Damodar	2021	Direct and Indirect Effects of ICT Infrastructure, Skills, and Use on Entrepreneurship	Journal of Global Information Management	10.4018/JGIM.20211101.oa48

Khursheed, Ambreen; Fatima, Maham; Mustafa, Faisal; Lodhi, Rab Nawaz; Akhtar, Ayesha	2021	An Empirical Analysis of the Factors Influencing Social Entrepreneurship: A Gendered Approach	cuadernosgestion (Cuadernos de Gestión)	10.5295/cdg.201320ak
Goel, Rajeev K.; Saunoris, James W.	2020	Where is the entrepreneurship bang for the patenting buck? Utility versus design patents	Manage Decis Econ (Managerial and Decision Economics)	10.1002/mde.3088
Ho, Cynthia Sin Tian; Berggren, Björn	2020	The effect of bank branch closures on new firm formation: the Swedish case	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-020-00986-4
Laplume, André; Walker, Kent; Zhang, Zhou; Yu, Xin	2020	Incumbent Stakeholder Management Performance and New Entry	J Bus Ethics (Journal of Business Ethics)	10.1007/s10551-020-04629-8
AJIDE, FOLORUNSHO M.; Osinubi, Tolulope T.	2020	Foreign aid and entrepreneurship in Africa: the role of remittances and institutional quality	Econ Change Restruct (Economic Change and Restructuring)	10.1007/s10644-020-09305-5
Cao, Guo-Hua; Zhang, Jing	2020	Is a sustainable loop of economy and entrepreneurial ecosystem possible? a structural perspective	Environ Dev Sustain (Environment, Development and Sustainability)	10.1007/s10668-020-00902-y
Goethner, Maximilian; Wyrwich, Michael	2020	Cross-faculty proximity and academic entrepreneurship: the role of business schools	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-019-09725-0
Changoluisa, Javier; Fritsch, Michael	2020	New Business Formation and Incumbents' Perception of Competitive Pressure	Rev Ind Organ (Review of Industrial Organization)	10.1007/s11151-019-09699-1
Antonietti, Roberto; Gambarotto, Francesca	2020	The role of industry variety in the creation of innovative start-ups in Italy	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-0034-4
Berrill, Jenny; O'Hagan-Luff, Martha; van Stel, André	2020	The moderating role of education in the relationship between FDI and entrepreneurial activity	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-0121-6
Del Monte, Alfredo; Pennacchio, Luca	2020	Historical roots of regional entrepreneurship: the role of knowledge and creativity	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00139-8
Obschonka, Martin; Lee, Neil; Rodríguez-Pose, Andrés; Eichstaedt, Johannes C.; Ebert, Tobias	2020	Big data methods, social media, and the psychology of entrepreneurial regions: capturing cross-county personality traits and their impact on entrepreneurship in the USA	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00204-2
Jauregui, Andres; Heriot, Kirk C.; Mitchell, David T.	2020	Corruption and formal-sector entrepreneurship in a middle-income country: spatial analysis of firm births in the Mexican states	Small Bus Econ (Small Business Economics)	10.1007/s11187-020-00388-y
Corradini, Carlo	2020	Social trust and new firm formation: a regional perspective	Small Bus Econ (Small Business Economics)	10.1007/s11187-020-00404-1
Urbano, David; Audretsch, David; Aparicio, Sebastian; Noguera, Maria	2020	Does entrepreneurial activity matter for economic growth in developing countries? The role of the institutional environment	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-019-00621-5

Nguyen, Bach; Canh, Nguyen Phuc; Thanh, Su Dinh	2020	Institutions, Human Capital and Entrepreneurship Density	J Knowl Econ (Journal of the Knowledge Economy)	10.1007/s13132-020-00666-w
Polemis, Michael L.; Stengos, Thanasis	2020	The impact of regulatory quality on business venturing: A semi-parametric approach	Economic Analysis and Policy	10.1016/j.eap.2020.05.005
Amoroso, Sara; Martino, Roberto	2020	Regulations and technology gap in Europe: The role of firm dynamics	European Economic Review	10.1016/j.euroecorev.2020.103551
Jha, Chandan Kumar; Bhuyan, Rafiqul	2020	Do financial reforms promote entrepreneurship?	Finance Research Letters	10.1016/j.frl.2019.08.020
Calza, Francesco; Cannavale, Chiara; Zohoorian Nadali, Iman	2020	How do cultural values influence entrepreneurial behavior of nations? A behavioral reasoning approach	International Business Review	10.1016/j.ibusrev.2020.101725
Slesman, Ly; Abubakar, Yazid Abdullahi; Mitra, Jay	2020	Foreign direct investment and entrepreneurship: Does the role of institutions matter?	International Business Review	10.1016/j.ibusrev.2020.101774
Fang, Hanqing; Chrisman, James J.; Memili, Esra; Wang, Minglin	2020	Foreign venture presence and domestic entrepreneurship: A macro level study	Journal of International Financial Markets, Institutions and Money	10.1016/j.intfin.2020.101240
Ali, Abdul; Kelley, Donna J.; Levie, Jonathan	2020	Market-driven entrepreneurship and institutions	Journal of Business Research	10.1016/j.jbusres.2019.03.010
Canestrino, Rossella; Cwiklicki, Marek; Magliocca, Pierpaolo; Pawelek, Barbara	2020	Understanding social entrepreneurship: A cultural perspective in business research	Journal of Business Research	10.1016/j.jbusres.2020.01.006
Luo, Lingli; Ma, Xufei; Makino, Shige; Shinkle, George A.	2020	Cluster status and new venture creation	Journal of Business Venturing	10.1016/j.jbusvent.2019.105985
Du, Rui; Zheng, Siqi	2020	Agglomeration, housing affordability, and new firm formation: The role of subway network	Journal of Housing Economics	10.1016/j.jhe.2020.101668
González, Francisco	2020	Bank development, competition, and entrepreneurship: International evidence	Journal of Multinational Financial Management	10.1016/j.mulfin.2020.100642
Lucas, David S.; Boudreaux, Christopher J.	2020	National regulation, state-level policy, and local job creation in the United States: A multilevel perspective	Research Policy	10.1016/j.respol.2020.103952
Cojoianu, Theodor F.; Clark, Gordon L.; Hoepner, Andreas G.F.; Veneri, Paolo; Wójcik, Dariusz	2020	Entrepreneurs for a low carbon world: How environmental knowledge and policy shape the creation and financing of green start-ups	Research Policy	10.1016/j.respol.2020.103988
Xiao, Fan; Zhou, Yong; Deng, Weipeng; Gu, Hengyu	2020	Did high-speed rail affect the entry of automobile industry start-ups? Empirical evidence from Guangdong Province, China	Travel Behaviour and Society	10.1016/j.tbs.2019.12.002
Song, Changhyeon; Park, Kyung Min; Kim, Yeonbae	2020	Socio-cultural factors explaining technology-based entrepreneurial activity: Direct and indirect role of social security	Technology in Society	10.1016/j.techsoc.2020.101246

Abdesselam, Rafik; Bonnet, Jean; Renou-Maissant, Patricia	2020	What are the drivers of business demography and employment in the countries of the European Union?	Applied Economics	10.1080/00036846.2020.1730756
Cebula, Richard J.; Davis, Malissa L.; Koch, James V.; Saunoris, James William	2020	The relationship between entrepreneurial activity and domestic gross state in-migration patterns in the U.S	Applied Economics	10.1080/00036846.2020.1737314
Fan, Zhaobin; Cheng, Yongli; Anwar, Sajid	2020	Macroeconomic uncertainty, cultural traits and entrepreneurship	Applied Economics	10.1080/00036846.2020.1770192
Agostino, Mariarosaria; Nifo, Annamaria; Trivieri, Francesco; Vecchione, Gaetano	2020	Rule of law and regulatory quality as drivers of entrepreneurship	Regional Studies	10.1080/00343404.2019.1648785
Lecuna, Antonio; Cohen, Boyd; Mandakovic, Vesna	2020	Want more high-growth entrepreneurs? Then control corruption with less ineffective bureaucracy	Interdisciplinary Science Reviews	10.1080/03080188.2020.1792128
Cumming, Douglas; Johan, Sofia; Uzuegbunam, Ikenna	2020	An anatomy of entrepreneurial pursuits in relation to poverty	Entrepreneurship & Regional Development	10.1080/08985626.2019.1640475
Lin, Song; Winkler, Christoph; Wang, Shanshan; Chen, Hui	2020	Regional determinants of poverty alleviation through entrepreneurship in China	Entrepreneurship & Regional Development	10.1080/08985626.2019.1640477
Oyarzo, Mauricio; Romaní, Gianni; Atienza, Miguel; Lufín, Marcelo	2020	Spatio-temporal dynamics in municipal rates of business start-ups in Chile	Entrepreneurship & Regional Development	10.1080/08985626.2020.1743769
Kansheba, Jonathan Mukiza Peter	2020	Small business and entrepreneurship in Africa: the nexus of entrepreneurial ecosystems and productive entrepreneurship	Small Enterprise Research	10.1080/13215906.2020.1761869
Lecuna, Antonio	2020	Income inequality and entrepreneurship	Economic Research-Ekonomska Istraživanja	10.1080/1331677X.2019.1663545
Dove, John A.	2020	Opportunity entrepreneurship and regulation: a state-level analysis	Applied Economics Letters	10.1080/13504851.2019.1654080
Ovaska, Tomi; Takashima, Ryo	2020	The robustness of trust, institutions and entrepreneurship regressions, revisited	Applied Economics Letters	10.1080/13504851.2020.1834495
Yu, Wentao	2020	Creative industries agglomeration and entrepreneurship in China: necessity or opportunity?	Industry and Innovation	10.1080/13662716.2019.1688136
García-Estévez, Javier; Duch-Brown, Néstor	2020	The relationship between new universities and new firms: evidence from a quasi-natural experiment in Spain	Regional Studies	10.1080/21681376.2020.1784778
Brás, Gonçalo Rodrigues; Soukiazis, Elias	2020	Entrepreneurship in secondary and tertiary sectors: The same determinants?	Cogent Business & Management	10.1080/23311975.2020.1748790
Ordeñana, Xavier; Vera-Gilces, Paul; Zambrano-Vera, Jack; Amaya, Adriana	2020	Does all entrepreneurship matter? The contribution of entrepreneurial activity to economic growth	ARLA (Academia Revista Latinoamericana de Administración)	10.1108/ARLA-11-2018-0256

Thai, Mai Thi Thanh; Turkina, Ekaterina; Simba, Amon	2020	The impact of national social capital on business creation rates in the formal vs informal sectors	IJEBR (International Journal of Entrepreneurial Behavior & Research)	10.1108/IJEBR-02-2020-0071
Brieger, Steven A.; Clercq, Dirk de; Hessels, Jolanda; Pfeifer, Christian	2020	Greater fit and a greater gap	IJEBR (International Journal of Entrepreneurial Behavior & Research)	10.1108/IJEBR-03-2019-0185
Hamdan, Allam Mohammed; Khamis, Reem; Al Hawaj, Ammar Abdulla; Barone, Elisabetta	2020	The mediation role of public governance in the relationship between entrepreneurship and economic growth	IJMF (International Journal of Managerial Finance)	10.1108/IJMF-04-2018-0111
Ayob, Abu Hanifah; Saiyed, Abrar Ali	2020	Islam, institutions and entrepreneurship: evidence from Muslim populations across nations	IMEFM (International Journal of Islamic and Middle Eastern Finance and Management)	10.1108/IMEFM-11-2019-0472
Arabi, Nahla G.A.; Abdalla, Abdelgadir M.A.	2020	The role of ecosystem for entrepreneurship development in Sudan	WJEMSD (World Journal of Entrepreneurship, Management and Sustainable Development)	10.1108/WJEMSD-09-2019-0075
Lee, Kyoung-Joo; Yun, Yang-Joong	2020	Reconciling Resource-Based View and Competency-Based View of Start-Up Formation in Universities	IEEE Access	10.1109/ACCESS.2020.3014213
Goel, Rajeev K.; Saunoris, James W.	2020	Does income inequality sand or grease the wheels of entrepreneurial activity? International evidence	Aust Econ Pap (Australian Economic Papers)	10.1111/1467-8454.12175
Idrees, Alvina Sabah; Sarwar, Saima	2020	State effectiveness, property rights and entrepreneurial behaviour as determinants of National Innovation	Aust Econ Pap (Australian Economic Papers)	10.1111/1467-8454.12210
Moore, Elizabeth M.; Dau, Luis Alfonso; Doh, Jonathan	2020	Does Monetary Aid Catalyse New Business Creation? Analysing the Impact of Global Aid Flows on Formal and Informal Entrepreneurship	J. Manage. Stud. (Journal of Management Studies)	10.1111/joms.12552
AREND, RICHARD J.; Patel, Pankaj C.	2020	THE AMERICAN DREAM, MELTING POT AND REGIONAL KNOWLEDGE STOCK AS DRIVERS OF ENTREPRENEURIAL ACTIVITY	J. Dev. Entrepreneurship (Journal of Developmental Entrepreneurship)	10.1142/S1084946720500016
AJIDE, FOLORUNSHO M.	2020	INFRASTRUCTURE AND ENTREPRENEURSHIP: EVIDENCE FROM AFRICA	J. Dev. Entrepreneurship (Journal of Developmental Entrepreneurship)	10.1142/S1084946720500156
Henrekson, Magnus; Sanandaji, Tino	2020	Measuring Entrepreneurship: Do Established Metrics Capture Schumpeterian Entrepreneurship?	Entrepreneurship Theory and Practice	10.1177/1042258719844500

