An Assessment of Entrepreneurial Ecosystem in Vietnam

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ABSTRACT

The paper approached the quantitative analysis such as FGLS to assess the relevance of the factors of the entrepreneurial ecosystem. The data were exploited for seven locations in Vietnam from 2011 to 2020. The results show that market size, infrastructure, policies, human capital, science and technology have a statistically significant impact on entrepreneurial ecosystem. Of which, market size and infrastructure placed the greatest impact on the ecosystem. In addition to the model, time dummy variable was added to examine the impact of the time period after 2016 to the ecosystem, and the variable was proved to have a statistically significant effect on the ecosystem. The results also revealed the fact that the progress of the ecosystem require the synchronous development of entrepreneurial components.

SARI PATI

Makalah ini menggunakan analisis kuantitatif seperti FGLS untuk menilai relevansi faktor-faktor dalam ekosistem kewirausahaan. Data yang digunakan mencakup tujuh lokasi di Vietnam dari tahun 2011 hingga 2020. Hasil penelitian menunjukkan bahwa ukuran pasar, infrastruktur, kebijakan, modal manusia, serta ilmu pengetahuan dan teknologi memiliki dampak yang signifikan secara statistik terhadap ekosistem kewirausahaan. Di antara faktor-faktor tersebut, ukuran pasar dan infrastruktur memberikan dampak terbesar pada ekosistem. Selain itu, model tersebut menambahkan variabel dummy waktu untuk mengkaji dampak periode waktu setelah tahun 2016 terhadap ekosistem, dan variabel ini terbukti memiliki efek yang signifikan secara statistik pada ekosistem. Hasil penelitian juga mengungkapkan bahwa kemajuan ekosistem memerlukan pengembangan yang serentak dari komponen-komponen kewirausahaan.

INTRODUCTION

There is currently a fair amount of academic research focusing on establishing the attributes/components of successful startup ecosystems (HSTKN) and exploring how they support entrepreneurs (Ahmad & Hoffmann, 2008; Isenberg, 2011; Acs et al., 2014; Alvedalen & Boschma, 2017; Audretsch & Belitski, 2017; Autio et al., 2014; Mack & Mayer, 2015; Spigel, 2017; Stam & Bosma, 2015; Stam, 2015; Stam, 2018).

Ecosystem assessment allows comparisons between different ecosystems, within the same country, around the world, and assessments over time are also performed (Mack & Mayer, 2016). In The Regional Entrepreneurship Acceleration Program (REAP), objective data with perception metrics were used in the assessment of the entrepreneurial ecosystem. Objective data is used to evaluate factors, while perception metrics identify the weaknesses and strengths of HSTKN. REAP is built based on six areas: Human capital, funding, policy, rewards, infrastructure and demand. The networks connecting these domains were also evaluated, a spider web diagram was used to compare different ecosystems.

A country's eco-system is generally the sum of local eco-systems. If a national eco-system wants to effectively realize its goals, it will have to depend on the interaction of eco-system's components. Although there are many studies in Vietnam on entrepreneurship, there has not yet had a study that evaluates the national entrepreneurial ecosystem on the basis of overall impact of ecosystem's components simulataneously. In this paper, several represented localities were picked to search for the impact of factors to the national entrepreneurial ecosystem. The impact factors were selected based on previous studies and the model of Isenberg (2011).

The paper was structured as five sections: Section 2 outlines the theoretical basis of the factors evaluated in the entrepreneurial ecosystem to serve as a premise for selecting impact fators of ecosystem in Vietnam. This is followed by section 3 describing the research method. Section 4 presents the results and discussion. Finally, section 5 concludes the research problem. The results showed a statistically significant positive impacts of factors such as time, market size, infrastructure, policies and human resources on the number of enterprises. Of the factors, Market size has a significant impact on the increase in the number of enterprises over the years, and this increase has reached a higher level since 2016. Factors such as policies and human resources have a weaker impact on the increase in the number of enterprises.

