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Fostering Entrepreneurial Ecosystems and the Choice of Location for New Companies in Rural Areas – the Case of Germany

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Startup ecosystems have become a popular field of research in recent years, not only for researchers but also for regional policy makers. Contemporary research on startup ecosystems generally focuses on urban areas and hubs such as Silicon Valley, Berlin, or Tel Aviv. However, little is known about startup ecosystems in rural areas. To fill this research gap, the research objective of this paper is to analyse disparities between entrepreneurial ecosystems in urban and rural areas in general and specifically in Germany. The major aim of this study is to examine the importance and development of startups in urban and rural areas and to identify challenges and opportunities for rural areas in order to set the right impulses. The research focus of this paper is to discuss which stakeholders and determinants affect the founders in their location decision. Using German Startup Monitor (DSM) 2019 data, it is found that the lack of network ties and opportunities to collaborate with established corporations; availability of qualified personnel; access to venture capital; an investment and economic policy initiative appear to be obstacles that prevent founders from starting up in rural areas in Germany. The results also confirm the findings of other studies that entrepreneurship tends to be an urban event. This study also provides suggestions for future research.

Introduction

Entrepreneurship makes an important contribution to the development of an economic region. Due to their influence on competitiveness, innovation and knowledge transfer, entrepreneurial activities have an immediate impact on regional economic development and is considered an engine of regional growth. Consequently, there is an academic and political interest in understanding entrepreneurial activities in general and the regional factors that influence emergence and development of entrepreneurial ecosystems, in particular (Ács & Szerb, 2007; Fornahl, 2003; Stam, 2009; Sternberg, 2009).

Several studies show that the subject of regional entrepreneurship is a complex topic with multiple independent variables as well as dependent variables and interactions among them playing an important role in entrepreneurial processes. Only a few studies have focused on analysing regional variations or specific entrepreneurial ecosystems in the context of entrepreneurial activities in Germany (e.g. Baron & Harima, 2019; Kuckertz et al., 2018; Sternberg

& Litzenberger, 2004; Stuetzer et al., 2014; Tamásy, 2006; Wyrwich et al., 2016). In Germany, the few studies that focus on interregional differences in entrepreneurial activities have mainly used secondary data sets collected for other purposes (Tamásy, 2006).

As we still know little about how entrepreneurial ecosystems function and what the associated policy challenges are, it is important to explore the key elements of entrepreneurial ecosystems and their specific roles within these ecosystems in more detail (Audretsch et al., 2019; Autio & Levie, 2017; Tripathi et al., 2019). Besides analysing key stakeholders of entrepreneurial ecosystems, it is also of utmost relevance to examine and identify other determinants, such as particular pull factors (Autio & Cao, 2019; Baron & Harima, 2019).

The purpose of this paper is to examine the importance and development of startups in urban and rural areas in Germany and to identify challenges and opportunities for rural areas in order to set the right impulses. It also focusses on the determinants that affect the choice of location for startups in rural areas. The three central research questions

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in this paper are:

- How do rural areas differ from urban areas in the context of entrepreneurial activities?
- What factors affect the regional distribution of startups?
- What measurements need to be taken in order to foster entrepreneurial ecosystems in rural areas?

This paper contributes to the existing entrepreneurship literature by further opening the black box regarding entrepreneurial ecosystems in rural German areas. A special focus is hereby put on the key stakeholders and dynamics that lead to innovation activities and to the transformation and growth of these regional entrepreneurial ecosystems (Doloreux & Dionne, 2008).

In this paper, we present an empirical analysis of the entrepreneurial landscape in Germany with a particular focus on entrepreneurial ecosystems in rural areas.

We begin with a brief literature review and a description of a regional entrepreneurial ecosystem. In the next sections we elaborate on key definitions and key stakeholders of startup ecosystems. After the presentation and discussion of the results, we finish with the sections policy implication and conclusion, limitations and future research.

Literature review

Starting up a business is considered a regional or local event. The existing literature emphasizes the relationship between entrepreneurial activities and regional development. However, it is important to note that entrepreneurial activities are not evenly distributed across countries or regions (Armington & Ács, 2002; Stam, 2009; Sternberg, 2009; Stuetzer et al., 2014).

Most research done on entrepreneurial ecosystems focuses on the national level (Sternberg & Litzenger, 2004), urban areas or entrepreneurial hotspots such as Silicon Valley (Pique et al., 2018), Berlin (Baron & Harima, 2019) or Tel Aviv (Fraiberg, 2017). Current research highlights the necessity to analyse the development, differences and governance of entrepreneurial ecosystems because a better understanding of entrepreneurial ecosystems is of high political interest (Ács et al., 2018; Audretsch et al., 2019).

Of the total number of all cities in the Federal Republic of Germany, 80 cities are assigned to the “large city” category. The remaining cities in Germany are medium-sized or small cities (Statistisches Bundesamt (Destatis), 2018). These medium-sized and small cities are primarily located in rural areas. Even though the majority of startup activities in Germany take place in the metropolitan areas of large cities, current entrepreneurship research shows that not only large cities, but also medium-sized and small towns have the potential to establish themselves as successful technology locations in the future due to various influencing factors (e.g., more favourable rents and land prices) (Fritsch, 2019; Kollmann et al., 2019).

With reference to the German Federal Institute for Research on Building, Urban Affairs and Spatial development rural areas in Germany are defined as regional areas with a population density of less than 150 inhabitants per km².

There are many reasons why startups prefer to locate in metropolitan areas in Germany. The founding of a company is considered a regional or local event. Founders usually start their own company where they feel a local connection. This can be either the place of birth, the workplace, the place of residence or the embedding in social networks (Stam, 2009). Bosma and Sternberg conclude that startups are more common in urban regions based on perceived opportunities than in non-urban areas (Bosma & Sternberg, 2014).

Whereas in the USA, the motto “fail often, fail fast, and fail cheap” is well known, in Germany failures or insolvencies create a socially stigmatized situation. In addition, in comparison with the USA, Germany is lagging in terms of willingness to found new businesses. Another major difference between the US startup landscape and the German startup landscape is that German startups are forced to expand early, due to the fact that Germany has a relatively small domestic market (Konrad Adenauer Stiftung, 2011; McKinsey & Company, 2018).