Plummer, Lawrence A.; Parker, Simon C.; Reyes, Silvia C.	2020	Regional Path Breaking: The Role of Industry Switching, Industry Diversity, and New Knowledge in New Venture Exit	Entrepreneurship Theory and Practice	10.1177/1042258720952288
Kolokas, Dimitrios; Vanacker, Tom; Veredas, David; Zahra, Shaker A.	2020	Venture Capital, Credit, and FinTech Start-Up Formation: A Cross-Country Study	Entrepreneurship Theory and Practice	10.1177/1042258720972652
Ghosh, Amit	2020	Bank diversification and entrepreneurship: evidence across US states	IJBAAF (International Journal of Banking, Accounting and Finance)	10.1504/IJBAAF.2020.110310
Chadha, Saurabh; Dutta, Nirankush	2020	Linking entrepreneurship, innovation and economic growth: evidence from GEM countries	IJTE (International Journal of Technoentrepreneurship)	10.1504/IJTE.2020.108032
Ayob, Abu H.	2020	Diversity, institutions and entrepreneurship	JIBED (J. for International Business and Entrepreneurship Development)	10.1504/JIBED.2020.110247
Zhang, Yi; Roelfsema, Hein	2020	Entrepreneurial Ecosystems, New Business Formation, and Scale-up Activity: Evidence from 286 Chinese Cities	Entrepreneurship Research Journal	10.1515/erj-2019-0265
Aparicio, Sebastian; Audretsch, David; Urbano, David	2020	Does Entrepreneurship Matter for Inclusive Growth? The Role of Social Progress Orientation	Entrepreneurship Research Journal	10.1515/erj-2019-0308
Salinas, Aldo; Ortiz, Cristian; Muffatto, Moreno; Changoluisa, Javier	2020	Formal Institutions and Informal Entrepreneurial Activity: Panel Data Evidence from Latin American Countries	Entrepreneurship Research Journal	10.1515/erj-2020-0013
Dove, John A.; Dove, Laura R.	2020	US State Tort Liability Reform and Entrepreneurship	Review of Law & Economics	10.1515/rle-2018-0067
Rodríguez-Gulías, María Jesús; Sousa Gabriel, Vítor Manuel de; Rodeiro-Pazos, David	2020	The effect of good governance on business creation: a multilevel approach	REM (Revista de Economía Mundial)	10.33776/rem.v0i54.3825
Ortega Irizo, Francisco Javier; Gavilán Ruiz, José Manuel; Jaén Figueroa, Inmaculada	2020	The Effect of Economic and Cultural Factors on Entrepreneurial Activity: An Approach through Frontier Production Models	REM (Revista de Economía Mundial)	10.33776/rem.v0i55.3830
Stoica, Ovidiu; Roman, Angela; Rusu, Valentina Diana	2020	The Nexus between Entrepreneurship and Economic Growth: A Comparative Analysis on Groups of Countries	Sustainability	10.3390/su12031186
Aceytuno, María-Teresa; Sánchez-López, Celia; Paz-Báñez, Manuela A. de	2020	Rising Inequality and Entrepreneurship during Economic Downturn: An Analysis of Opportunity and Necessity Entrepreneurship in Spain	Sustainability	10.3390/su12114540
Widiastuti, Wini	2020	Are Wealthy Regions Also Entrepreneurial? The Case of Indonesia	jrcp (Journal of Regional and City Planning)	10.5614/jpwk.2020.31.1.5
Alford, Kendall C.	2020	Institutions and New Business Startups in the Former Socialist States		

Coles, Ryan Scott	2020	It Takes A Village: Explorting the Social Fabric Supporting Entrepreneurship in Emerging Market Communities		
Chambers, Dustin; Munemo, Jonathan	2019	Natural Resource Dependency and Entrepreneurship: Are Nations with High Resource Rents Cursed?	J. Int. Dev. (Journal of International Development)	10.1002/jid.3397
Hanoteau, Julien; Rosa, Jean-Jacques	2019	Information technologies and entrepreneurship	Manage Decis Econ (Managerial and Decision Economics)	10.1002/mde.2996
Goel, Rajeev K.; Saunoris, James W.	2019	International corruption and its impacts across entrepreneurship types	Manage Decis Econ (Managerial and Decision Economics)	10.1002/mde.3017
Dvouletý, Ondrej; Orel, Marko	2019	Entrepreneurial Activity and Its Determinants: Findings from African Developing Countries		10.1007/978-3-030-12342-0_2
Conroy, Tessa; Weiler, Stephan	2019	Local and social: entrepreneurs, information network effects, and economic growth	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-019-00915-0
Fritsch, Michael; Kublina, Sandra	2019	Persistence and change of regional new business formation in the national league table	J Evol Econ (Journal of Evolutionary Economics)	10.1007/s00191-019-00610-5
Bermpei, Theodora; Kalyvas, Antonios Nikolaos; Neri, Lorenzo; Russo, Antonella	2019	Will Strangers Help you Enter? The Effect of Foreign Bank Presence on New Firm Entry	J Financ Serv Res (Journal of Financial Services Research)	10.1007/s10693-017-0286-1
Cunningham, James A.; Lehmann, Erik E.; Menter, Matthias; Seitz, Nikolaus	2019	The impact of university focused technology transfer policies on regional innovation and entrepreneurship	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-019-09733-0
Chambers, Dustin; Munemo, Jonathan	2019	Regulations, institutional quality and entrepreneurship	J Regul Econ (Journal of Regulatory Economics)	10.1007/s11149-019-09377-w
Sunny, Sanwar A.; Shu, Cheng	2019	Investments, incentives, and innovation: geographical clustering dynamics as drivers of sustainable entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-017-9941-z
Ghio, Niccolò; Guerini, Massimiliano; Rossi-Lamastra, Cristina	2019	The creation of high-tech ventures in entrepreneurial ecosystems: exploring the interactions among university knowledge, cooperative banks, and individual attitudes	Small Bus Econ (Small Business Economics)	10.1007/s11187-017-9958-3
Pan, Fenghua; Yang, Bofei	2019	Financial development and the geographies of startup cities: evidence from China	Small Bus Econ (Small Business Economics)	10.1007/s11187-017-9983-2
Haddad, Christian; Hornuf, Lars	2019	The emergence of the global fintech market: economic and technological determinants	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-9991-x
Hechavarría, Diana M.; Ingram, Amy E.	2019	Entrepreneurial ecosystem conditions and gendered national-level entrepreneurial activity: a 14-year panel study of GEM	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-9994-7

Simmons, Sharon A.; Wiklund, Johan; Levie, Jonathan; Bradley, Steve W.; Sunny, Sanwar A.	2019	Gender gaps and reentry into entrepreneurial ecosystems after business failure	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-9998-3
Stam, Erik; van de Ven, Andrew	2019	Entrepreneurial ecosystem elements	Small Bus Econ (Small Business Economics)	10.1007/s11187-019-00270-6
Yan, Yan; Guan, Jiancheng	2019	Entrepreneurial ecosystem, entrepreneurial rate and innovation: the moderating role of internet attention	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-018-0493-8
Fuentelsaz, Lucio; González, Consuelo; Maicas, Juan P.	2019	Formal institutions and opportunity entrepreneurship. The contingent role of informal institutions	BRQ Business Research Quarterly	10.1016/j.brq.2018.06.002
Boudreaux, Christopher J.; Escaleras, Monica P.; Skidmore, Mark	2019	Natural disasters and entrepreneurship activity	Economics Letters	10.1016/j.econlet.2019.06.010
Boudreaux, Christopher J.; Nikolaev, Boris N.; Klein, Peter	2019	Socio-cognitive traits and entrepreneurship: The moderating role of economic institutions	Journal of Business Venturing	10.1016/j.jbusvent.2018.08.003
Bennett, Daniel L.	2019	Infrastructure investments and entrepreneurial dynamism in the U.S	Journal of Business Venturing	10.1016/j.jbusvent.2018.10.005
Diallo, Boubacar	2019	Entrepreneurship and genetics: New Evidence	Journal of Business Venturing Insights	10.1016/j.jbvi.2019.e00123
Gianiodis, Peter T.; Meek, William R.; Chen, Wendy	2019	Political climate and academic entrepreneurship: The case of strange bedfellows?	Journal of Business Venturing Insights	10.1016/j.jbvi.2019.e00135
Escandón-Barbosa, Diana Marcela; Urbano, David; Hurtado-Ayala, Andrea; Salas paramo, Jairo; Dominguez, Alvaro Zapata	2019	Formal institutions, informal institutions and entrepreneurial activity: A comparative relationship between rural and urban areas in Colombia	Journal of Urban Management	10.1016/j.jum.2019.06.002
Gregory, Richard P.	2019	Financial openness and entrepreneurship	Research in International Business and Finance	10.1016/j.ribaf.2018.12.006
Hu, Mingzhi; Su, Yinxin; Ye, Wenping	2019	Promoting or inhibiting: The role of housing price in entrepreneurship	Technological Forecasting and Social Change	10.1016/j.techfore.2019.119732
Cummings, Michael E.; Gamlen, Alan	2019	Diaspora engagement institutions and venture investment activity in developing countries	J Int Bus Policy (Journal of International Business Policy)	10.1057/s42214-019-00035-8
Vaan, Mathijs de; Frenken, Koen; Boschma, Ron	2019	The Downside of Social Capital in New Industry Creation	Economic Geography	10.1080/00130095.2019.1586434
Horváth, Krisztina; Rabetino, Rodrigo	2019	Knowledge-intensive territorial servitization: regional driving forces and the role of the entrepreneurial ecosystem	Regional Studies	10.1080/00343404.2018.1469741
Hasan, Iftekhar; Jackowicz, Krzysztof;	2019	The economic impact of changes in local bank presence	Regional Studies	10.1080/00343404.2018.1475729

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Wyrwich, Michael	2019	New KIBS on the bloc: the role of local manufacturing for start-up activity in knowledge-intensive business services	Regional Studies	10.1080/00343404.2018.1478076
Szerb, László; Lafuente, Esteban; Horváth, Krisztina; Páger, Balázs	2019	The relevance of quantity and quality entrepreneurship for regional performance: the moderating role of the entrepreneurial ecosystem	Regional Studies	10.1080/00343404.2018.1510481
Sun, Bindong; Zhu, Pan; Li, Wan	2019	Cultural diversity and new firm formation in China	Regional Studies	10.1080/00343404.2019.1566700
Fritsch, Michael; Obschonka, Martin; Wyrwich, Michael	2019	Historical roots of entrepreneurship-facilitating culture and innovation activity: an analysis for German regions	Regional Studies	10.1080/00343404.2019.1580357
Content, Jeroen; Frenken, Koen; Jordaan, Jacob A.	2019	Does related variety foster regional entrepreneurship? Evidence from European regions	Regional Studies	10.1080/00343404.2019.1595565
Bishop, Paul	2019	Knowledge diversity and entrepreneurship following an economic crisis: an empirical study of regional resilience in Great Britain	Entrepreneurship & Regional Development	10.1080/08985626.2018.1541595
Eriksson, Rikard; Rataj, Marcin	2019	The geography of starts-ups in Sweden. The role of human capital, social capital and agglomeration	Entrepreneurship & Regional Development	10.1080/08985626.2019.1565420
Espinoza, Claudia; Mardones, Cristian; Sáez, Katia; Catalán, Pablo	2019	Entrepreneurship and regional dynamics: the case of Chile	Entrepreneurship & Regional Development	10.1080/08985626.2019.1565421
Mohammadi Khyareh, Mohsen	2019	A cointegration analysis of tax evasion, corruption and entrepreneurship in OECD countries	Economic Research-Ekonomska Istraživanja	10.1080/1331677X.2019.1674175
Canare, Tristan; Francisco, Jamil Paolo; Morales, Jose Fernando	2019	Long- and Short-run Relationship Between Firm Creation and the Ease and Cost of Doing Business	International Journal of the Economics of Business	10.1080/13571516.2018.1558636
Chen, Can; Cheng, Shaoming	2019	The Effects of Corruption and Regulation on Business Entrepreneurship: Evidence from American States	Public Performance & Management Review	10.1080/15309576.2019.1574593
Abdulmohsen Alfalih, Abdulaziz	2019	Investigating critical resource determinants of start-ups: An empirical study of the MENA region	Cogent Economics & Finance	10.1080/23322039.2019.1628494
Lai, Yanzhao; Vonortas, Nicholas S.	2019	Regional entrepreneurial ecosystems in China	Industrial and Corporate Change	10.1093/icc/dtz035
Rico, Paz; Cabrer-Borrás, Bernardí	2019	Entrepreneurship, firms creation and regional performance	EJMBE (European Journal of Management and Business Economics)	10.1108/EJMBE-07-2018-0077
Lortie, Jason; Barreto, Tais; Cox, Kevin	2019	The implications of national and regional long-term orientation on entrepreneurial activity	IJEBR (International Journal of Entrepreneurial Behavior & Research)	10.1108/IJEBR-01-2018-0026