Literature Review

Entrepreneurial ecosystems have been recognized as sets of actors, institutions, social structures, and cultural values that are linked together in the creation of new ventures (Feld, 2012; Mason & Brown, 2014; Neck et al., 2004; Spigel, 2017; Spilling, 1996; Van de Ven, 1993; Mack & Mayer, 2016). Isenberg (2011) figured that the components of the entrepreneurial ecosystem interact in a complex and specific way, leading to the formation of unique and different entrepreneurial ecosystems. Spigel (2015) focused on factors that develop simultaneously and reinforce each other. Although components can support each other, they cannot completely substitute for each other (Acs et al., 2014). Feld (2012) addressed the importance of interaction of components in successful startup communities and the tight connections among components in which all entities are willing to contribute to the ecosystem (Borissenko & Boschma, 2016). Most experts agree that there is geographical boundary for entrepreneurial ecosystems and Ecological ecosystems can be of any scale (Qian et al., 2013). Entrepreneurial eco-system depends heavily on location and development, historial, cultural and other local factors. Although, the concept of HSTKN is not completely new, it contains a few new ideas. Many of the core elements surrounding ecosystem development have been widely understood for decades, emphasizing the importance of systems and networks in fostering entrepreneurship.

According to this view, there is no single cause or factor that leads to the success of an entrepreneur (or a region) but There is a need of the connections and interdependencies of many important factors.

In recent years, a particularly influential approach to HSTKN has been developed by the work of Isenberg. Isenberg (2010) discussed the concept of entrepreneurial ecosystem. The author noted that there is no exact formula for creating an ecosystem, countries' leaders should follow nine principles when building an ecosystem. These principles first emphasize the role of local conditions and processes: (1) stop simulating Silicon Valley; (2) shaping ecosystems under local conditions; (3) engage the participation of private sector from the beginning; (4) emphasize the origins of new business formation; (5) promote the development of components in the ecosystem; second, emphasize the ambitious entrepreneurial spirit; (6) prioritize high potential; (7) focusing on organizations; (8) addressing cultural changes; (9) reform of the legal, administrative and regulatory framework. Although, this is an individual's perspective, it is largely consistent with academic research on innovation and growth in the region (Boschma and Martin, 2010; Cooke et al., 2011). Also, the focus on ambitious entrepreneurship and institutions is also a key feature of entrepreneurship research (Stam et al., 2012; Acs et al., 2014).

An entrepreneurial ecosystem needs the combination of leadership, government, funding, cultural norms, success stories, human capital, universities, start-ups, infrastructure, support services, networks, and others, customers. They are categorized into six main domains such as: Policy (leadership, government); Finance (financial capital); Culture (success stories, social norms); Support (infrastructure, support services); Human capital (workforce, educational institutions); and market (early customers, network of connections) (Isenberg, 2011). This approach has placed entrepreneurship at the heart of HSTKN, recognizing the importance of entrepreneurship and the key factors necessary for the success of HSTKN. The listed attributes, principles and pillars elaborated in Isenberg's framework show that the HSTKN contains a change in traditional economic thinking about the enterprise, and especially about markets and market failure, to a new economic perspective on people, networks and institutions. Therefore, on the basis of previous research, especially the model of Isenberg (2011), a number of indicators was selected to suit the research objectives, data and Vietnam's context and the provinces' development

METHODS

Research Model

There are seven provinces and cities selected for the study. They all have experienced economic enviroments with vibrant startup activities and high economic growth. The first three localities were selected are Hanoi, Da Nang and Ho Chi Minh City for the reason of being first developed eco-system under the Government's program. The remaining provinces/cities are added to the model to diversify the representatives for assessing the overall impact of a national eco-system. These localities include: Vinh Phuc, Binh Duong, Binh Phuoc, Bac Ninh. The nation's entrepreneurship activities have officially recognized approximately for ten years. This period is not long enough to capture a sufficient amount of data and information which may cause a limited assessment on the nation's entrepreneurial ecosystem.