Developing prosperous innovation regions is a common goal of policy makers in Germany at a national but also regional level. In this context an entrepreneur creates an innovation and has the ability to fully implement it on the market (Autio et al., 2014; Florida et al., 2017; Kollmann et al., 2019). Research indicates that it takes more than just top-down policy interventions to foster entrepreneurial activities and to build entrepreneurial ecosystems (Boschma, 2009; Mason & Brown, 2014; Sternberg, 2012). Bottom-up actions, such as increased network activities between regional startups and other stakeholders, are sometimes more effective (Mason & Brown, 2014; Thompson et al., 2018). A well-functioning innovation region has the capability to strengthen and renew itself in the long term (Etzkowitz & Klofsten, 2005).

Defining entrepreneurial ecosystems

In order to understand the determinants that affect the founders’ choice of location, it is crucial to have a common understanding of the term entrepreneurial ecosystems. Entrepreneurship research lacks a commonly accepted definition of the term “entrepreneurial ecosystem” (Audretsch et al., 2019; Brown & Mason, 2017; Molina & Maya, 2017; Stam, 2014).

[Table 1](#) highlights a few selected definitions which also apply to German startup ecosystems.

Though several different definitions of the term “entrepreneurial ecosystems” exist, most definitions commonly emphasize the relevance of proximity and interdependencies among different stakeholders and key factors within the entrepreneurial ecosystem (Brown & Mason, 2017). As each entrepreneurial ecosystem has its own network structure, it is different and unique. This also leads to the issue that fostering entrepreneurial activities is a complex process (Kuckertz et al., 2018; Roundy et al., 2018).

An entrepreneurial ecosystem can be described by six significant characteristics (see [Figure 1](#)). It is a network that includes several interdependent actors within a geographic region whose interactions lead to knowledge transfer and new venture creation (Ács et al., 2014; Brown & Mason,

Table 1. Definition of the term startup ecosystem

Source	Definition
Ács et al., 2014	“dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures.”
Cohen, 2006	“[...] a diverse set of inter-dependent actors within a geographic region that influence the formation and eventual trajectory of the entire group of actors and potentially the economy as a whole [which] evolve through a set of interdependent components which interact to generate new venture creation over time”
Isenberg, 2011	“Entrepreneurship, to be self-sustaining, requires an ecosystem, and an ecosystem requires proximity so the different domains can evolve together and become mutually reinforcing. Entrepreneurship education can support capital formation, and capital formation can support government reform.”
Stam, 2015	“a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship.”

2017; Cohen, 2006; Isenberg, 2011). Entrepreneurship research almost exclusively focuses on ecosystems in urban areas. Research shows that entrepreneurship tends to be higher in urban areas than in other areas (Bosma & Sternberg, 2014). However, many unknown world market leaders, so-called “hidden champions” are based on rural areas (Lehmann et al., 2019).

Even though research on entrepreneurial ecosystem has increased significantly over the last decade, many aspects regarding the concept of entrepreneurial ecosystems remain unclear (Autio & Levie, 2017). To understand how an entrepreneurial ecosystem is structured and how it evolves, it is necessary to identify the stakeholders of this system. Based on existing literature we identify eight relevant actors within an entrepreneurial ecosystem as shown in [Figure 2](#) (Isenberg, 2011; Malecki, 2018; Tripathi et al., 2019).

[Figure 2](#) shows that the startup at the heart of the entrepreneurial ecosystem can be directly linked to all other stakeholders involved in the ecosystem. Startups do not necessarily have to build relationships with all stakeholders. However, the more relationships that a startup builds with other stakeholders, the higher the chance of surviving (Cukier & Kon, 2018; Mason & Brown, 2014).

Relevant actors and factors of German entrepreneurial ecosystems

With reference to the triple-helix-model by Etzkowitz & Klofsten (2005), universities, industries and policy-makers play a crucial role in building entrepreneurial ecosystems. In Germany, higher education institutions (HEI) are mainly universities, universities of applied sciences, and colleges of art and music. Most HEI in Germany are financed by the Federal Government and the 16 federal states. Many of these HEI offer entrepreneurial education and help students develop entrepreneurial skills. However, whereas in the USA HEI can be described as startup hubs and are considered excellent financial resources for startups, in Germany, no university funds with sufficient capital and adequate risk aversion and startup affinity exist (Konrad Adenauer Stiftung, 2011; McKinsey & Company, 2018).

The importance of entrepreneurship for the development of national and regional economies is widely recognized by politicians in Germany. Consequently, since the early 1990s, there have been numerous national and re-



Figure 1. Characteristics of an entrepreneurial ecosystem

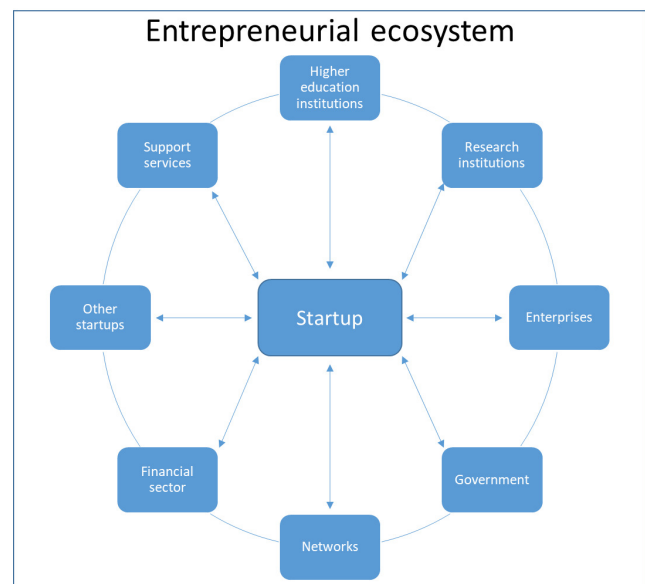


Figure 2. Main actors of an entrepreneurial ecosystem

gional policy initiatives aimed at promoting startups and their growth (Tamásy, 2006).