Berggren, Bjorn; Fili, Andreas; Wilhelmsson, Mats	2019	Homeownership and entrepreneurship	IJHMA (International Journal of Housing Markets and Analysis)	10.1108/IJHMA-01-2018-0007
Tran, Nam Hoai; Dat Le, Chi	2019	Governance quality, foreign direct investment, and entrepreneurship in emerging markets	JABES (Journal of Asian Business and Economic Studies)	10.1108/JABES-09-2018-0063
Ghura, Hasan; Harraf, Arezou; Li, Xiaoqing; Hamdan, Allam	2019	The moderating effect of corruption on the relationship between formal institutions and entrepreneurial activity	JEEE (Journal of Entrepreneurship in Emerging Economies)	10.1108/JEEE-03-2019-0032
Salinas, Aldo; Ortiz, Cristian; Muffatto, Moreno	2019	Business regulation, rule of law and formal entrepreneurship: evidence from developing countries	JEPP (Journal of Entrepreneurship and Public Policy)	10.1108/JEPP-03-2019-0019
Felix, Claudia; Aparicio, Sebastian; Urbano, David	2019	Leadership as a driver of entrepreneurship: an international exploratory study	Journal of Small Business & Entrepreneurship	10.1108/JSBED-03-2018-0106
Vedula, Siddharth; York, Jeffrey G.; Corbett, Andrew C.	2019	Through the Looking-Glass: The Impact of Regional Institutional Logics and Knowledge Pool Characteristics on Opportunity Recognition and Market Entry	J. Manage. Stud. (Journal of Management Studies)	10.1111/joms.12400
Ebert, Tobias; Götz, Friedrich M.; Obschonka, Martin; Zmigrod, Leor; Rentfrow, P. Jason	2019	Regional variation in courage and entrepreneurship: The contrasting role of courage for the emergence and survival of start-ups in the United States	Journal of personality	10.1111/jopy.12454
Ciffolilli, Andrea; Cutrini, Eleonora; Pompili, Marco	2019	Do European Funds support the formation of firms? New evidence from Italy	Reg Sci Policy Pract (Regional Science Policy & Practice)	10.1111/rsp3.12205
Weiss, Jan; Anisimova, Tatiana; Shirokova, Galina	2019	The translation of entrepreneurial intention into start-up behaviour: The moderating role of regional social capital	International Small Business Journal (International Small Business Journal: Researching Entrepreneurship)	10.1177/0266242619831170
Kanellopoulos, Vasilios; Fotopoulos, Georgios	2019	The effect of knowledge spillovers on regional new firm formation: The Greek manufacturing case	Environ Plan A (Environment and Planning A: Economy and Space)	10.1177/0308518X18820078
Wang, Liang; Tan, Justin	2019	Social Structure of Regional Entrepreneurship: The Impacts of Collective Action of Incumbents on De Novo Entrants	Entrepreneurship Theory and Practice	10.1177/1042258717750861
Audretsch, David B.; Belitski, Maksim; Desai, Sameeksha	2019	National Business Regulations and City Entrepreneurship in Europe: A Multilevel Nested Analysis	Entrepreneurship Theory and Practice	10.1177/1042258718774916
Rodrigues Brás, Gonçalo; Soukiazis, Elias	2019	The Determinants of Entrepreneurship at the Country Level: A Panel Data Approach	Entrepreneurship Research Journal	10.1515/erj-2016-0060

Achim, Monica Violeta; Borlea, Sorin Nicolae; Vaidean, Viorela Ligia	2019	Culture, Entrepreneurship and Economic Development. An Empirical Approach	Entrepreneurship Research Journal	10.1515/erj-2018-0091
Fritsch, Michael; Wyrwich, Michael	2019	Regional Emergence of Start-Ups in Information Technologies: The Role of Knowledge, Skills and Opportunities	Foresight and STI Governance	10.17323/2500-2597.2019.2.62.71
D. Reddy, Colin	2019	Cross-country start-up rates and formal incentives: a moderated mediation model of economic development and societal legitimacy	Problems and Perspectives in Management	10.21511/ppm.17(1).2019.26
Belenzon, Sharon; Bennett, Victor Manuel; Patacconi, Andrea	2019	Flexible Production and Entry: Institutional, Technological, and Organizational Determinants		10.3386/w25659
Escandon-Barbosa, Diana; Urbano-Pulido, David; Hurtado-Ayala, Andrea	2019	Exploring the Relationship between Formal and Informal Institutions, Social Capital, and Entrepreneurial Activity in Developing and Developed Countries	Sustainability	10.3390/su11020550
Ghura, H.; Harraf, A.; Hamdan, A.	2019	Entrepreneurship in emerging economies: The role of corruption and rule of law		10.34190/ECIE.19.065
Colombelli, Alessandra	2019	Green startups and local knowledge bases: newborn suppliers of energy related technologies in Italian provinces		10.4337/9781788110686.00020
Alheet, Ahmad Fathi	2019	Investigating the relationship between entrepreneurial activity and economic growth: a case of Middle East	JESI (Entrepreneurship and Sustainability Issues)	10.9770/jesi.2019.7.2(17)
Dvoulety, Ondrej; Pilkova, Anna; Mikuš, Juraj; Rimská, Miroslava	2019	Entrepreneurial Activity in Slovakia: Selected Regional Aspects and the Role of Governmental Environment		
Alkhurafi, Naeimah	2019	The Role of Context in Country Level Entrepreneurial Activity		
Shami, Muntasir	2019	INSTITUTIONAL CHANGE AND ENTREPRENEURSHIP: THE IMPACT OF INCREMENTAL CHANGE, CHANGE DUE TO CONFLICT, AND SOCIAL CHANGE CAPTURED BY MIGRATION		
Berdiev, Aziz N.; Saunoris, James W.	2018	Corruption and Entrepreneurship: Cross-Country Evidence from Formal and Informal Sectors	Southern Economic Journal	10.1002/soej.12250
Stam, Erik	2018	Measuring Entrepreneurial Ecosystems		10.1007/978-3-319-63531-6_9
Oo, Pyayt P.; Sahaym, Arvin; Juasrikul, Sakdipon; Lee, Sang-Youn	2018	The interplay of entrepreneurship education and national cultures in entrepreneurial activity: a social cognitive perspective	J Int Entrep (Journal of International Entrepreneurship)	10.1007/s10843-018-0229-4
Amoroso, Sara; Müller, Bettina	2018	The short-run effects of knowledge intensive greenfield FDI on new domestic entry	Journal of technology transfer	10.1007/s10961-017-9575-y

Hans, Lianne; Koster, Sierdjan	2018	Urbanization and start-up rates in different geographies: Belgium, the Netherlands, and Sweden	Small Bus Econ (Small Business Economics)	10.1007/s11187-017-9967-2
Dilli, Selin; Elert, Niklas; Herrmann, Andrea M.	2018	Varieties of entrepreneurship: exploring the institutional foundations of different entrepreneurship types through 'Varieties-of-Capitalism' arguments	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-0002-z
Darnihamedani, Pourya; Block, Joern Hendrich; Hessels, Jolanda; Simonyan, Aram	2018	Taxes, start-up costs, and innovative entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-0005-9
Bosma, Niels; Content, Jeroen; Sanders, Mark; Stam, Erik	2018	Institutions, entrepreneurship, and economic growth in Europe	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-0012-x
Fritsch, Michael; Wyrwich, Michael	2018	Regional knowledge, entrepreneurial culture, and innovative start-ups over time and space-an empirical investigation	Small Bus Econ (Small Business Economics)	10.1007/s11187-018-0016-6
González-Pernía, José L.; Guerrero, Maribel; Jung, Andres; Peña-Legazkue	2018	Economic recession shake-out and entrepreneurship: Evidence from Spain	BRQ Business Research Quarterly	10.1016/j.brq.2018.06.001
Wang, Liang; Tan, Justin; Li, Wan	2018	The impacts of spatial positioning on regional new venture creation and firm mortality over the industry life cycle	Journal of Business Research	10.1016/j.jbusres.2018.01.020
Fossen, Frank M.; Martin, Thorsten	2018	Entrepreneurial dynamics over space and time	Regional Science and Urban Economics	10.1016/j.regsciurbeco.2018.04.004
Colombelli, Alessandra; Quatraro, Francesco	2018	New firm formation and regional knowledge production modes: Italian evidence	Research Policy	10.1016/j.respol.2017.10.006
Peris-Ortiz, Marta; Ferreira, João J.M.; Fernandes, Cristina I.	2018	Do Total Early-stage Entrepreneurial Activities (TEAs) foster innovative practices in OECD countries?	Technological Forecasting and Social Change	10.1016/j.techfore.2017.07.005
Coulibaly, Salifou K.; Erbao, Cao; Metuge Mekongcho, T.	2018	Economic globalization, entrepreneurship, and development	Technological Forecasting and Social Change	10.1016/j.techfore.2017.09.028
Dhahri, Sabrine; Omri, Anis	2018	Entrepreneurship contribution to the three pillars of sustainable development: What does the evidence really say?	World Development	10.1016/j.worlddev.2018.01.008
Ragoubi, Hanen; El Harbi, Sana	2018	Entrepreneurship and income inequality: a spatial panel data analysis	International Review of Applied Economics	10.1080/02692171.2017.1342776
Qian, Haifeng; Liu, Shiqin	2018	Cultural entrepreneurship in U.S. cities	Journal of Urban Affairs	10.1080/07352166.2018.1468223
Capozza, Claudia; Salomone, Sergio; Somma, Ernesto	2018	Local industrial structure, agglomeration economies and the creation of innovative start-ups: evidence from the Italian case	Entrepreneurship & Regional Development	10.1080/08985626.2018.1457087
Roman, Angela; Bilan, Irina; Ciuma<U+0219>, Cristina	2018	What Drives the Creation of New Businesses? A Panel-Data Analysis for EU Countries	Emerging Markets Finance and Trade	10.1080/1540496X.2017.1412304

Liang, James; Wang, Hui; Lazear, Edward P.	2018	Demographics and Entrepreneurship	Journal of Political Economy	10.1086/698750
Goldschlag, Nathan; Tabarrok, Alex	2018	Is regulation to blame for the decline in American entrepreneurship?	Economic Policy	10.1093/epolic/eix019
Rodríguez-Gulías, María Jesús; Sousa Gabriel, Vítor Manuel de; Rodeiro-Pazos, David	2018	Effects of governance on entrepreneurship: European Union vs non-European Union	CR (Competitiveness Review: An International Business Journal)	10.1108/CR-06-2016-0035
Zikou, Eva; Varsakelis, Nikos; Sarri, Aikaterini K.	2018	Does public sector crowd out entrepreneurship? Evidence from the EU regions	IJEBR (International Journal of Entrepreneurial Behavior & Research)	10.1108/IJEBR-03-2017-0100
Tarabar, Danko	2018	Regional integration and entrepreneurship: evidence from European Union	JEPP (Journal of Entrepreneurship and Public Policy)	10.1108/JEPP-D-18-00003
Jia, Shaomeng	2018	Foreign aid: boosting or hindering entrepreneurship?	JEPP (Journal of Entrepreneurship and Public Policy)	10.1108/JEPP-D-18-00031
Tuszynski, Meg Patrick; Stansel, Dean	2018	Targeted state economic development incentives and entrepreneurship	JEPP (Journal of Entrepreneurship and Public Policy)	10.1108/JEPP-D-18-00033
Atiase, Victor Yawo; Mahmood, Samia; Wang, Yong; Botchie, David	2018	Developing entrepreneurship in Africa: investigating critical resource challenges	Journal of Small Business & Entrepreneurship	10.1108/JSBED-03-2017-0084
Munemo, Jonathan	2018	Entrepreneurial Success in Africa: How Relevant Are Foreign Direct Investment and Financial Development?	African Development Review	10.1111/1467-8268.12345
Anglin, Aaron H.; McKenny, Aaron F.; Short, Jeremy C.	2018	The Impact of Collective Optimism on New Venture Creation and Growth: A Social Contagion Perspective	Entrepreneurship Theory and Practice	10.1111/etap.12256
Li, Chengguang; Isidor, Rodrigo; Dau, Luis Alfonso; Kabst, Rudy	2018	WITHDRAWN–Administrative Duplicate Publication—The More the Merrier? Immigrant Share and Entrepreneurial Activities	Entrepreneurship Theory and Practice	10.1111/etap.12277
Nikolaev, Boris N.; Boudreaux, Christopher J.; Palich, Leslie	2018	Cross-Country Determinants of Early-Stage Necessity and Opportunity-Motivated Entrepreneurship: Accounting for Model Uncertainty	Journal of Small Business Management	10.1111/jsbm.12400
Lavesson, Niclas	2018	How does distance to urban centres influence necessity and opportunity-based firm start-ups?	Papers in Regional Science	10.1111/pirs.12289
Credit, Kevin	2018	Transit-oriented economic development: The impact of light rail on new business starts in the Phoenix, AZ Region, USA	Urban Studies	10.1177/0042098017724119
Lee, Ming-Hsuan; Lio, Mon-Chi	2018	Can information and communication technology promote venture creation? A	Information Development	10.1177/0266666917697368

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Thompson, Piers; Zang, Wenyu	2018	The foreign business and domestic enterprise relationship: Its implications for local entrepreneurial resilience	Local Economy (Local Economy: The Journal of the Local Economy Policy Unit)	10.1177/0269094218756817
Deskins, John; Ross, Amanda	2018	Economic Freedom and Racial Differences in Entrepreneurship	Public Finance Review	10.1177/1091142116671804
Conti, Raffaele; Valentini, Giovanni	2018	Super Partes? Assessing the Effect of Judicial Independence on Entry	Management Science	10.1287/mnsc.2017.2794
Chatmi, Arbia; Elasri, Karim	2018	Entrepreneurship and knowledge spillovers from FDI and exports concentration, diversification	IJESB (International Journal of Entrepreneurship and Small Business)	10.1504/IJESB.2018.10017355
Fischer, Bruno; Rücker Schaeffer, Paola; Queiroz, Sérgio	2018	High-growth entrepreneurship in a developing country: Regional systems or stochastic process?	CyA (Contaduría y Administración)	10.22201/fca.24488410e.2019.1816
Camargo, David Andrés; Ortiz Riaga, María Carolina; Cardona García, Octavio	2018	Formal and informal institutions in relation to the entrepreneurial phenomenon in the Americas	cuad.adm. (Cuadernos de Administración)	10.25100/cdea.v34i61.6399
Bernstein, Shai; Colonnelli, Emanuele; Malacrino, Davide; McQuade, Timothy	2018	Who Creates New Firms When Local Opportunities Arise?		10.3386/w25112
Chen, Feng-Wen; Fu, Long-Wang; Wang, Kai; Tsai, Sang-Bing; Su, Ching-Hsia	2018	The Influence of Entrepreneurship and Social Networks on Economic Growth—From a Sustainable Innovation Perspective	Sustainability	10.3390/su10072510
Bayar, Yilmaz; Gavriletea, Marius; Ucar, Zeki	2018	Financial Sector Development, Openness, and Entrepreneurship: Panel Regression Analysis	Sustainability	10.3390/su10103493
Roman, Angela; Rusu, Valentina-Diana	2018	MACROECONOMIC AND INSTITUTIONAL DRIVERS OF ENTREPRENEURIAL ACTIVITY. A CROSS-COUNTRY EMPIRICAL ASSESSMENT		10.3846/bm.2018.03
Jahn, Vera; Steinhardt, Max Friedrich	2018	Immigration and new firm formation		
Piontek, Matthias; Wyrwich, Michael	2017	The emergence of entrepreneurial ideas at universities in times of demographic change: evidence from Germany	Rev Reg Res (Review of Regional Research)	10.1007/s10037-016-0111-6
Audretsch, David B.; Belitski, Maksim	2017	Entrepreneurial ecosystems in cities: establishing the framework conditions	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-016-9473-8
Li, Xibao	2017	Exploring the spatial heterogeneity of entrepreneurship in Chinese manufacturing industries	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-016-9474-7