Model (1) shows the overall impact of factors on the entrepreneurial ecosystem of the provinces:

$$\ln SDN_{it} = \alpha_1 + \alpha_2 te + \beta_{1i} CS_{it} + \beta_{2i} \ln TT_{it} + \beta_{3i} \ln NVCN_{it} + \beta_{4i} CSHT_{it} + \beta_{5i} \ln KHCN_{it} + \mu_{it} \quad (1)$$

te is a dummy variable representing the time from 2016 onwards to consider the impact of policies from the Vietnamese government and action programs in localities on the eco-system.

The variables were assigned as follow: the number of non-state enterprises (SDN_{it}), the local

government policies (CS_{it}), market size (TT_{it}), the number of students studying at college or higher average ($NVCN_{it}$), volume of goods transported per person ($CSHT_{it}$), expenditure on science and technology ($KHCN_{it}$), province i, time t.

The number of enterprises (Dependent variable, SDN): The increase in the number of small and medium enterprises is always the expectation of any economy in the world. SMEs have a great contribution to the economic development in developed countries such that they have received preferential policies from governments. In recent years, governments in developing countries have recognized the importance of SMEs by paying much attention on startup activities. Appropriate policies and other good conditions of market, bank's credit, human resources for SMEs will encourage individuals to start a business, establish a company and develop their business. On the contrary, if these factors do no good conditions for the development of entrepreneurship, the number of small and medium-sized enterprises will decrease which is a signal of an economic decline. Therefore, the number of currently operating businesses in each province/city, excluding bankrupt and discontinued businesses, was selected as the dependent variable, which is the variable to evaluate the results of start-up activities.

Policy (CS): Policies play a critical role, comprehensively affecting the development of a country. Similarly, in an ecosystem, policy also play the role of overall orientation for the entire development in the eco-system. Policy will directly and indirectly impact other factors in the ecosystem such as market, finance, human capital, support and culture. Policy also indirectly has a strong impact on the success of individuals in that ecosystem. A good policy will help building a community with enterprise development services which encourage enterprises' establishment and promote business development. These support services provide a great access for start-ups to investors, investment funds, and broaden business network through overseas cooperation. Also, enterprises are instructed with administrative procedures for saving time. There is no perfect and objective metric to measure accurately the effectiveness of policy since the results of a policy is experienced in all aspects of the economy in the long run. The assessment of enterpises is partly an appropriate measurement of policy's success. Currently in Vietnam, there are three indexes for the evaluation of the effectiveness of management capacity at the local level. They are The Viet Nam Provincial Governance and Public Administration Performance Index (PAPI), Provincial Competitiveness Index (PCI) and (DOSSI). PAPI index indicates entrepreneurs' opinion of corruption, public service, and administrative procedures of public agencies. DOSSI provides the evaluation of the administrative services at the district-level. PCI helps ranking the local governments in Vietnam on the basis of enterprises's assessements of business environment. A set of indicators such as business environment, quality of economic governance, administrative reform of local governments. Thus, PCI is a suitable metric that is a proxy for policy. PCI was selected for the policy's performance variable, and is expected to have a positive impact on the change in the number of businesses.

Market (TT): Isenberg's (2011) indicated that market factors encompass initial customers and networks. However, the most important factor in the supply chain and commodities' movement is consumption in the market. The more consumption, the more production and movement of goods will be promoted, promoting economic development. Market's consumption is largely driven by disposable income. GRDP can be considered an appropriate factor that is measurable the income and spending levels of an economy. The larger the market size, the greater the consumption of commodities in the economy. Thus market factor is also expected to have a positive impact on startup development. GRDP was chosed to be a proxy for market size. It is expected to promote the development of enterprises.

Human capital (NVCN): it is encompassed labor (e.g. skilled and unskilled labor) and educational facilities (e.g. degrees, training courses for entrepreneurs. Human capital has long been considered as a key determinants of the economic's growth. The higher the quality of human capital, the greater the creativity, innovation, and application of modern advanced technologies are implemented in bbusiness' activities and economy. A high quality human capital can be achived by the provision of good education which educate learners not only knowledge but also critical thinking and other necessary skills for the preparation of future career. The vast majority of fundamental knowledge and skills for future career can be firstly achieved by attending College and university courses. Accordingly, the number of graduated students from college and university is the proxy for human resources. This factor is expected to have a positive impact on the number of enterprises.