Table 2. Nationwide support programs for business start-ups in Germany

Type	Titel	Funding organisation
Grant	EXIST start-up grant	Project Management Agency Jülich
Grant	EXIST research transfer	Project Management Agency Jülich
Grant	Financial support by consulting services for handicraft enterprises	Chamber of Crafts
Grant	Funding of entrepreneurial know-how through information and training events/workshops	Federal Office of Economics and Export Control (BAFA)
Grant	INVEST - Grant for venture capital	Federal Office of Economics and Export Control (BAFA)
Loan	ERP Start-up Loan - Universal	KfW Banking Group
Loan	ERP capital for start-ups	KfW Banking Group
Loan	RP/EIF Fund	European Investment Fund (EIF)
Loan	European Angels Fund (EAF)	European Investment Fund (EIF)

Source: Piegeler & Röhl, 2015

Besides, network activities are very important in new and existing startups and firms. In the early stage, startups in Germany strive to build regional network ties before engaging in nation-wide network activities. Established companies have a significant influence on the development and existence of entrepreneurial ecosystems, as many of them not only implemented accelerator programs, innovation-labs and startup hubs, but they also collaborate with startups. However, small and medium-sized enterprises (SME) seem to have not yet fully recognized the relevance of collaborating with startups even though collaboration might be considered beneficial for both in many cases (Baharian & Wallisch, 2017). Regarding the financing sector, compared to the USA venture capital is less common in Germany (National Venture Capital Association, 2020; White Star Capital, 2020). For startups in Germany, several funding sources exist on a national and regional level. However, particular funding schemes for startups settling in rural areas are very rare. A selection of examples for funding schemes on the national level is shown in [Table 2](#).

To foster entrepreneurial ecosystems in a German region, it is necessary to attract a sufficient number of startups which are mainly responsible for building an entrepreneurial culture and network structure within a region (Wallisch et al., 2019). This is considered a great challenge for policy makers in German rural areas.

Regional entrepreneurship and innovation systems in a rural context

Pato & Teixeira (2018) explain that “[...] rural spaces extend over regions and areas presenting a variety of activities and landscapes that comprise natural countryside, farmland, villages, small towns, regional centers and industrialized rural areas and incorporate a wide range of activities like farming, commerce, services and small and medium industries.”

Compared to urban areas, rural areas face particular problems regarding fostering entrepreneurial activities. These challenges include geographical, institutional, social,

funding deficiency, poor infrastructure, marketing issues, technical support problems, difficulties in the procurement of raw materials and of human resources (Pato & Teixeira, 2018; Singh, 2020).

With reference to [Figure 2](#), knowledge transfer, for example, through network interaction or capacity building at higher education institutions is a key element of the entrepreneurial ecosystem approach. Specifically, the transfer of tacit knowledge requires a high degree of personal interaction, innovation systems and entrepreneurial ecosystems that are embedded in the regional context (Arnold et al., 2014; Assenza, 2016).

In the literature, however, there are different views on how to understand the importance of spatial proximity in terms of knowledge transfer and innovation creation. Lundvall & Borrás (1998) see a direct connection between proximity and the development of human capital, network formation, knowledge spillovers and synergy effects (Lundvall & Borrás, 1998).

Proximity can help minimize uncertainties through personal trust, which is established through face-to-face contact. In addition, tacit knowledge is often linked to a specific person or location. Physical proximity to this tacit knowledge can result in gaining strategic advantages. Regarding the relationship between innovator and user, physical proximity can create stronger ties (Koschatzky, 2009).

Regional innovation systems (RIS) have increased in relevance as policy has placed a greater focus on localised learning processes in order to give regions a competitive advantage (Doloreux & Parto, 2005). The transfer of knowledge is a key characteristic of a RIS. According to Dreger & Erber (2011), innovation systems can be described as “processes of interactions between people, companies and other institutions [...] by means of information, technology and knowledge exchange using financial resources to jointly create innovations.” As part of their “third mission” to commercialise research and promote the growth of local economies, universities have been given a central role in RIS (Brown, 2016).

The fast-moving competition among companies is

strongly influenced by globalisation. To this reason, it is particularly important for companies to maintain or distinguish themselves in the marketplace through their competitive advantages, among other things. Chung (2002) sees RIS as a "complex of innovation actors and institutions (universities, industrial enterprises, and public research institutions) in a region that are directly related with the generation, diffusion, and appropriation of technological innovation and an interrelationship between these innovation actors. Despite the different definitions, it can be concluded that RIS involve different actors, whose interaction plays a significant role in the creation of innovation.

Large firms engage in the search for and/or the production of economically useful technological and entrepreneurial knowledge as inputs for their ongoing innovation processes (Karlsson & Nyström, 2011). In line with the concept of RIS, entrepreneurial ecosystems are systems in which the degree of collaboration and networks outweigh competition (Audretsch et al., 2019).

Data and results

This section presents the results for the questions posed about how rural areas differ from urban areas in the context of entrepreneurial activities.

Data collection and methodological approach

Our analysis is based on micro data from the German Startup Monitor (DSM) 2019. The German Startup Monitor is a survey being executed every year. It captures the status quo of the development of startups in Germany and describes the German startup ecosystem (Kollmann et al., 2019). 1,933 startups participated in the seventh round of the German Startup Monitor survey. Data were collected between May and June 2019. The DSM was created in 2013 as the first comprehensive study of the startup ecosystem in Germany. In order to compare the startup activities and entrepreneurial context between rural and urban areas, we added variables on NUTS 2 level and NUTS 3 level to the micro data set to indicate whether a startup survey in the German Startup Monitor 2019 study is located in an urban or rural area. NUTS (Nomenclature des Unités Territoriales Statistiques) is a regional classification. For Germany, NUTS 1 subdivides the entire area of Germany into 16 regional areas according to its 16 federal states. NUTS 2 covers 38 regional areas and NUTS 3 more than 400 regional areas (districts) (Brandmueller et al., 2017). In a second step, the data were analysed using a geographic information system (GIS) application.

Results

The descriptive analyses have given a clear picture of how the entrepreneurial landscape in Germany looks like. According to the German Startup Monitor 2019 most startups are located in the state North Rhine-Westphalia (398 startups) followed by Berlin (311), Bavaria (250) and Baden-Württemberg (241). These states are also among the top five in Germany regarding GDP in 2019 (Statista, 2019). The states with the lowest numbers of startups are Saarland (17), Mecklenburg-Vorpommern (19) and Saxony-Anhalt