Mrozewski, Matthias; Kratzer, Jan	2017	Entrepreneurship and country-level innovation: investigating the role of entrepreneurial opportunities	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-016-9479-2
Bailey, James B.; Thomas, Diana W.	2017	Regulating away competition: the effect of regulation on entrepreneurship and employment	J Regul Econ (Journal of Regulatory Economics)	10.1007/s11149-017-9343-9
Danakol, Seçil Hülya; Estrin, Saul; Reynolds, Paul; Weitzel, Utz	2017	Foreign direct investment via M&A and domestic entrepreneurship: blessing or curse?	Small Bus Econ (Small Business Economics)	10.1007/s11187-016-9792-z
Awaworyi Churchill, Sefa	2017	Fractionalization, entrepreneurship, and the institutional environment for entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-016-9796-8
Sun, Laixiang; Lee, In Hyeock; Hong, Eunsuk	2017	Does foreign direct investment stimulate new firm creation? In search of spillovers through industrial and geographical linkages	Small Bus Econ (Small Business Economics)	10.1007/s11187-016-9803-0
Dheer, Ratan J. S.	2017	Cross-national differences in entrepreneurial activity: role of culture and institutional factors	Small Bus Econ (Small Business Economics)	10.1007/s11187-016-9816-8
Bruns, K.; Bosma, N.; Sanders, M.; Schramm, M.	2017	Searching for the existence of entrepreneurial ecosystems: a regional cross-section growth regression approach	Small Bus Econ (Small Business Economics)	10.1007/s11187-017-9866-6
Nylund, Petra A.; Cohen, Boyd	2017	Collision density: driving growth in urban entrepreneurial ecosystems	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-016-0424-5
Lehmann, Erik E.; Seitz, Nikolaus; Wirsching, Katharine	2017	Smart finance for smart places to foster new venture creation	Econ Polit Ind (Economia e Politica Industriale)	10.1007/s40812-016-0052-7
Lafuente, Esteban; Vaillant, Yancy; Vendrell-Herrero, Ferran	2017	Territorial servitization: Exploring the virtuous circle connecting knowledge-intensive services and new manufacturing businesses	International Journal of Production Economics	10.1016/j.ijpe.2016.12.006
Hasan, Iftekhar; Kobeissi, Nada; Wang, Haizhi; Zhou, Mingming	2017	Bank financing, institutions and regional entrepreneurial activities: Evidence from China	International Review of Economics & Finance	10.1016/j.iref.2017.01.013
Seth, Tapan; Lee, Jaegul	2017	Consensus and conflict: Exploring moderating effects of knowledge workers on industry environment and entrepreneurial entry relationship	Journal of Business Research	10.1016/j.jbusres.2017.05.003
Munemo, Jonathan	2017	Foreign direct investment and business start-up in developing countries: The role of financial market development	The Quarterly Review of Economics and Finance	10.1016/j.qref.2016.08.010
Piacentino, Davide; Bono, Filippa; Cracolici, Maria Francesca; Giuliani, Diego	2017	A spatial analysis of new business formation: Replicative vs innovative behaviour	Spatial Statistics	10.1016/j.spasta.2017.02.004

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Ghosh, Saibal	2017	Broadband penetration and economic growth: Do policies matter?	Telematics and Informatics	10.1016/j.tele.2016.12.007
Qian, Haifeng	2017	Skills and knowledge-based entrepreneurship: evidence from US cities	Regional Studies	10.1080/00343404.2016.1213383
Ferreira, João J.; Fayolle, Alain; Fernandes, Cristina; Raposo, Mário	2017	Effects of Schumpeterian and Kirznerian entrepreneurship on economic growth: panel data evidence	Entrepreneurship & Regional Development	10.1080/08985626.2016.1255431
Breitenecker, Robert J.; Harms, Rainer; Weyh, Antje; Maresch, Daniela; Kraus, Sascha	2017	When the difference makes a difference – the regional embeddedness of entrepreneurship	Entrepreneurship & Regional Development	10.1080/08985626.2016.1255432
Kedmenec, Irena; Strašek, Sebastjan	2017	Are some cultures more favourable for social entrepreneurship than others?	Economic Research-Ekonomska Istraživanja	10.1080/1331677X.2017.1355251
Motoyama, Yasuyuki; Malizia, Emil	2017	Demand pull or supply push? Metro-level analysis of start-ups in the United States	Regional Studies	10.1080/21681376.2017.1379885
Fritsch, Michael; Wyrwich, Michael	2017	The effect of entrepreneurship on economic development—an empirical analysis using regional entrepreneurship culture	J Econ Geogr (Journal of Economic Geography)	10.1093/jeg/lbv049
Kachlami, Habib	2017	Regional dynamism between social and commercial ventures	IJSE (International Journal of Social Economics)	10.1108/IJSE-11-2015-0293
Dvouletý, Ondrej	2017	Can policy makers count with positive impact of entrepreneurship on economic development of the Czech regions?	JEEE (Journal of Entrepreneurship in Emerging Economies)	10.1108/JEEE-11-2016-0052
Ghosh, Sriparna	2017	Regulation and entrepreneurial intention: cross-country evidence	JEPP (Journal of Entrepreneurship and Public Policy)	10.1108/JEPP-02-2017-0004
Lihn, Jacob; Bjørnskov, Christian	2017	Economic freedom and veto players jointly affect entrepreneurship	JEPP (Journal of Entrepreneurship and Public Policy)	10.1108/JEPP-D-17-00007
Dvouletý, Ondrej	2017	Determinants of Nordic entrepreneurship	Journal of Small Business & Entrepreneurship	10.1108/JSBED-07-2016-0104
Alderete, María Verónica	2017	Mobile Broadband: A Key Enabling Technology for Entrepreneurship?	Journal of Small Business Management	10.1111/jsbm.12314
Fritsch, Michael; Aamoucke, Ronney	2017	Fields of knowledge in higher education institutions, and innovative start-ups: An empirical investigation	Papers in Regional Science	10.1111/pirs.12175
Jimenez, Alfredo; Regaliza, Julio César Puche; Eguizábal, Juan Alfredo Jiménez; Alon, Ilan	2017	Political discretion and corruption: the impact of institutional quality on formal and informal entrepreneurship	EJIM (European Journal of Innovation Management)	10.1504/EJIM.2017.083873
Jimenez, Alfredo; Matos, Rafael Fabricio; Cámara,	2017	Enrolment in education and entrepreneurship in Latin America: a multi-country study	EJIM (European Journal of Innovation Management)	10.1504/EJIM.2017.083881

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Berggren, Björn; Fili, Andreas; Wilhelmsson, Mats Håkan	2017	The effect of house prices on business start-ups: A review and analysis using Swedish regional data	REGION	10.18335/region.v4i1.95
Nepelski, Daniel; van Roy, Vincent	2017	Determinants of high-tech entrepreneurship in Europe		10.2791/96153
Rusu, Valentina; Roman, Angela	2017	Entrepreneurial Activity in the EU: An Empirical Evaluation of Its Determinants	Sustainability	10.3390/su9101679
Anton, Sorin; Bostan, Ionel	2017	The Role of Access to Finance in Explaining Cross-National Variation in Entrepreneurial Activity: A Panel Data Approach	Sustainability	10.3390/su9111947
Dantas, José Guilherme Leitão; Moreira, António; Valente, Fernando Manuel	2017	Entrepreneurship and National Culture		10.4018/978-1-5225-1923-2.ch062
Facchini, François; [Nachname nicht vorhanden], Subandono	2017	Institutions, entrepreneurship, and regional growth in Indonesia (1994–2010)		10.4337/9781783472666.00011
Huggins, Robert; Thompson, Piers	2017	Entrepreneurship, culture and resilience: the determinants of local development in uncertain times		10.4337/9781785367649.00017
Coll Martinez, Eva	2017	Creative industries and firm creation: disentangling causal effects through historical cultural associations		
Lee, Chong Kyoon	2017	BUSINESS FAILURE AND ENTREPRENEURSHIP: THREE ESSAYS ON THE EFFECTS OF THE COST OF FAILURE		
Albiol-Sánchez, Judit	2016	The Relevance of Business Exit for Future Entrepreneurial Activity	Strategic Change	10.1002/jsc.2053
Urbano, David; Aparicio, Sebastian; Querol, Victor	2016	Social progress orientation and innovative entrepreneurship: an international analysis	J Evol Econ (Journal of Evolutionary Economics)	10.1007/s00191-016-0485-1
Guerrero, Maribel; Urbano, David; Fayolle, Alain	2016	Entrepreneurial activity and regional competitiveness: evidence from European entrepreneurial universities	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-014-9377-4
Mendonça, Joana; Grimpe, Christoph	2016	Skills and regional entrepreneurship capital formation: a comparison between Germany and Portugal	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-015-9444-5
Braunerhjelm, Pontus; Ding, Ding; Thulin, Per	2016	Labour as a knowledge carrier: how increased mobility influences entrepreneurship	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-015-9452-5
Bergmann, Heiko; Hundt, Christian; Sternberg, Rolf	2016	What makes student entrepreneurs? On the relevance (and irrelevance) of the university and the regional context for student start-ups	Small Bus Econ (Small Business Economics)	10.1007/s11187-016-9700-6

Carbonara, Emanuela; Santarelli, Enrico; Tran, Hien Thu	2016	De jure determinants of new firm formation: how the pillars of constitutions influence entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-016-9715-z
Ghio, Niccolò; Guerini, Massimiliano; Rossi-Lamastra, Cristina	2016	University knowledge and the creation of innovative start-ups: an analysis of the Italian case	Small Bus Econ (Small Business Economics)	10.1007/s11187-016-9720-2
Colombelli, Alessandra	2016	The impact of local knowledge bases on the creation of innovative start-ups in Italy	Small Bus Econ (Small Business Economics)	10.1007/s11187-016-9722-0
Albulescu, Claudiu Tiberiu; Tamasila, Matei	2016	Exploring the role of FDI in enhancing the entrepreneurial activity in Europe: a panel data analysis	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-015-0360-9
Audretsch, David B.; Lehmann, Erik E.; Menter, Matthias	2016	Public cluster policy and new venture creation	Econ Polit Ind (Economia e Politica Industriale)	10.1007/s40812-016-0050-9
Wang, Jiejing; Zhang, Xiaohu; Yeh, Anthony G.O.	2016	Spatial proximity and location dynamics of knowledge-intensive business service in the Pearl River Delta, China	Habitat International	10.1016/j.habitatint.2015.11.041
Kim, Dong-Hyeon; Lin, Shu-Chin; Chen, Ting-Cih	2016	Financial structure, firm size and industry growth	International Review of Economics & Finance	10.1016/j.iref.2015.10.002
Kuckertz, Andreas; Berger, Elisabeth S.C.; Mpeqa, Andrew	2016	The more the merrier? Economic freedom and entrepreneurial activity	Journal of Business Research	10.1016/j.jbusres.2015.10.094
Urbano, David; Aparicio, Sebastian	2016	Entrepreneurship capital types and economic growth: International evidence	Technological Forecasting and Social Change	10.1016/j.techfore.2015.02.018
Aparicio, Sebastian; Urbano, David; Audretsch, David	2016	Institutional factors, opportunity entrepreneurship and economic growth: Panel data evidence	Technological Forecasting and Social Change	10.1016/j.techfore.2015.04.006
Huggins, Robert; Thompson, Piers	2016	Socio-Spatial Culture and Entrepreneurship: Some Theoretical and Empirical Observations	Economic Geography	10.1080/00130095.2016.1146075
Drucker, Joshua	2016	Reconsidering the Regional Economic Development Impacts of Higher Education Institutions in the United States	Regional Studies	10.1080/00343404.2014.986083
Doran, Justin; McCarthy, Noirin; O'Connor, Marie	2016	Entrepreneurship and employment growth across European regions	Regional Studies	10.1080/21681376.2015.1135406
Crum, Michael; Gohmann, Stephan F.	2016	The impact of taxes and regulations on firm births and deaths in state border counties	Journal of Entrepreneurship and Public Policy	10.1108/JEPP-06-2014-0025
Hall, Joshua C.; Lacombe, Donald J.; Pokharel, Shree B.	2016	Freedom and entrepreneurship: a spatial econometric approach	JEPP (Journal of Entrepreneurship and Public Policy)	10.1108/JEPP-12-2015-0038
Agostino, Mariarosaria; Trivieri, Francesco	2016	Bank market power and firm creation: a multi-country analysis	Journal of Small Business and Enterprise Development	10.1108/JSBED-02-2014-0027
PETROVA, KAMELIIA	2016	ENTREPRENEURSHIP AND THE INFORMAL ECONOMY: AN EMPIRICAL ANALYSIS	J. Dev. Entrepreneurship (Journal of	10.1142/S1084946716500102