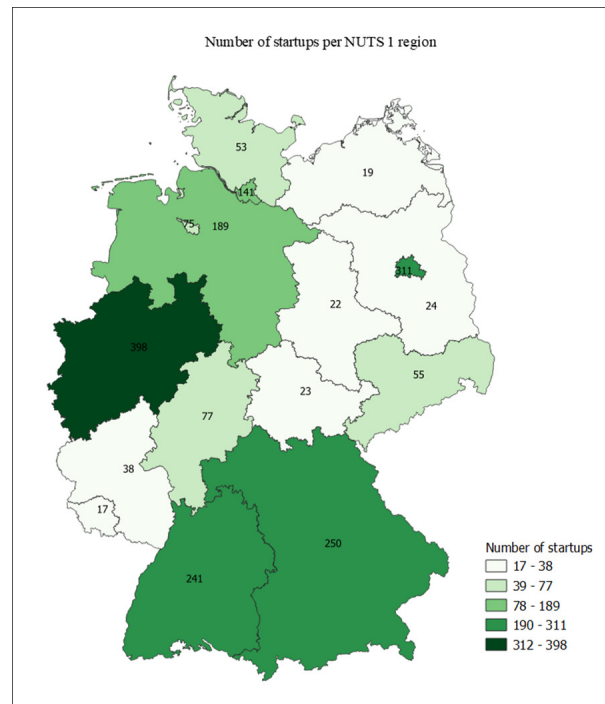


Figure 3. Number of startups by type of region (NUTS1-Level)

Data source: German Startup Monitor 2019

(23). According to the GDP in 2019, these states were, besides Bremen, the states with the lowest GDP (Statista, 2019). This may lead to the conclusion that regional GDP matters for the choice of startup location. Moreover, except the state Saxony (55), the so-called "new states" of Germany of Mecklenburg-Vorpommern (19), Brandenburg (24), Saxony-Anhalt (22) and Thuringia (23) are amongst the five states with the lowest number of startups according to the DSM Survey 2019. This is another indicator for the divergence between the new states of Germany and the old states of Germany.

The analysis of NUTS 2 regions (Figure 4) shows that currently five startup hubs exist in Germany. These hubs are located in Berlin, Hamburg, Munich, the Rhine-Ruhr metropolitan region (Cologne, Düsseldorf, Arnsberg, Münster) and Stuttgart/Karlsruhe. As the number of startups in the regions of Frankfurt and Hannover are also amongst the top startup regions, it can be assumed that the economic situation of the prospect location matters for startup founders.

Analysing the entrepreneurial landscape on the NUTS3 level (Figure 5) we identify regional clusters of startups. It also becomes clear that startups are spread out, but not evenly distributed across the federal states with many federal states accounting for not more than five startups. As the DSM 2019 shows and Figure 5 reveals, many counties reported no startups. As startups are important for the economic development of regions, regional politicians need to find ways to foster entrepreneurial activities.

The results confirm the findings of Bosma & Sternberg (2014) that entrepreneurship tends to be an urban event (Bosma & Sternberg, 2014).

As the results depicted in Figure 6 show, most startups surveyed in this study are located in urban areas. Nation-

ally, only 7.1 % of the startups are located in rural areas. However, the numbers vary across states and geographical location. The amount of rural entrepreneurship is higher in northern states with the highest proportion in Mecklenburg-Vorpommern (68.4 %), Brandenburg (58.3 %), Schleswig-Holstein (39.6 %) and Saxony-Anhalt (31.8 %).

These results become even clearer when taking a closer look at regions at NUTS 2 level (Figure 7). Entrepreneurial activities appear to be more in the northern and eastern parts of Germany and less in the western and southern parts. Looking at the proportion of startups located in rural areas at the NUTS 2 level, the findings reveal that the regions with the highest proportion ($\geq 50\%$) of startups in rural areas, with at least 10 startups, are Mecklenburg-Vorpommern (68.4 %), Brandenburg (58.3 %) and Lüneburg (50 %). To understand why startups are more likely to locate their business in urban areas, it is necessary to take a closer look at determinants that affect the evaluation of regional entrepreneurial ecosystems.

Figure 8 depicts the evaluation of the regional entrepreneurial ecosystem by NUTS 2 regions. It clearly shows that many regions have been rated “good” or “very good” on average, whereas other regions have received lower scores.

The reasons for this divergence are manifold. Taking a closer look at the overall rating separated by startups located in rural areas and startups located in urban areas, the results show that entrepreneurial ecosystems have received a significant higher score (3.64) than entrepreneurial ecosystems in rural areas (2.91). The survey asked the respondents to rate the overall regional entrepreneurial ecosystem as well as several determinants and stakeholders of the regional entrepreneurial ecosystem. These questions covered the topics such as digital infrastructure, network to other startups, collaboration opportunities with established companies, proximity to higher education institutions, and the availability of qualified personnel.

In all key questions related to the evaluation, entrepreneurial ecosystems in urban areas are rated higher than entrepreneurial ecosystems in rural areas. All questions used a 5-point Likert scale response that ranged from strongly poor (1) to very good (5). A summary of the measures used is outlined below (Figure 9).

Figure 9 shows that regional politicians and startups in rural areas face several challenges regarding the development of their business, as does the entire regional entrepreneurial ecosystem. With the exception of the availability of affordable office space significant differences exist between rural and urban areas regarding all other items. According to this question, major challenges that startups in rural areas face are collaboration opportunities with established companies (2.77), the availability of qualified personnel (2.57), access to capital and investment (2.4) and economic policy initiatives such as regional startup hubs (2.87).

The results show that most startup ecosystem in rural German areas cover only a few startups. The reasons for this are multifarious. It can be considered a chicken or egg causality dilemma. As these results reveal, startups are more likely to commence their businesses in regions where they see high market potential, a certain easy of entry and economic stability. As discussed earlier, startups usually

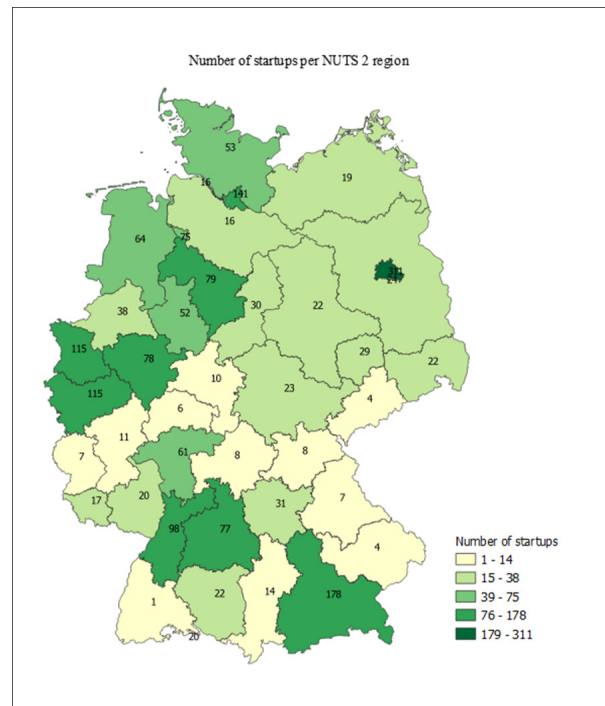


Figure 4. Number of startups by type of region (NUTS2-Level)