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Albulescu, Claudiu Tiberiu; Draghici, Anca	2016	Entrepreneurial activity and national innovative capacity in selected European countries	The International Journal of Entrepreneurship and Innovation	10.1177/1465750316655902
Alon, Ilan; Lerner, Miri; Shoham, Amir	2016	Cross-national cultural values and nascent entrepreneurship	Int'l Jnl of Cross Cultural Management (International Journal of Cross Cultural Management)	10.1177/1470595816674744
Amorós, José Ernesto; Borraz, Fernando; Veiga, Leonardo	2016	Entrepreneurship and Socioeconomic Indicators in Latin America	Latin American Research Review	10.1353/lar.2016.0055
Teplov, Roman; Väätänen, Juha; Podmetina, Daria	2016	A System Dynamic Approach to Modelling the Endogenous and Exogenous Determinants of the Entrepreneurship Process	jim (Journal of Innovation Management)	10.24840/2183-0606_004.002_0005
Chatman, Daniel G.; Noland, Robert B.; Klein, Nicholas J.	2016	Firm Births, Access to Transit, and Agglomeration in Portland, Oregon, and Dallas, Texas	Transportation Research Record (Transportation Research Record: Journal of the Transportation Research Board)	10.3141/2598-01
Rehak, Jan; Cerveny, Jakub; Pilkova, Anna	2016	Senior Entrepreneurship in European Context: Key Determinants of Entrepreneurial Activity	Journal of Economics SAV	
Puumalainen, Kaisu; Sjögrén, Helena; Syrjä, Pasi; Barraket, Jo	2015	Comparing social entrepreneurship across nations: An exploratory study of institutional effects	Can J Adm Sci (Canadian Journal of Administrative Sciences / Revue Canadienne des Sciences de l'Administration)	10.1002/cjas.1356
Plummer, Lawrence A.; GILBERT, BRETT ANITRA	2015	The Effect of Defense Agency Funding of University Research on Regional New Venture Creation	Strategic Entrepreneurship Journal	10.1002/sej.1199
Liñán, Francisco; Jaén, Inmaculada; Ortega, Francisco J.	2015	Understanding the Role of Culture and Economic Conditions in Entrepreneurship		10.1007/978-3-319-15111-3_4
Chowdhury, Farzana; Terjesen, Siri; Audretsch, David	2015	Varieties of entrepreneurship: institutional drivers across entrepreneurial activity and country	Eur J Law Econ (European Journal of Law and Economics)	10.1007/s10657-014-9464-x
Baradwaj, Babu G.; Dewally, Michaël; Shao, Yingying	2015	Does Securitization Support Entrepreneurial Activity?	J Financ Serv Res (Journal of Financial Services Research)	10.1007/s10693-013-0175-1
Audretsch, David B.; Heger, Diana; Veith, Tobias	2015	Infrastructure and entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-014-9600-6

Modrego, Félix; McCann, Philip; Foster, William E.; Olfert, M. Rose	2015	Regional entrepreneurship and innovation in Chile: a knowledge matching approach	Small Bus Econ (Small Business Economics)	10.1007/s11187-014-9612-2
Hong, Eunsuk; Lee, In Hyeock; Sun, Laixiang; Harrison, Richard	2015	Entrepreneurship across time and space: empirical evidence from Korea	Small Bus Econ (Small Business Economics)	10.1007/s11187-014-9613-1
González-Pernía, José L.; Peña-Legazkue, Iñaki	2015	Export-oriented entrepreneurship and regional economic growth	Small Bus Econ (Small Business Economics)	10.1007/s11187-015-9657-x
Turkina, Ekaterina; Thai, Mai Thi Thanh	2015	Socio-psychological determinants of opportunity entrepreneurship	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-013-0288-x
Fritsch, Michael; Kritikos, Alexander; Pijnenburg, Katharina	2015	Business cycles, unemployment and entrepreneurial entry—evidence from Germany	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-014-0326-3
Klapper, Leora; Love, Inessa; Randall, Douglas	2015	New firm registration and the business cycle	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-014-0345-0
Dove, John A.	2015	The effect of judicial independence on entrepreneurship in the US states	Economic Systems	10.1016/j.ecosys.2014.06.006
Mendoza-Abarca, Karla I.; Anokhin, Sergey; Zamudio, César	2015	Uncovering the influence of social venture creation on commercial venture creation: A population ecology perspective	Journal of Business Venturing	10.1016/j.jbusvent.2015.04.003
Carree, Martin; Congregado, Emilio; Golpe, Antonio; van Stel, André	2015	Self-employment and job generation in metropolitan areas, 1969–2009	Entrepreneurship & Regional Development	10.1080/08985626.2015.1025860
Pathak, Saurav; Laplume, André; Xavier-Oliveira, Emanuel	2015	Inbound foreign direct investment and domestic entrepreneurial activity	Entrepreneurship & Regional Development	10.1080/08985626.2015.1058424
Huggins, R.; Thompson, P.	2015	Local entrepreneurial resilience and culture: the role of social values in fostering economic recovery	Cambridge Journal of Regions, Economy and Society	10.1093/cjres/rsu035
Thompson, Piers; Zang, Wenyu	2015	Foreign direct investment and the SME sector	International Journal of Entrepreneurial Behavior & Research	10.1108/IJEBR-12-2013-0218
Gross, Stephen; Campbell, Noel	2015	Central city vibrancy and new business venturing	Journal of Entrepreneurship and Public Policy	10.1108/JEPP-01-2014-0002
Mann, John; Shideler, David	2015	Measuring Schumpeterian activity using a composite indicator	Journal of Entrepreneurship and Public Policy	10.1108/JEPP-07-2013-0029
Krichevskiy, Dmitriy; Snyder, Thomas	2015	U.S. State Government policies and entrepreneurship	Journal of Entrepreneurship and Public Policy	10.1108/JEPP-09-2013-0041

Backman, Mikaela	2015	Banks and new firm formation	Journal of Small Business and Enterprise Development	10.1108/JSBED-03-2013-0035
Hasan, Iftekhar; Kobeissi, Nada; Wang, Haizhi; Zhou, Mingming	2015	Banking Structure, Marketization, and Small Business Development: Regional Evidence From China	Pacific Economic Review	10.1111/1468-0106.12118
Audretsch, David B.; Dohse, Dirk; Niebuhr, Annekatrin	2015	Regional unemployment structure and new firm formation	Papers in Regional Science	10.1111/pirs.12169
HERRERA-ECHEVERRI, HERNÁN; HAAR, JERRY; JIMÉNEZ, ALEXANDER ARRIETA; ZAPATA, MANUEL ARAÚJO	2015	DEVALUATION, COMPETITIVENESS AND NEW BUSINESS FORMATION IN EMERGING COUNTRIES	J. Dev. Entrepreneurship (Journal of Developmental Entrepreneurship)	10.1142/S1084946715500156
Low, Sarah A.; Isserman, Andrew M.	2015	Where Are the Innovative Entrepreneurs? Identifying Innovative Industries and Measuring Innovative Entrepreneurship	International Regional Science Review	10.1177/0160017613484926
Obschonka, Martin; Stuetzer, Michael; Gosling, Samuel D.; Rentfrow, Peter J.; Lamb, Michael E.; Potter, Jeff; Audretsch, David B.	2015	Entrepreneurial Regions: Do Macro-Psychological Cultural Characteristics of Regions Help Solve the "Knowledge Paradox" of Economics?	PloS one	10.1371/journal.pone.0129332
Samila, Sampsa; Sorenson, Olav	2015	Community and Capital in Entrepreneurship and Economic Growth	SSRN Journal (SSRN Electronic Journal)	10.2139/ssrn.2564516
Kim, Jung Hoon	2015	The Effect of Institutional Dimensions and Cultural Dimensions on the Level of Entrepreneurial Activity Across Countries		10.25148/etd.FIDC006599
Parajuli, Jitendra; Haynes, Kingsley E.	2015	Broadband Internet and new firm formation: a US perspective		10.4337/9781783477326.00017
Cavusoglu, Tarkan; Dincer, Oguzhan	2015	Economic freedom and entrepreneurial activity in American states		10.4337/9781784718237.00025
Bryant, Charles	2015	ECONOMIC GLOBALIZATION: THE ROLE OF CORRUPTION, ENTREPRENEURSHIP, ECONOMIC FREEDOM, AND HUMAN CAPITAL		
Fritsch, Michael; Kublina, Sandra	2015	Entrepreneurship, Growth, Regional Growth Regimes		
Juasrikul, Sakdipon	2015	CULTURAL AND INSTITUTIONAL CONTEXT, ENTREPRENEURSHIP, AND INTERNATIONAL VENTURING		
Merriman, Douglas Arthur	2015	Cyclical Economic Impacts on Aggregated Fiscal Imbalance Levels in the United States		
Wyrwich, Michael	2014	Ready, set, go! Why are some regions entrepreneurial jump starters?	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-014-0629-x

Sambharya, Rakesh; Musteen, Martina	2014	Institutional environment and entrepreneurship: An empirical study across countries	J Int Entrep (Journal of International Entrepreneurship)	10.1007/s10843-014-0137-1
Carree, Martin; Della Malva, Antonio; Santarelli, Enrico	2014	The contribution of universities to growth: empirical evidence for Italy	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-012-9282-7
Qian, Haifeng; Haynes, Kingsley E.	2014	Beyond innovation: the Small Business Innovation Research program as entrepreneurship policy	J Technol Transf (The Journal of Technology Transfer)	10.1007/s10961-013-9323-x
Barreneche García, Andrés	2014	Analyzing the determinants of entrepreneurship in European cities	Small Bus Econ (Small Business Economics)	10.1007/s11187-012-9462-8
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Naudé, Wim; Amorós, José Ernesto; Cristi, Oscar	2014	"Surfeiting, the appetite may sicken": entrepreneurship and happiness	Small Bus Econ (Small Business Economics)	10.1007/s11187-013-9492-x
Clercq, Dirk de; Lim, Dominic S. K.; Oh, Chang Hoon	2014	Hierarchy and conservatism in the contributions of resources to entrepreneurial activity	Small Bus Econ (Small Business Economics)	10.1007/s11187-013-9515-7
Liñán, Francisco; Fernandez-Serrano, José	2014	National culture, entrepreneurship and economic development: different patterns across the European Union	Small Bus Econ (Small Business Economics)	10.1007/s11187-013-9520-x
Bonaccorsi, Andrea; Colombo, Massimo G.; Guerini, Massimiliano; Rossi-Lamastra, Cristina	2014	The impact of local and external university knowledge on the creation of knowledge-intensive firms: evidence from the Italian case	Small Bus Econ (Small Business Economics)	10.1007/s11187-013-9536-2
Fritsch, Michael; Bublitz, Elisabeth; Sorgner, Alina; Wyrwich, Michael	2014	How much of a socialist legacy? The re-emergence of entrepreneurship in the East German transformation to a market economy	Small Bus Econ (Small Business Economics)	10.1007/s11187-014-9544-x
Hülsbeck, Marcel; Pickavé, Elena N.	2014	Regional knowledge production as determinant of high-technology entrepreneurship: empirical evidence for Germany	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-011-0217-9
Fernández-Serrano, José; Romero, Isidoro	2014	About the interactive influence of culture and regulatory barriers on entrepreneurial activity	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-014-0296-5
Plummer, Lawrence A.; Acs, Zoltan J.	2014	Localized competition in the knowledge spillover theory of entrepreneurship	Journal of Business Venturing	10.1016/j.jbusvent.2012.10.003
Kim, Phillip H.; Li, Mingxiang	2014	Injecting demand through spillovers: Foreign direct investment, domestic socio-political conditions, and host-country entrepreneurial activity	Journal of Business Venturing	10.1016/j.jbusvent.2012.10.004
Bird, Miriam; Wennberg, Karl	2014	Regional influences on the prevalence of family versus non-family start-ups	Journal of Business Venturing	10.1016/j.jbusvent.2013.06.004

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Li, Lixing; Wu, Xiaoyu	2014	Housing price and entrepreneurship in China	Journal of Comparative Economics	10.1016/j.jce.2013.09.001
Draghici, Anca; Albulescu, Claudiu Tiberiu	2014	Does the Entrepreneurial Activity Enhance the National Innovative Capacity?	Procedia - Social and Behavioral Sciences	10.1016/j.sbspro.2014.02.500
Hancioglu, Yasemin; Dogan, Ülkühan Bike; Yildirim, Sükran Sirkintioglu	2014	Relationship between Uncertainty Avoidance Culture, Entrepreneurial Activity and Economic Development	Procedia - Social and Behavioral Sciences	10.1016/j.sbspro.2014.09.100
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Fritsch, Michael; Wyrwich, Michael	2014	The Long Persistence of Regional Levels of Entrepreneurship: Germany, 1925–2005	Regional Studies	10.1080/00343404.2013.816414
Kibler, Ewald; Kautonen, Teemu; Fink, Matthias	2014	Regional Social Legitimacy of Entrepreneurship: Implications for Entrepreneurial Intention and Start-up Behaviour	Regional Studies	10.1080/00343404.2013.851373
Westlund, Hans; Larsson, Johan P.; Olsson, Amy Rader	2014	Start-ups and Local Entrepreneurial Social Capital in the Municipalities of Sweden	Regional Studies	10.1080/00343404.2013.865836
Delfmann, Heike; Koster, Sierdjan; McCann, Philip; van Dijk, Jouke	2014	Population Change and New Firm Formation in Urban and Rural Regions	Regional Studies	10.1080/00343404.2013.867430
Motoyama, Yasuyuki	2014	The state-level geographic analysis of high-growth companies	Journal of Small Business & Entrepreneurship	10.1080/08276331.2015.1012795
Guerini, Massimiliano; Rossi-Lamastra, Cristina	2014	How university and industry knowledge interact to determine local entrepreneurship	Applied Economics Letters	10.1080/13504851.2013.864031
Fotopoulos, G.	2014	On the spatial stickiness of UK new firm formation rates	Journal of Economic Geography	10.1093/jeg/lbt011
Avnimelech, Gil; Zelekha, Yaron; Sharabi, Eyal	2014	The effect of corruption on entrepreneurship in developed vs non-developed countries	International Journal of Entrepreneurial Behavior & Research	10.1108/IJEBR-10-2012-0121
Song, Lin; Winkler, Christoph	2014	China's trans-regional entrepreneurship	Journal of Entrepreneurship in Emerging Economies	10.1108/JEEE-06-2014-0020
Bruce, Don; C. Rork, Jon; Wagner, Gary	2014	State income tax reciprocity agreements and small businesses	Journal of Entrepreneurship and Public Policy	10.1108/JEPP-07-2012-0037
Hellerstedt, Karin; Wennberg, Karl; Frederiksen, Lars	2014	University Knowledge Spillovers and regional start-up rates: supply and Demand-Side Factors		10.1108/S1074-754020140000016005

Cumming, Douglas; Johan, Sofia; Zhang, Minjie	2014	The Economic Impact of Entrepreneurship: Comparing International Datasets	Corporate Governance: An International Review	10.1111/corg.12058
Folmer, Emma	2014	Entrepreneurship in the Neighborhood: Shifting Patterns of Economic Activities in Residential Neighborhoods in Five Dutch Cities	Journal of Urban Affairs	10.1111/juaf.12065
Braunerhjelm, Pontus; Eklund, Johan E.	2014	Taxes, tax administrative burdens and new firm formation	Kyklos	10.1111/kykl.12040
Koster, Sierdjan; van Stel, André	2014	The relationship between start-ups, market mobility and employment growth: An empirical analysis for Dutch regions	Papers in Regional Science	10.1111/pirs.12000
SABELLA, ANTON R.; FARRAJ, WOJDAN A.; BURBAR, MAISA; QAIMARY, DANA	2014	ENTREPRENEURSHIP AND ECONOMIC GROWTH IN WEST BANK, PALESTINE	J. Dev. Entrepreneurship (Journal of Developmental Entrepreneurship)	10.1142/S1084946714500034
Alderete, María Verónica	2014	ICT incidence on the entrepreneurial activity at country level	IJESB (International Journal of Entrepreneurship and Small Business)	10.1504/IJESB.2014.059472
Haveman, Heather; Rider, Christopher	2014	The Spatial Scope of Competition and the Geographical Distribution of Entrepreneurship: Magazine Foundings and the U.S. Post Office	SocScience (Sociological Science)	10.15195/v1.a9
Álvarez, Claudia; Amorós, José Ernesto; Urbano, David	2014	Regulations and Entrepreneurship: Evidence from Developed and Developing Countries	Innovar	10.15446/innovar.v24n1spe.47548
Garcia-Posada, Miguel; Mora-Sanguinetti, Juan S.	2014	Entrepreneurship and Enforcement Institutions: Disaggregated Evidence for Spain	SSRN Journal (SSRN Electronic Journal)	10.2139/ssrn.2413422
Lorenzani, Dimitri; Lucidi, Federico	2014	The economic impact of civil justice reforms		10.2765/71090
Lecuna, Antonio	2014	High Income Inequality as a Structural Factor in Entrepreneurial Activity	Journal of Technology Management & Innovation (Journal of technology management & innovation)	10.4067/S0718-27242014000100002
Nyström, Kristina	2014	Business regulation and red tape in the entrepreneurial economy		10.4337/9781783472635.00020
Henley, Andrew	2014	Is Religion Associated with Entrepreneurial Activity?		
Bras, Goncalo; Soukiazis, Elias	2014	The Nature of Entrepreneurship and its Determinants: Opportunity or Necessity?		
Fritsch, Michael; Wyrwich, Michael	2014	The Effect of Regional Entrepreneurship Culture on Economic Development – Evidence for Germany		

Levratto, Nadine; Carre Denis	2014	Regional dynamics and start-ups: Evidence from French departments in 2011		
Daunfeldt, Sven-Olov; Elert, Niklas; Rudholm, Niklas	2013	Start-ups and firm in-migration: evidence from the Swedish wholesale industry	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-012-0536-y
Félix, Elisabete Gomes Santana; Pires, Cesaltina Pacheco; Gulamhussen, Mohamed Azzim	2013	The Determinants of Venture Capital in Europe — Evidence Across Countries	J Financ Serv Res (Journal of Financial Services Research)	10.1007/s10693-012-0146-y
Bacher, Hans Ulrich; Brülhart, Marius	2013	Progressive taxes and firm births	Int Tax Public Finance (International Tax and Public Finance)	10.1007/s10797-012-9218-z
Dreher, Axel; Gassebner, Martin	2013	Greasing the wheels? The impact of regulations and corruption on firm entry	Public Choice	10.1007/s11127-011-9871-2
Qian, Haifeng; Acs, Zoltan J.	2013	An absorptive capacity theory of knowledge spillover entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-011-9368-x
Kalmi, Panu	2013	Catching a wave: the formation of co-operatives in Finnish regions	Small Bus Econ (Small Business Economics)	10.1007/s11187-012-9424-1
Audretsch, David B.; Belitski, Maksim	2013	The missing pillar: the creativity theory of knowledge spillover entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-013-9508-6
Bonaccorsi, Andrea; Colombo, Massimo G.; Guerini, Massimiliano; Rossi-Lamastra, Cristina	2013	University specialization and new firm creation across industries	Small Bus Econ (Small Business Economics)	10.1007/s11187-013-9509-5
Fritsch, Michael; Aamoucke, Ronney	2013	Regional public research, higher education, and innovative start-ups: an empirical investigation	Small Bus Econ (Small Business Economics)	10.1007/s11187-013-9510-z
Stam, Erik	2013	Knowledge and entrepreneurial employees: a country-level analysis	Small Bus Econ (Small Business Economics)	10.1007/s11187-013-9511-y
Lee, In Hyeock; Hong, Eunsuk; Sun, Laixiang	2013	Regional knowledge production and entrepreneurial firm creation: Spatial Dynamic Analyses	Journal of Business Research	10.1016/j.jbusres.2013.02.037
Stenholm, Pekka; Acs, Zoltan J.; Wuebker, Robert	2013	Exploring country-level institutional arrangements on the rate and type of entrepreneurial activity	Journal of Business Venturing	10.1016/j.jbusvent.2011.11.002
Cumming, Douglas; Li, Dan	2013	Public policy, entrepreneurship, and venture capital in the United States	Journal of Corporate Finance	10.1016/j.jcorpfin.2013.09.005
Autio, Erkko; Pathak, Saurav; Wennberg, Karl	2013	Consequences of cultural practices for entrepreneurial behaviors	J Int Bus Stud (Journal of International Business Studies)	10.1057/jibs.2013.15
Baughn, C. Christopher; Neupert, Kent E.; Sugheir, Jeffrey S.	2013	Domestic migration and new business creation in the United States	Journal of Small Business & Entrepreneurship	10.1080/08276331.2012.761799
Wennberg, Karl; Pathak, Saurav; Autio, Erkko	2013	How culture moulds the effects of self-efficacy and fear of failure on entrepreneurship	Entrepreneurship & Regional Development	10.1080/08985626.2013.862975

Wyrwich, Michael	2013	The Role of Regional Conditions for Newly Emerging KIBS Industries in the Face of Radical Institutional Change	European Planning Studies	10.1080/09654313.2012.753694
Fritsch, M.; Noseleit, F.	2013	Investigating the anatomy of the employment effect of new business formation	Cambridge Journal of Economics	10.1093/cje/bes030
Qian, Haifeng; Acs, Zoltan J.; Stough, Roger R.	2013	Regional systems of entrepreneurship: the nexus of human capital, knowledge and new firm formation	Journal of Economic Geography	10.1093/jeg/lbs009
Campbell, Noel; Mitchell, David T.; Rogers, Tammy M.	2013	Multiple measures of US entrepreneurial activity and classical liberal institutions	Journal of Entrepreneurship and Public Policy	10.1108/20452101311318648
Pathak, Saurav; Goltz, Sonia; W. Buche, Mari	2013	Influences of gendered institutions on women ' s entry into entrepreneurship	Int Jrnl of Ent Behav & Res (International Journal of Entrepreneurial Behavior & Research)	10.1108/IJEBR-09-2011-0115
Neupert, Kent E.; Baughn, C. Christopher	2013	Immigration, education and entrepreneurship in developed countries	Journal of Enterprising Comm (Journal of Enterprising Communities: People and Places in the Global Economy)	10.1108/JEC-12-2011-0033
Dutta, Nabamita; S. Sobel, Russell; Roy, Sanjukta	2013	Entrepreneurship and political risk	Journal of Entrepreneurship and Public Policy	10.1108/JEPP-03-2012-0018
Clercq, Dirk de; Lim, Dominic S.K.; Oh, Chang Hoon	2013	Individual-Level Resources and New Business Activity: The Contingent Role of Institutional Context	Entrepreneurship Theory and Practice	10.1111/j.1540-6520.2011.00470.x
Zelekha, Yaron	2013	The Effect of Immigration on Entrepreneurship	Kyklos	10.1111/kykl.12031
Breitenecker, Robert J.; Weyh, Antje	2013	Modelling regional start-up activity in Austria and Germany: a comparison of traditional and spatial econometric methods	IJEV (International Journal of Entrepreneurial Venturing)	10.1504/IJEV.2013.053594
Amezcua, Alejandro S.; Grimes, Matthew G.; Bradley, Steven W.; Wiklund, Johan	2013	Organizational Sponsorship and Founding Environments: A Contingency View on the Survival of Business-Incubated Firms, 1994–2007	AMJ (Academy of Management Journal)	10.5465/amj.2011.0652
Alessandra Colombelli; Francesco Quatraro	2013	New Firm Formation and the properties of local knowledge bases: Evidence from Italian NUTS 3 regions		
Backman; Mikaela	2013	The Influence of Diversity on the Formation, Survival and Growth of New Firms		
Mednzoa Abarca, Karla	2013	Essays on Social Venture Antecedents, Consequences, and Strategies		

Morgan, Horatio M.	2013	Credit Unions, Consolidation and Small Business Lending: Evidence from Canada		
Khanin, Dmitry; Ogilvie, Kristie; Leibsohn, David	2012	International entrepreneurship, venture capital networks, and reinvestment decisions	J Int Entrep (Journal of International Entrepreneurship)	10.1007/s10843-012-0085-6
Aidis, Ruta; Estrin, Saul; Mickiewicz, Tomasz Marek	2012	Size matters: entrepreneurial entry and government	Small Bus Econ (Small Business Economics)	10.1007/s11187-010-9299-y
Acs, Zoltan J.; Audretsch, David B.; Braunerhjelm, Pontus; Carlsson, Bo	2012	Growth and entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-010-9307-2
Rogers, Tammy M.	2012	Bank market structure and entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-011-9320-0
Dohse, Dirk; Walter, Sascha G.	2012	Knowledge context and entrepreneurial intentions among students	Small Bus Econ (Small Business Economics)	10.1007/s11187-011-9324-9
Piergiovanni, Roberta; Carree, Martin A.; Santarelli, Enrico	2012	Creative industries, new business formation, and regional economic growth	Small Bus Econ (Small Business Economics)	10.1007/s11187-011-9329-4
Audretsch, David B.; Hülsbeck, Marcel; Lehmann, Erik E.	2012	Regional competitiveness, university spillovers, and entrepreneurial activity	Small Bus Econ (Small Business Economics)	10.1007/s11187-011-9332-9
Lee, Seung-Hyun; Yamakawa, Yasuhiro	2012	Forgiving Features for Failed Entrepreneurs vs. Cost of Financing inBankruptcies	Manag Int Rev (Management International Review)	10.1007/s11575-011-0112-1
Li, Yong; Zahra, Shaker A.	2012	Formal institutions, culture, and venture capital activity: A cross-country analysis	Journal of Business Venturing	10.1016/j.jbusvent.2010.06.003
Anokhin, Sergey; Wincent, Joakim	2012	Start-up rates and innovation: A cross-country examination	J Int Bus Stud (Journal of International Business Studies)	10.1057/jibs.2011.47
Cumming, Douglas; Knill, April	2012	Disclosure, venture capital and entrepreneurial spawning	J Int Bus Stud (Journal of International Business Studies)	10.1057/jibs.2012.9
Feldman, Maryann; Zoller, Ted D.	2012	Dealmakers in Place: Social Capital Connections in Regional Entrepreneurial Economies	Regional Studies	10.1080/00343404.2011.607808
Bishop, Paul	2012	Knowledge, diversity and entrepreneurship: a spatial analysis of new firm formation in Great Britain	Entrepreneurship & Regional Development	10.1080/08985626.2011.617786
Santarelli, Enrico; Tran, Hien Thu	2012	Growth of Incumbent Firms and Entrepreneurship in Vietnam	Growth Change (Growth and Change)	10.1111/j.1468-2257.2012.00601.x
Wyrwich, Michael	2012	Regional Entrepreneurial Heritage in a Socialist and a Postsocialist Economy	Economic Geography	10.1111/j.1944-8287.2012.01166.x
Munemo, Jonathan	2012	ENTREPRENEURSHIP IN DEVELOPING COUNTRIES: IS AFRICA DIFFERENT?	J. Dev. Entrepreneurship (Journal of Developmental Entrepreneurship)	10.1142/S1084946712500045