Data source: German Startup Monitor 2019

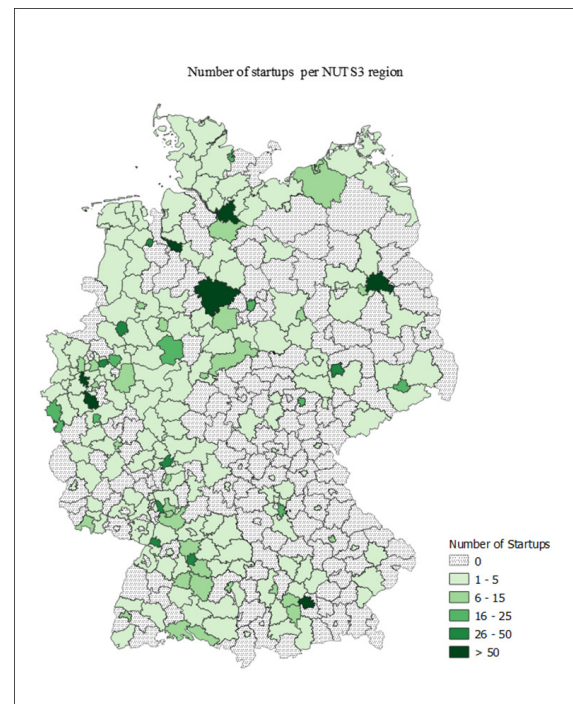


Figure 5. Number of startups by type of region (NUTS3-Level)

Data source: German Startup Monitor 2019

need access to other stakeholders of the entrepreneurial ecosystem, as well as financial support. Without the existence of such particular actors, it is less likely that an entrepreneur would start up a business in such an area. Ad-

ditionally, rural areas need to increase the number of local startups in order to build and sustain an entrepreneurial ecosystem.

As previously described, networks play a crucial role in the success and development of startups and entire entrepreneurial ecosystems. The survey asked respondents whether they collaborate with other startups, established firms or research institutes. The results are shown in Figures 10 and 11. Startups in urban areas and in rural areas are aware of the importance of collaborating with other stakeholder of the entrepreneurial ecosystems. However, the share of startups which collaborate with other startups (48.4 % vs. 57.3 %), established firms (65.6 % vs. 67.2 %) and/or research institutions (45.7 % vs. 55.3 %) tends to be lower in rural compared to urban areas.

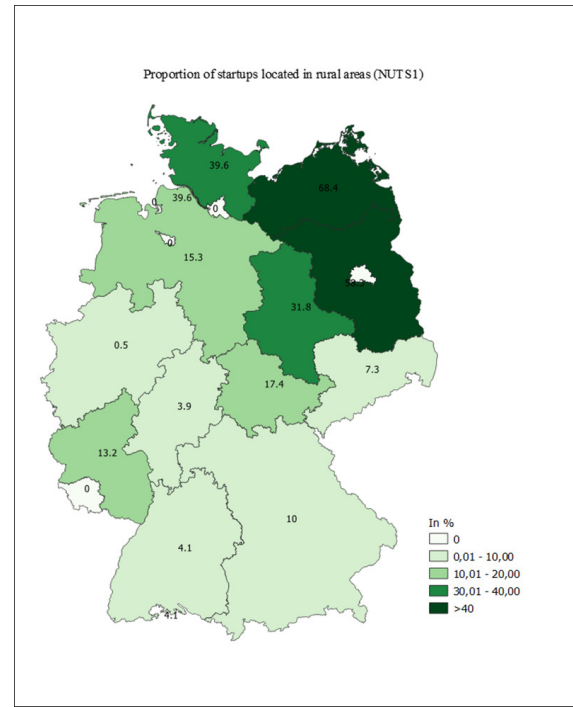
Taking the average number of collaborations with other startups, established firms and research institutions into account shows that even larger regional disparities between startups located in rural and urban areas exist. Whereas startups located in rural areas collaborate on average with 1.32 other startups, 1.89 established firms and 0.67 research institutions, startups in urban areas collaborate on average with 1.94 other startups, 2.81 established firms and 0.96 research institutions. This indicates that the network ties of startups located in rural areas are weaker than startups in urban areas. This also leads to the conclusion that the overall network structure of entrepreneurial ecosystems in rural areas is less strong compared to those in urban areas. Collaboration with other firms and research institutions is crucial for the transfer of knowledge and the creation of innovation; startups in rural areas should strive to strengthen their network ties.

Policy implication

With this paper we investigate the determinants of the choice of location for startups. As the analyses in this article have demonstrated, there is a positive relationship between urban regions and the comparatively high number of startups as well as the better evaluation of the regional entrepreneurial ecosystem.

The results pave the way for several policy implications. It must be the aim of rural communities to support new businesses ventures. The overall results show that a high potential exists for startup ecosystems in rural areas. Reaching a sufficient number of startups appears to be a major problem for rural areas in the context of building startup ecosystems. One action could be the establishment of a local business incubator or close collaboration with an already existing incubator in a nearby region (see George, 2015).

As the analyses show, physical and digital infrastructure play an important role for the development of startup ecosystems in rural areas. However, the recognition of these factors requires local policy makers to promote and execute a specific mix of policy instruments for a particular combination of contexts. Such an approach requires a more detailed assessment of the regional state of the art and is a rather complex process. This can ultimately contribute to more effective policies (Autio et al., 2014). An entrepreneurial governance structure would help regional policy



Conclusion, limitations and future research

The purpose of this paper is to examine the importance and development of startups in urban and rural areas and to identify challenges and opportunities for rural areas.

As the results depicted in the results section show, it can be concluded that the results align with the research questions. Rural areas in Germany differ from urban areas because of several different factors that affect entrepreneurial activities. Besides factors concerning the digital and physical infrastructure, network ties to other actors within the regional startup ecosystem play a crucial role. As the results also highlight, collaborating with other startups, firms or research institutions are crucial for the success and development of startups. Young enterprises and established firms should be aware of the advantages of joining forces with one another. Established companies as well as SME should strive to work together with startups. In particular, many SME still miss out on opportunities that lie with collaborating with startups (Baharian & Wallisch, 2017).