Zhao, Xiangyang; Li, Hai; Rauch, Andreas	2012	Cross-Country Differences in Entrepreneurial Activity: The Role of Cultural Practice and National Wealth	Frontiers of Business Research in China	10.3868/s070-001-012-0021-0
Nyström, Kristina	2012	Regional Institutional Environment and New Firm Formation		10.4337/9781781953549.00015
Delmar, Frédéric; Wennberg, Karl; Hellerstedt, Karin	2011	Endogenous growth through knowledge spillovers in entrepreneurship: an empirical test	Strategic Entrepreneurship Journal	10.1002/sej.114
Audretsch, David; Falck, Oliver; Heblich, Stephan	2011	Who's got the aces up his sleeve? Functional specialization of cities and entrepreneurship	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-009-0353-0
Acosta, Manuel; Coronado, Daniel; Flores, Esther	2011	University spillovers and new business location in high-technology sectors: Spanish evidence	Small Bus Econ (Small Business Economics)	10.1007/s11187-009-9224-4
Pinillos, María-José; Reyes, Luisa	2011	Relationship between individualist–collectivist culture and entrepreneurial activity: evidence from Global Entrepreneurship Monitor data	Small Bus Econ (Small Business Economics)	10.1007/s11187-009-9230-6
Hessels, Jolanda; van Stel, André	2011	Entrepreneurship, export orientation, and economic growth	Small Bus Econ (Small Business Economics)	10.1007/s11187-009-9233-3
Fritsch, Michael; Schroeter, Alexandra	2011	Why does the effect of new business formation differ across regions?	Small Bus Econ (Small Business Economics)	10.1007/s11187-009-9256-9
Chang, Erick P.C.; Chrisman, James J.; Kellermanns, Franz W.	2011	The relationship between prior and subsequent new venture creation in the United States: A county level analysis	Journal of Business Venturing	10.1016/j.jbusvent.2009.05.001
Baptista, Rui; Lima, Francisco; Mendonça, Joana	2011	Establishment of higher education institutions and new firm entry	Research Policy	10.1016/j.respol.2011.02.006
Aldridge, T. Taylor; Audretsch, David	2011	The Bayh-Dole Act and scientist entrepreneurship	Research Policy	10.1016/j.respol.2011.04.006
Amorós, José Ernesto	2011	The Impact of Institutions on Entrepreneurship in Developing Countries		10.1057/9780230295155_8
Vaaler, Paul M.	2011	Immigrant remittances and the venture investment environment of developing countries	J Int Bus Stud (Journal of International Business Studies)	10.1057/jibs.2011.36
Dyck, Andrew; Ovaska, Tomi	2011	Business Environment and New Firm Creation: An International Comparison	Journal of Small Business & Entrepreneurship	10.1080/08276331.2011.10593540
El Harbi, Sana; Grolleau, Gilles; Bekir, Insaf	2011	Chapter 4 Entrepreneurship and Growth: What Causes What?		10.1108/S1048-4736(2011)0000022007
Levie, Jonathan; Autio, Erkko	2011	Regulatory Burden, Rule of Law, and Entry of Strategic Entrepreneurs: An International Panel Study	Journal of Management Studies	10.1111/j.1467-6486.2010.01006.x
KOO, J. U.N.; CHO, KWANG-RAE	2011	New Firm Formation and Industry Clusters: A Case of the Drugs Industry in the U.S	Growth and Change	10.1111/j.1468-2257.2011.00549.x
Fritsch, Michael; Schindele, Yvonne	2011	The Contribution of New Businesses to Regional Employment-An Empirical Analysis	Economic Geography	10.1111/j.1944-8287.2011.01113.x

Barkley, David L.; Dudensing, Rebekka M.	2011	Industrial Legacy Matters: Implications for the Development and Use of Indices of Regional Competitiveness	Economic Development Quarterly	10.1177/0891242410393951
Li, Huaqun; Cheng, Shaoming; Haynes, Kingsley E.	2011	The Employment Effects of New Business Formation: A Regional Perspective	Economic Development Quarterly	10.1177/0891242411407310
Chipalkatti, Niranjan; Doh, Jonathan P.; Rishi, Meenakshi	2011	Institutional quality, knowledge spillovers and entrepreneurship	IJEPEE (International Journal of Economic Policy in Emerging Economies)	10.1504/IJEPEE.2011.043307
Karlsson, Charlie; Backman, Mikaela	2011	Accessibility to human capital and new firm formation	IJFIP (International Journal of Foresight and Innovation Policy)	10.1504/IJFIP.2011.040063
Fritsch, Michael; Schroeter, Alexandra	2011	Does Quality Make a Difference? Employment Effects of High- and Low-Quality Start-Ups		10.2139/ssrn.1858747
Ikeuchi, Kenta; Okamuro, Hiroyuki	2011	Effects of Regional Human Capital Structure on Business Entry: A Comparison of Independent Start-ups and New Subsidiaries in Different Industries		10.4337/9780857934901.00011
Bae, Jonghoon; Wezel, Filippo Carlo; Koo, Jun	2011	Cross-Cutting Ties, Organizational Density, and New Firm Formation in the U.S. Biotech Industry, 1994–98	AMJ (Academy of Management Journal)	10.5465/amj.2011.60263089
Bashir, Saima	2011	A spatial analysis of the role of entrepreneurship in the economic development in Northeast region of the United States		
Belitski, Maksim	2011	ESSAYS ON MACROECONOMICS, SELF-EMPLOYMENT AND SMALL BUSINESS IN CITIES		
Lee, Bumsoo; Gordon, Peter	2011	URBAN STRUCTURE: ITS ROLE IN URBAN GROWTH, NET NEW BUSINESS FORMATION AND INDUSTRIAL CHURN	Region et Developpement	
Saul Estrin, Tomasz Mickiewicz, Ute Stephan	2011	For Benevolence and for Self-Interest: Social and Commercial Entrepreneurial Activity across Nations		
Bjørnskov, Christian; Foss, Nicolai	2010	Economic Freedom and Entrepreneurial Activity: Some Cross-Country Evidence		10.1007/978-3-540-87910-7_10
Suddle, Kashifa; Beugelsdijk, Sjoerd; Wennekers, Sander	2010	Entrepreneurial Culture and its Effect on the Rate of Nascent Entrepreneurship		10.1007/978-3-540-87910-7_11
Uhlaner, Lorraine; Thurik, Roy	2010	Postmaterialism Influencing Total Entrepreneurial Activity Across Nations		10.1007/978-3-540-87910-7_14
Baptista, Rui; Mendonça, Joana	2010	Proximity to knowledge sources and the location of knowledge-based start-ups	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-009-0289-4
Audretsch, David; Dohse, Dirk; Niebuhr, Annekatrin	2010	Cultural diversity and entrepreneurship: a regional analysis for Germany	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-009-0291-x

Clercq, Dirk de; Danis, Wade M.; Dakhli, Mourad	2010	The moderating effect of institutional context on the relationship between associational activity and new business activity in emerging economies	International Business Review	10.1016/j.ibusrev.2009.09.002
Baughn, C. Christopher; Sugheir, Jeff; Neupert, Kent E.	2010	Labor Flexibility and the Prevalence of High-Growth Entrepreneurial Activity 1	Journal of Small Business & Entrepreneurship	10.1080/08276331.2010.10593470
Michelsen, Claus; Wolf, Harald; Schwartz, Michael	2010	Regional Entrepreneurial Opportunities in the Biotech Industry: Exploring the Transition from Award-Winning Nascent Entrepreneurs to Real Start-Ups		10.1080/09654313.2012.753693
Delgado, M.; Porter, M. E.; Stern, S.	2010	Clusters and entrepreneurship	Journal of Economic Geography	10.1093/jeg/lbq010
Fritsch, Michael; Noseleit, Florian; Schindele, Yvonne	2010	The direct and indirect effects of new businesses on regional employment: an empirical analysis	IJESB (International Journal of Entrepreneurship and Small Business)	10.1504/IJESB.2010.033048
Fazio, G.	2010	Competition and entrepreneurship as engines of growth		
Hartog, Chantal; van Stel, André; Storey, David J.	2010	Institutions and entrepreneurship: The role of the rule of law		
Hellerstedt, Karin; Wennberg, Karl	2010	Emergence of Firms: A Sociogeographic Demand Side Perspective		
Johansson, Börje; Karlsson, Charlie; Stough, Roger	2010	Entrepreneurship and regional development		
Kan, Viktoriya	2010	Regional Determinants of New Firm Formation in a Transition Economy: The Case of Uzbekistan		
Klapper, Leora; Amit, Raphael; Guillén, Mauro F.	2010	Entrepreneurship and firm formation across countries		
Wayne, Kevin T.	2010	Determinants of commercial innovation for university technology transfer	Journal of Behavioral Studies in Business	
Geroski, P. A.; Mata, JosÃ©; Portugal, Pedro	2009	Founding conditions and the survival of new firms	Strat. Mgmt. J. (Strategic Management Journal)	10.1002/smj.823
Acs, Zoltan J.; Braunerhjelm, Pontus; Audretsch, David B.; Carlsson, Bo	2009	The knowledge spillover theory of entrepreneurship	Small Bus Econ (Small Business Economics)	10.1007/s11187-008-9157-3
Barbosa, Natália; Eiriz, Vasco	2009	The role of inward foreign direct investment on entrepreneurship	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-007-0050-3
Lippmann, Stephen	2009	LOCAL LABOR MARKET DYNAMICS AND SELF-EMPLOYMENT IN RURAL NEW ENGLAND	Sociological Spectrum	10.1080/02732170902761990

Avdeitchikova, Sofia	2009	False expectations: Reconsidering the role of informal venture capital in closing the regional equity gap1	Entrepreneurship & Regional Development	10.1080/08985620802025962
Bae, J.; Koo, J.	2009	The nature of local knowledge and new firm formation	Industrial and Corporate Change	10.1093/icc/dtn017
Kobeissi, Nada	2009	Impact of the Community Reinvestment Act on New Business Start-Ups and Economic Growth in Local Markets	Journal of Small Business Management	10.1111/j.1540-627X.2009.00280.x
Francis, Bill; Hasan, Iftekhar; Wang, Haizhi	2009	Personal Bankruptcy Law and New Business Formation	Financial Review	10.1111/j.1540-6288.2009.00234.x
Bönte, Werner; Falck, Oliver; Heblich, Stephan	2009	The Impact of Regional Age Structure on Entrepreneurship	Economic Geography	10.1111/j.1944-8287.2009.01032.x
Verheul, Ingrid; Carree, Martin; Santarelli, Enrico	2009	Regional Opportunities and Policy Initiatives for New Venture Creation	International Small Business Journal (International Small Business Journal: Researching Entrepreneurship)	10.1177/0266242609338757
Kobeissi, Nada; Wang, Haizhi	2009	Venture capital and economic growth in the local markets	IJPSPM (International Journal of Public Sector Performance Management)	10.1504/IJPSPM.2009.029122
Mojica, Maribel N.	2009	Examining the role of entrepreneurship in economic development in Appalachia		
Grek, Jenny; Karlsson, Charlie; Klaesson, Johan	2009	Market Potential and New Firm Formation		
Mojica, Maribel; Gebremedhin, Tesfa; Schaeffer, Peter	2009	An Empirical Analysis of the Link between Entrepreneurship and Economic Growth in West Virginia		
Ozer, Ugur	2009	The Underpinnings of Finance, Inequality and Growth Nexus: Is There a Link between Credit Constraints, Entrepreneurship and Growth in Turkey?		
Clercq, Dirk de; Hessels, Jolanda; van Stel, André	2008	Knowledge spillovers and new ventures' export orientation	Small Bus Econ (Small Business Economics)	10.1007/s11187-008-9132-z
Okamuro, Hiroyuki	2008	How different are the regional factors of high-tech and low-tech start-ups? Evidence from Japanese manufacturing industries	Int Entrep Manag J (International Entrepreneurship and Management Journal)	10.1007/s11365-007-0062-z
Francis, Bill; Hasan, Iftekhar; Wang, Haizhi	2008	Bank consolidation and new business formation	Journal of Banking & Finance	10.1016/j.jbankfin.2007.11.015
Audretsch, David B.; Bönte, Werner; Keilbach, Max	2008	Entrepreneurship capital and its impact on knowledge diffusion and economic performance	Journal of Business Venturing	10.1016/j.jbusvent.2008.01.006
Bowen, Harry P.; Clercq, Dirk de	2008	Institutional context and the allocation of entrepreneurial effort	J Int Bus Stud (Journal of International Business Studies)	10.1057/palgrave.jibs.8400343

Fritsch, Michael; Schilder, Dirk	2008	Does Venture Capital Investment Really Require Spatial Proximity? An Empirical Investigation	Environ Plan A (Environment and Planning A: Economy and Space)	10.1068/a39353
Naudé, Wim; Gries, Thomas; Wood, Eric; Meintjies, Aloe	2008	Regional determinants of entrepreneurial start-ups in a developing country	Entrepreneurship & Regional Development	10.1080/08985620701631498
TAMÁSY, CHRISTINE; Le HERON, RICHARD	2008	THE GEOGRAPHY OF FIRM FORMATION IN NEW ZEALAND	Tijd voor Econ & Soc Geog (Tijdschrift voor Economische en Sociale Geografie)	10.1111/j.1467-9663.2008.00438.x
McMullen, Jeffery S.; Bagby, D. Ray; Palich, Leslie E.	2008	Economic Freedom and the Motivation to Engage in Entrepreneurial Action	Entrepreneurship Theory and Practice	10.1111/j.1540-6520.2008.00260.x
Dudensing, Rebekka M.	2008	Benchmarking Regional Competitiveness: The Role of a Region's Economic Legacy in Determining Competitiveness		
Hennessy, Dean A.	2008	External entry and the evolution of clusters: a study of the biotechnology industry in Canada		
Nyström, Kristina	2007	An industry disaggregated analysis of the determinants of regional entry and exit	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-007-0130-x
Uhlaner, Lorraine; Thurik, Roy	2007	Postmaterialism influencing total entrepreneurial activity across nations	J Evol Econ (Journal of Evolutionary Economics)	10.1007/s00191-006-0046-0
Levie, Jonathan	2007	Immigration, In-Migration, Ethnicity and Entrepreneurship in the United Kingdom	Small Bus Econ (Small Business Economics)	10.1007/s11187-006-9013-2
Ho, Yuen-Ping; Wong, Poh-Kam	2007	Financing, Regulatory Costs and Entrepreneurial Propensity	Small Bus Econ (Small Business Economics)	10.1007/s11187-006-9015-0
Mueller, Pamela	2007	Exploiting Entrepreneurial Opportunities: The Impact of Entrepreneurship on Growth	Small Bus Econ (Small Business Economics)	10.1007/s11187-006-9035-9
Fritsch, Michael; Falck, Oliver	2007	New Business Formation by Industry over Space and Time: A Multidimensional Analysis	Regional Studies	10.1080/00343400600928301
Brixy, Udo; Grotz, Reinhold	2007	Regional patterns and determinants of birth and survival of new firms in Western Germany	Entrepreneurship & Regional Development	10.1080/08985620701275510
Audretsch, David B.; Keilbach, Max	2007	The localisation of entrepreneurship capital: Evidence from Germany	Papers Regional Science (Papers in Regional Science)	10.1111/j.1435-5957.2007.00131.x
Kirchhoff, Bruce A.; Newbert, Scott L.; Hasan, Iftekhar; Armington, Catherine	2007	The Influence of University R & D Expenditures on New Business Formations and Employment Growth	Entrepreneurship Theory and Practice	10.1111/j.1540-6520.2007.00187.x
Cumming, Douglas J.; Dai, Na	2007	Local Bias in Venture Capital Investments	SSRN Journal (SSRN Electronic Journal)	10.2139/ssrn.1034222