Our results presented are based on a rather small sample of startups in rural areas in Germany covered by the German Startup Monitor 2019. The presentation of this research is based on the DSM 2019. As this survey does not cover data for all districts in Germany and therefore not all urban and rural areas, analyses on NUTS3 level were limited.

As a result of our research, it could be shown that further investigations of the relevance of entrepreneurial ecosystems in rural areas will be promising.

Future research could take a closer look at the network ties within entrepreneurial ecosystems with a special focus on the distinction between urban and rural area. Moreover, as many startups are located in rural areas, even though urban areas appear to be more appealing as location for startups, motives for the decision to startup a business in rural areas should be further examined.

Despite the recent progress made in this research area, some research gaps remain. To better understand the structure and development of entrepreneurial ecosystem an existing black box is how the critical mass of startups required for developing a self-sustaining entrepreneurial ecosystem can be defined. Currently, no clear definition exists of how many startups a startup ecosystem should cover at the minimum level. In addition, our study only focused on Germany. Future studies could therefore apply cross-country research to carve out contrasts among countries or regions to get a better idea of the determinants and stakeholders that affect the process of fostering entrepreneurial ecosystems.

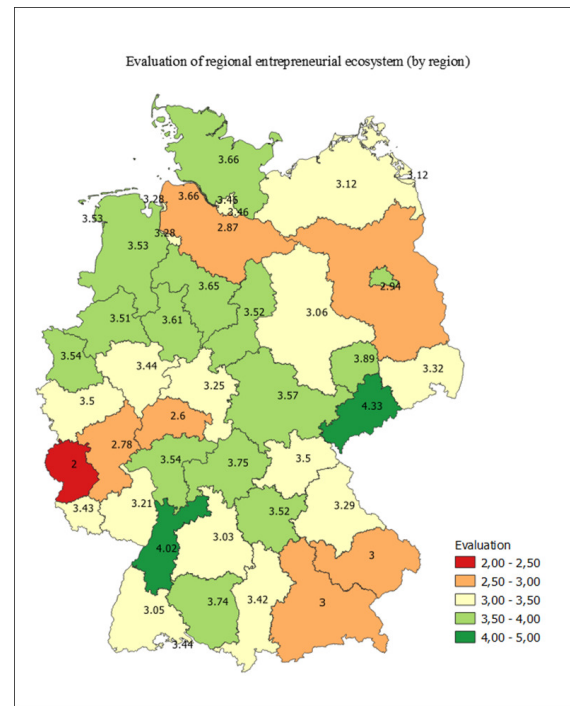


Figure 8. Evaluation by region (NUTS2-Level)

Data source: German Startup Monitor 2019

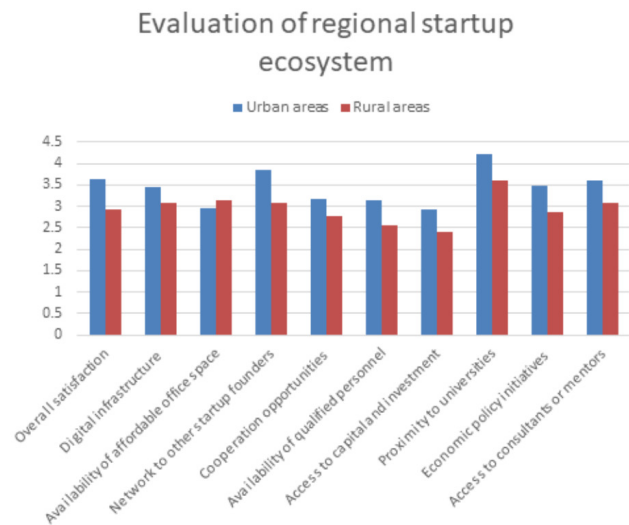


Figure 9. Evaluation of regional startup ecosystem

Data source: German Startup Monitor 2019

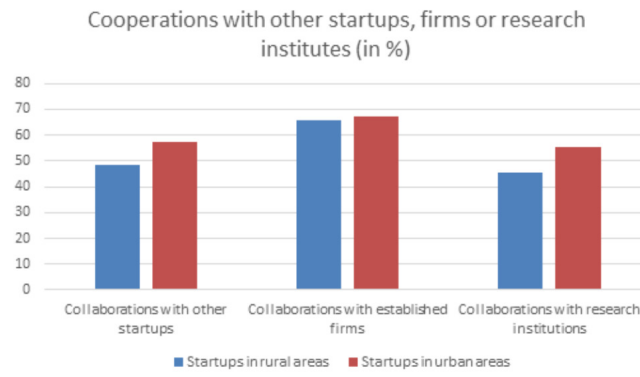


Figure 10. Collaboration with other startups, firms or research institutes (by area, in %)

Data source: German Startup Monitor 2019

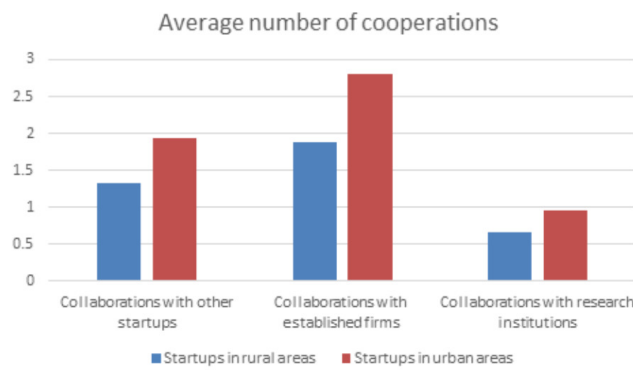


Figure 11. Average number of collaborations (by area)

Data source: German Startup Monitor 2019



REFERENCES

- Ács, Z. J., Autio, E., & Szerb, L. (2014). National systems of entrepreneurship: Measurement issues and policy implications. *Research Policy*, 43(3), 476–494. <http://doi.org/10.1016/j.respol.2013.08.016>
- Ács, Z. J., Estrin, S., Mickiewicz, T., & Szerb, L. (2018). Entrepreneurship, institutional economics, and economic growth: An ecosystem perspective. *Small Business Economics*, 51(2), 501–514. <https://doi.org/10.1007/s11187-018-0013-9>
- Ács, Z. J., & Szerb, L. (2007). Entrepreneurship, Economic Growth and Public Policy. *Small Business Economics*, 28(2–3), 109–122. <https://doi.org/10.1007/s11187-006-9012-3>
- Armington, C., & Ács, Z. J. (2002). The Determinants of Regional Variation in New Firm Formation. *Regional Studies*, 36(1), 33–45. <https://doi.org/10.1080/00343400120099843>
- Arnold, M., Mattes, A., & Sandner, P. (2014). Regionale Innovationssysteme im Vergleich. *DIW-Wochenbericht*, 81(5), 79–87.
- Assenza, P. (2016). Identifying fertile ground: Peripheral stakeholder contribution to a healthy entrepreneurial ecosystem. *Journal of Business and Entrepreneurship*, 28(1), 31.
- Audretsch, D. B., Cunningham, J. A., Kuratko, D. F., Lehmann, E. E., & Menter, M. (2019). Entrepreneurial ecosystems: Economic, technological, and societal impacts. *The Journal of Technology Transfer*, 44(2), 313–325. <https://doi.org/10.1007/s10961-018-9690-4>
- Autio, E., & Cao, Z. (2019). *Fostering digital start-ups: Structural model of entrepreneurial ecosystems*. <http://doi.org/10.24251/hicss.2019.653>
- Autio, E., Kenney, M., Mustar, P., Siegel, D., & Wright, M. (2014). Entrepreneurial innovation: The importance of context. *Research Policy*, 43(7), 1097–1108. <https://doi.org/10.1016/j.respol.2014.01.015>
- Autio, E., & Levie, J. (2017). Management of Entrepreneurial Ecosystems. In G. Ahmetoglu, T. Chamorro-Premuzic, B. Klinger, & T. Karcisky (Eds.), *The Wiley Handbook of Entrepreneurship* (pp. 423–449). John Wiley & Sons, Ltd. <https://doi.org/10.1002/9781118970812.ch19>
- Baharian, A., & Wallisch, M. (2017). *Mittelstand meets Startup. Potenziale der Zusammenarbeit*. RKW Kompetenzzentrum.
- Baron, T., & Harima, A. (2019). The role of diaspora entrepreneurs in start-up ecosystem development - a Berlin case study. *International Journal of Entrepreneurship and Small Business*, 36(1/2), 74. <http://doi.org/10.1504/ijesb.2019.096968>
- Boschma, R. (2009). Evolutionary economic geography and its implications for regional innovation policy. *Papers in Evolutionary Economic Geography*, 9(12), 1–33.
- Bosma, N., & Sternberg, R. (2014). Entrepreneurship as an Urban Event? Empirical Evidence from European Cities. *Regional Studies*, 48(6), 1016–1033. <https://doi.org/10.1080/00343404.2014.904041>
- Brandmueller, T., Schäfer, G., Ekkehard, P., Müller, O., & Angelova-Tosheva, V. (2017). Territorial indicators for policy purposes: NUTS regions and beyond. *Regional Statistics*, 7(1), 78–89. <https://doi.org/10.15196/rs07105>
- Brown, R. (2016). Mission impossible? Entrepreneurial universities and peripheral regional innovation systems. *Industry and Innovation*, 23(2), 189–205. <http://doi.org/10.1080/13662716.2016.1145575>
- Brown, R., & Mason, C. (2017). Looking inside the spiky bits: A critical review and conceptualisation of entrepreneurial ecosystems. *Small Business Economics*, 49(1), 11–30. <https://doi.org/10.1007/s1187-017-9865-7>
- Chung, S. (2002). Building a national innovation system through regional innovation systems. *Technovation*, 22(8), 485–491. [https://doi.org/10.1016/s0166-4972\(01\)00035-9](https://doi.org/10.1016/s0166-4972(01)00035-9)
- Cohen, B. (2006). Sustainable valley entrepreneurial ecosystems. *Business Strategy and the Environment*, 15(1), 1–14. <https://doi.org/10.1002/bse.428>
- Colombelli, A., Paolucci, E., & Ughetto, E. (2019). Hierarchical and relational governance and the life cycle of entrepreneurial ecosystems. *Small Business Economics*, 52(2), 505–521. <https://doi.org/10.1007/s11187-017-9957-4>
- Cukier, D., & Kon, F. (2018). A maturity model for software startup ecosystems. *Journal of Innovation and Entrepreneurship*, 7(1), 13731–13018. <https://doi.org/10.1186/s13731-018-0091-6>
- Doloreux, D., & Dionne, S. (2008). Is regional innovation system development possible in peripheral regions? Some evidence from the case of La Pocatière, Canada. *Entrepreneurship & Regional Development*, 20(3), 259–283. <https://doi.org/10.1080/08985620701795525>
- Doloreux, D., & Parto, S. (2005). Regional innovation systems: Current discourse and unresolved issues. *Technology in Society*, 27(2), 133–153. <https://doi.org/10.1016/j.techsoc.2005.01.002>
- Dreger, C., & Erber, G. (2011). Regionale Innovationssysteme in der EU. *Wirtschaftsdienst*, 91(8), 565–571. <https://doi.org/10.1007/s10273-011-1263-1>
- Etzkowitz, H., & Klofsten, M. (2005). The innovating region: Toward a theory of knowledge-based regional development. *R and D Management*, 35(3), 243–255. <https://doi.org/10.1111/j.1467-9310.2005.00387.x>
- Florida, R., Adler, P., & Mellander, C. (2017). The city as innovation machine. *Regional Studies*, 51(1), 86–96. <https://doi.org/10.1080/00343404.2016.1255324>