Gabe, T. M.	2007	Local Economic Instability and Business Location: The Case of Maine	Land Economics	10.3368/le.83.3.398
Choi, Young Rok; Phan, Phillip H.	2006	The Influences of Economic and Technology Policy on the Dynamics of New Firm Formation	Small Bus Econ (Small Business Economics)	10.1007/s11187-005-5989-2
Mueller, P.	2006	Entrepreneurship in the Region: Breeding Ground for Nascent Entrepreneurs?	Small Bus Econ (Small Business Economics)	10.1007/s11187-006-6951-7
Verheul, Ingrid; van Stel, André; Thurik, Roy	2006	Explaining female and male entrepreneurship at the country level	Entrepreneurship & Regional Development	10.1080/08985620500532053
Alfaro, Laura; Charlton, Andrew	2006	International financial integration and entrepreneurship		
Acs, Zoltan J.; Plummer, Lawrence A.	2005	Penetrating the ``knowledge filter'' in regional economies	Ann Reg Sci (The Annals of Regional Science)	10.1007/s00168-005-0245-x
Rocha, Hector O.; Sternberg, Rolf	2005	Entrepreneurship: The Role of Clusters Theoretical Perspectives and Empirical Evidence from Germany	Small Bus Econ (Small Business Economics)	10.1007/s11187-005-1993-9
Wennekers, Sander; van Wennekers, Andr; Thurik, Roy; Reynolds, Paul	2005	Nascent Entrepreneurship and the Level of Economic Development	Small Bus Econ (Small Business Economics)	10.1007/s11187-005-1994-8
Wong, Poh Kam; Ho, Yuen Ping; Autio, Erkko	2005	Entrepreneurship, Innovation and Economic Growth: Evidence from GEM data	Small Bus Econ (Small Business Economics)	10.1007/s11187-005-2000-1
Johansson, Dan	2005	The Turnover of Firms and Industry Growth	Small Bus Econ (Small Business Economics)	10.1007/s11187-005-6446-y
Garrett, Thomas A.; Wall, Thomas J.	2005	Creating a Policy Environment for Entrepreneurs		
Sutaria, Vinod; Hicks, Donald A.	2004	New firm formation: Dynamics and determinants	The Annals of Regional Science	10.1007/s00168-004-0194-9
Acs, Zoltan J.; Armington, Catherine	2004	The impact of geographic differences in human capital on service firm formation rates	Journal of Urban Economics	10.1016/j.jue.2004.03.008
Markman, Gideon D.; Gianiodis, Peter T.; Phan, Phillip H.; Balkin, David B.	2004	Entrepreneurship from the Ivory Tower: Do Incentive Systems Matter?	Journal of technology transfer	10.1023/B:JOTT.0000034127.01889.86
Lee, Sam Youl; Florida, Richard; Acs, Zoltan	2004	Creativity and Entrepreneurship: A Regional Analysis of New Firm Formation	Regional Studies	10.1080/0034340042000280910
Acs, Zoltan; Armington, Catherine	2004	Employment Growth and Entrepreneurial Activity in Cities	Regional Studies	10.1080/0034340042000280938
Audretsch, David B.; Keilbach, Max	2004	Does Entrepreneurship Capital Matter?	Entrepreneurship Theory and Practice	10.1111/j.1540-6520.2004.00055.x
Lorraine Uhlaner; A. Roy Thurik	2004	Post-Materialism: A Cultural Factor Influencing Total Entrepreneurial Activ-ity Across Nations		
Gabe, Todd	2003	Local Industry Agglomeration and New Business Activity	Growth and Change	10.1111/1468-2257.00197
Ovaska, Tomi	2003	Essays on international political economy		10.33915/etd.1885

Miyase Yesim Köksal	2003	Regional Variation in New Firm Formation in Turkey: Cross-Section and Panel Data Evidence		
Armington, Catherine; Acs, Zoltan J.	2002	The Determinants of Regional Variation in New Firm Formation	Regional Studies	10.1080/00343400120099843
Guiso, Luigi; Sapienza, Paola; Zingales, Luigi	2002	Does Local Financial Development Matter?		10.3386/w8923
Joachim Wagner; Rolf Sternberg	2002	Personal and Regional Determinants of Entrepreneurial Activities: Empirical Evidence from the REM Germany		
Uhlaner, Lorraine M.; Thurik, Roy; Hutjes, Jan	2002	Post-materialism as a cultural factor influencing entrepreneurial activity across nations		
Shane, Scott	2001	Technology Regimes and New Firm Formation	Management Science	10.1287/mnsc.47.9.1173.9785
Gabe, Todd	2001	THE EFFECTS OF LOCAL TAXES AND SPENDING ON BUSINESS STARTUPS		
Kangasharju, Aki	2000	Regional variations in firm formation: Panel and cross-section data evidence from Finland*	Papers in Regional Science	10.1111/j.1435-5597.2000.tb01762.x
Dean, Thomas J.; Meyer, G.Dale	1996	Industry environments and new venture formations in U.S. manufacturing: A conceptual and empirical analysis of demand determinants	Journal of Business Venturing	10.1016/0883-9026(95)00109-3
Dean, Thomas J.; Brown, Robert L.	1995	Pollution Regulation as a Barrier to New Firm Entry: Initial Evidence and Implications for Future Research	AMJ (Academy of Management Journal)	10.5465/256737
Whittington, R. C.	1984	Regional bias in new firm formation in the UK	Regional Studies	10.1080/09595238400185241

Appendix I. Interview guideline for ecosystem actors

1. Please describe your activities related to entrepreneurship.
2. Please describe the goals related to entrepreneurship, that you and your organization are pursuing. Please describe, how you try to achieve them.
3. Please describe the organization, that you work for.
4. Please name and describe the actors that you and your organization collaborate with in terms of entrepreneurship.
5. Do you know start-up competitions in this region? If so, what are they and do you collaborate with them in any manner?
6. How would you assess these competitions regarding their influence on the participants?
    a. (if applicable) Are there differences between different types of competitions?
    b. (if applicable) Do you promote the participation in these competitions in your work with entrepreneurs?
7. What role do start-up competitions in this region and for the entrepreneurs and actors that are related to entrepreneurship?
8. Please describe the ‚climate' and the circumstances for entrepreneurship in this region.
    a. (if applicable) How do you think the circumstances are here, comparted to other regions?
9. Which are the central actors for starting a new business or growing a business in this region?
10. Which are the best connected actors in terms of entrepreneurship in this region? And why them?
11. Where do you see the (respective) start-up competition in this 'ecosystem'?
    a. How well connected is it and to whom?
    b. How central of crucial is it for the ecosystem?
12. Thank you very much. At the end, I would like to kindly as you, if you have contact to other actors in this region, that are in your opinion relevant for this topic, or entrepreneurs who participated in the competition, and that you could give me a contact or an introduction to.

Appendix J. Interview guideline for entrepreneurs

1. How did it come out, that you decided to become an entrepreneur?
2. Please describe your current business / start-up idea and in what phase of the realization you are currently in.
3. Did you receive any kind of support for your business / start-up from any side? If so, please describe which and from whom.
4. Please describe your participation in the (respective) start-up competition.
    a. (if not mentioned) How did you hear about it?
    b. (if not mentioned) Why did you participated?
    c. (if not mentioned) How did you hear about it?
    d. (if not mentioned) Please describe the procedure.
    e. (if not mentioned) What position did you achieve?
    f. (if not mentioned) What documents did you have to submit? Did you had them before or were they written for the competition?
5. Please describe the effects that the participation had on your business or the process of setting up the new business.
    a. (if not mentioned) What learnings were made?
    b. (if not mentioned) What contacts were made?
    c. (if not mentioned) Have you been contacted afterwards due to your participation, e.g. press, investors?
6. Did you also participate in other competitions? If so, please describe them.
    a. (if not mentioned) Please name them.
    b. (if not mentioned) Please describe their procedure.
    c. (if not mentioned) What learnings were made?
    d. (if not mentioned) What contacts were made?
    e. (if not mentioned) Have you been contacted afterwards due to your participation, e.g. press, investors?
    f. (if not mentioned) How would you rate it, compared to the other competition(s)?
7. Please describe the ‚climate' and the circumstances for entrepreneurship in this region.
    a. (if applicable) How do you think the circumstances are here, comparted to other regions?

8. Which are the central actors for starting a new business or growing a business in this region?
9. Which are the best connected actors in terms of entrepreneurship in this region? And why them?
10. Where do you see the (respective) start-up competition in this 'ecosystem'?
    b. How well connected is it and to whom?
    c. How central of crucial is it for the ecosystem?
11. Thank you very much. At the end, I would like to kindly as you, if you have contact to other actors in this region, that are in your opinion relevant for this topic, or entrepreneurs who participated in the competition, and that you could give me a contact or an introduction to.

Appendix K. List of codes

CODE	N
1 Supplementary information	437
1.1 Business planning in general	53
1.2 Other competitions	69
1.3 Personal information on interviewee	70
1.3.1 Background (job / education)	8
1.3.2 Entrepreneurs in family / environment?	32
1.3.3 Support by environment	10
1.3.4 Motivation / reason for becoming an entrepreneur	10
1.3.5 Origin interviewee	4
1.3.6 Serial entrepreneur?	6
1.4 General information on competition	111
1.4.1 Changes over time	18
1.4.2 Number participants / applications	7
1.4.3 Awarding ceremony	13
1.4.4 Additional coaching	14
1.4.5 Procedure / structure competition	59
1.5 General information on start-up	134
1.5.1 Origin of founders	3

1.5.2 Start (year) of idea	15
1.5.3 Number of employees	7
1.5.4 Number of founders	15
1.5.5 Formal foundation? (yes, no, year?)	32
1.5.6 Type of foundation (spin-off, university, PhD, company, necessity)	10
1.5.7 Background founders	23
1.5.8 Supported / financed by..?	29
2 General information on Ecosystem	446
2.1 Bureaucracy	8
2.2 Support programs (Exist, Grants, etc.)	33
2.3 Actors in EE	121
2.4 Description and assessment of the work of actors	139
2.5 Perceived quality of EE (advantages, problems, networks)	145
3 Influence of Ecosystem on SUC	46
4 SUC Participation – Why, how made aware?	128
4.1 Motivation for participation	70
4.2 How made aware of / who advertises SUC	58
5 Role of SUC in EE	143
5.1 Differentiation SUC to other sub-networks	38
5.2 Awareness of SUC in local scene	47
5.3 Networking of actors through SUC	24
6 Who is coach / judge at SUC	34
7 Influence SUC on Participants	477
7.1 Prices, money, videos, trips	30
7.2 Who wins / who has best chances?	43
7.3 Perception of effects SUC has on participants	92
7.4 Networking of participants through SUC (among themselves / with actors)	69
7.5 ‚Force' to focus on business / business model through SUC	24
7.6 PR-effects/ contacts made afterwards/ 'seal of approval'	80
7.7 Start-up-feeling / motivation	14
7.8 Learnings (coaching, feedback, pitch, information material)	125
SUM	1677

Appendix L. Membership scores for all cases of the fsQCA

Interview No Paper	fs_Outcome-Learning	fs_Interactive	fs_Prior-Entrepreneurial	fs_Prior-Industry	fs_Prior-Management	fs_Wettbewerb-(0=Berlin)
1	0,6	0,6	0,4	0,6	0,2	0
2	0,4	0,6	0	0	0,2	0
3	1	1	0	0	0,4	0
4	0,6	0,8	0	0	0	0
5	0	0,2	0,8	0,8	0,2	0
6	0,6	0,6	0,6	1	0	0
7	0,2	0,4	0,4	0	0	0
8	0,2	0	0	0,8	0	0
9	0,2	0,6	0,4	1	0,8	0
10	0,4	0,4	0	0,8	0,2	0
11	0,4	0	0,2	0,8	0,8	0
12	0,2	0,8	0	0,8	0,6	0
13	0	0	0,8	0,6	1	0
14	0,6	0,8	0,6	0,8	0,8	0
15	0,8	0,6	0	0,4	0,8	1
16	0,4	0,8	0,6	0,4	0	1
17	0,6	0,8	0	0,6	0	1
18	0,6	1	0	0,2	0,6	1
19	0	0,2	0,6	0,8	0,2	1
20	0,6	0,4	0	0,2	1	1
21	1	1	0	0,4	0,4	1
22	0,8	0,8	0	0,8	0	1
23	0,2	0,6	0	0,8	0,2	1
24	0,6	0,4	0,6	1	0,4	1
25	0,6	0,6	0,6	0,2	0	1
26	0,2	0,4	0,6	0,8	1	1

Short curriculum vitae

Lennard Stolz (* 30th September, 1993) is a research associate at the Institute of Economic and Cultural Geography at Leibniz Universität Hannover. He is a member of the German team of the Global Entrepreneurship Monitor (GEM) and is responsible for data collection and analysis at GEM Germany. Previously, he held a position as a consultant at Kantar Germany, where he was responsible for client advisory and supervising market and opinion research projects. From May 2020 to January 2022 he led the student group of UNICEF in Hannover. Lennard received his higher education entrance qualification in July 2012 from Gymnasium Tellkampfschule Hannover and received his bachelor's degree in Geography and his master's degree in Economic Geography from Leibniz University Hannover.

List of publications

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