- Fornahl, D. (2003). Entrepreneurial activities in a regional context. In *Cooperation, Networks and Institutions in Regional Innovation Systems* (pp. 38–57). Edward Elgar.
- Fraiberg, S. (2017). Start-Up Nation. *Journal of Business and Technical Communication*, 31(3), 350–388. <http://doi.org/10.1177/1050651917695541>
- Fritsch, M. (2019). *Entrepreneurship*. Springer Gabler.
- George, W. (2015). Existenzgründung im ländlichen Raum. In *Regionales Zeitmanagement: Vol. Bd. 7* (pp. 11–14). Pabst Science Publ.
- Isenberg, D. (2011). *The entrepreneurship ecosystem strategy as a new paradigm for economy policy: Principles for cultivating entrepreneurship* (Babson Entrepreneurship Ecosystem Project). Babson college.
- Karlsson, C., & Nyström, K. (2011). Knowledge accessibility and new firm formation. *New Directions in Regional Economic Development*, 174–198. <https://doi.org/10.4337/9780857933515.00016>
- Kollmann, T., Hensellek, S., Jung, P. B., & Kleine-Stegemann, K. L. (2019). *Deutscher Startup Monitor 2019: Mehr mut, neue Wege*.
- Konrad Adenauer Stiftung. (2011). *Start-Ups in Deutschland und den USA (Report). Analysen und Argumente*.
- Koschätzky, K. (2009). Innovtion und Raum-zur räumlichen Kontextualität von Innovationen. *Innovationen Im Raum-Raum Für Innovationen: 11. Junges Forum Der ARL, 21. Bis 23. Mai 2008 in Berlin*, 6–17.
- Kuckertz, A., Berger, E. S., & Pommer, T. (2018). *Jeder für sich oder alle zusammen? Das Stuttgarter Startup Ökosystem*.
- Lehmann, E. E., Schenkenhofer, J., & Wirsching, K. (2019). Hidden champions and unicorns: A question of the context of human capital investment. *Small Business Economics*, 52(2), 359–374. <https://doi.org/10.1007/s11187-018-0096-3>
- Lundvall, B. Å., & Borrás, S. (1998). *The globalising learning economy: Implications for innovation policy*.
- Malecki, E. J. (2018). Entrepreneurship and entrepreneurial ecosystems. *Geography Compass*, 12(3), e12359. <https://doi.org/10.1111/gec3.12359>
- Mason, C., & Brown, R. (2014). Entrepreneurial ecosystems and growth oriented entrepreneurship. *Final Report to OECD, Paris*, 30(1), 77–102.
- McKinsey & Company (Ed.). (2018). *Tech-Titanen made in Germany. Eine Perspektive*.
- Molina, V., & Maya, J. (2017). How should an entrepreneurship ecosystem be? Entrepreneurship ecosystems as an artifact of design. In *European Conference on Innovation and Entrepreneurship* (pp. 734–741). Academic Conferences International Limited.
- National Venture Capital Association. (2020). *2020 Yearbook (Report)*.
- Pato, L., & Teixeira, A. A. C. (2018). Rural entrepreneurship: The tale of a rare event. *Journal of Place Management and Development*, 11(1), 46–59. <http://doi.org/10.1108/jpmd-08-2017-0085>
- Piegeler, M., & Röhl, K. H. (2015). *Gründungsförderung in Deutschland: Ein Aktionsplan gegen sinkende Gründerzahlen (No. 17/2015)*. IW Policy Paper.
- Pique, J. M., Berbegal-Mirabent, J., & Etzkowit, H. (2018). Triple Helix and the evolution of ecosystems of innovation: The case of Silicon Valley. *Triple Helix*, 5(1), 40604–40018. <https://doi.org/10.1186/s40604-018-0060-x>
- Roundy, P. T., Bradshaw, M., & Brockman, B. K. (2018). The emergence of entrepreneurial ecosystems: A complex adaptive systems approach. *Journal of Business Research*, 86, 1–10. <https://doi.org/10.1016/j.jbusres.2018.01.032>
- Singh, A. (2020). Challenges of Women Entrepreneurship and Entrepreneurship Development: A Study of Indian Rural Market. *International Journal of Advanced Science and Technology*, 29(8s), 362–369.
- Stam, E. (2009). Why Butterflies Don't Leave: Locational Behavior of Entrepreneurial Firms. *Economic Geography*, 83(1), 27–50. <https://doi.org/10.1111/j.1944-8287.2007.tb00332.x>
- Stam, E. (2014). The Dutch Entrepreneurial Ecosystem. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2473475>
- Stam, E. (2015). Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique. *European Planning Studies*, 23(9), 1759–1769. <https://doi.org/10.1080/09654313.2015.1061484>
- Statista. (2019). *Bruttoinlandsprodukt (BIP) in Deutschland nach Bundesländern im Jahr 2019*.
- Statistisches Bundesamt (Destatis). (2018). *Städte in Deutschland*.
- Sternberg, R. (2009). Regional Dimensions of Entrepreneurship. *Foundations and Trends® in Entrepreneurship*, 5(4), 211–340. <https://doi.org/10.1561/03000000024>
- Sternberg, R. (2012). Learning from the Past? Why “Creative Industries” can hardly be created by Local/Regional Government Policies. *Erde*, 143(4), 293–315.
- Sternberg, R., & Litzenberger, T. (2004). Regional clusters in Germany--their geography and their relevance for entrepreneurial activities. *European Planning Studies*, 12(6), 767–791. <https://doi.org/10.1080/0965431042000251855>
- Stuetzer, M., Obschonka, M., Brixy, U., Sternberg, R., & Cantner, U. (2014). Regional characteristics, opportunity perception and entrepreneurial activities. *Small Business Economics*, 42(2), 221–244. <https://doi.org/10.1007/s11187-013-9488-6>
- Tamásy, C. (2006). Determinants of regional entrepreneurship dynamics in contemporary Germany: A conceptual and empirical analysis. *Regional Studies*, 40(4), 365–384. <https://doi.org/10.1080/00343400600612137>
- Thompson, T. A., Purdy, J. M., & Ventresca, M. J. (2018). How entrepreneurial ecosystems take form: Evidence from social impact initiatives in Seattle. *Strategic Entrepreneurship Journal*, 12(1), 96–116. <https://doi.org/10.1002/sej.1285>

- Tripathi, N., Seppänen, P., Boominathan, G., Oivo, M., & Liukkunen, K. (2019). Insights into startup ecosystems through exploration of multi-vocal literature. *Information and Software Technology, 105*, 56–77. <https://doi.org/10.1016/j.infsof.2018.08.005>
- Wallisch, M., Gorynia-Pfeffer, N., Morgenstern, K., Ahluwaia, R. D., Koch, A., Depner, H., & Starke, C. (2019). Gründerökosysteme gestalten. In *Handbuch zur Unterstützung von Gründungen und Startups*. RKW Kompetenzzentrum.
- White Star Capital. (2020). *German Venture Capital Landscape 2020: From the eyes of an International Investor (Report)*.
- Wyrwich, M., Stuetzer, M., & Sternberg, R. (2016). Entrepreneurial role models, fear of failure, and institutional approval of entrepreneurship: A tale of two regions. *Small Business Economics, 46*(3), 467–492. <https://doi.org/10.1007/s11187-015-9695-4>