Support (CSHT): Including infrastructure (communications, transportation, energy, incubators), professional support (legal advisors, accounting, investment, technical experts, mentors) , and non-governmental organizations (business competitions, seminars, associations of entrepreneurs, non-profit trade fair). These supports can be seen as infrastructure that facilitate business operations. These supports which are mostly provided by state organisations are quite modest in Vietnam provinces and ctiites. Startup incubators in provinces and cities have establised for much less than 20 years which is the minimal period of time to have a certain influence on the ecosystem as mentioned by Isenberg (2010). Thus, incubators in this context is not an appripriate proxy for support. Another substitution is infrastructure which is proxied by entrepreneurs' judgment. Infrastructure plays an important role in the circulation of goods in the economy. High quality infrastructure help reduce costs and time in transporting goods in supply chains. Infrastructure assessment of businesses is conducted for years by Vietnam Chamber of Commerce and Industry

(VCCI). There are a group of component factors help ranking quality of infrastructure in each territories such as industrial zone, road, power system, telecommunication, and others. This judgment is a comprehensive tool which covers most aspects of the infrastructure needed for businesses. Accordingly, the infrastructure quality rating according to VCCI's assessment is chosen to represent the supporting factor. Infrastructure is expected to have a positive influence on entrepreneurship.

Science and technology (KHCN): This is an important factor contributing to the development of entrepreneurship. The development of science and technology produces achievements, inventions, and patents that change production methods, improve production capacity, and maintain sustainable business development. Accordingly, science and technology is a highly promoted factor that directly impacts the results and goals of startups. In the very first stage of imporving science and technology, the role of government is inevitable through policy and spending on science and technology research. Thus, the impact of science and technology in entrepreneurship will be evaluated through the annual state budget expenditure for each province or city on science and technology. The more science and technology develops, it will certainly bring huge benefits to enterprises. Science and technology spending is expected to positively promote the activities of businesses.

Data

Startup activities in Vietnam were launched in 2011. Thus, appropriate data for starup activities is available from 2011 onwards. In addition, data is also considered to be collected within the pre-pandemic period, 2020, to evaluate the impact of policies while eliminating global economic instability due to the pandemic. Accordingly, the data used in this study was collected from 2011 to 2020 to evaluate the overall impact of factors on the economic ecosystem. Startup program has been officially spread throughout the provinces/

cities since 2016 by the government program "Initiative for Startup Ecosystem in Vietnam - ISEV". Therefore, the period from 2016 to 2020 is also considered to have a different impact compared to the previous period. The data is collected from Vietnam statistical yearbooks over the years and statistical yearbooks of relevant provinces/cities over the years. In addition, data from province competitiveness index (PCI) over the years was taken from VCCI and USAID.

Data Analysis Method

In this study fixed effects model (FEM) and random effects model (REM) were used to analyse the data. To select the appropriate model, the Hausman test is performed. In case both of these models violate the assumptions of heteroskedasticity and autocorrelation, the feasible generalized least squares (FGLS) estimation method is chosen to fix these violations.

The Breusch Pagan test was performed to examine the violation of the heteroskedasticity assumption. Wooldridge test was to detect autocorrelation between residuals in the model. To check the multicollinearity phenomenon of the model, the variance inflation factor VIF is calculated.

RESULTS AND DISCUSSION

The data in Table 1 shows that there is a large difference in the number of observed enterprises between localities during the study period. These figures partly reflect the market size and economic development of the localities. The two cities with the largest number of enterprises are Ho Chi Minh City and Hanoi, which are also the two cities with the largest number of enterprises in Vietnam and have the largest economic development in the country. Danang and Binh Duong, which have the second largest number of observations in the sample, are also the two localities with strong economic activities in Vietnam. Finally, the remaining three provinces have economic activities in vibrant industrial zones with a large number of enterprises.

Table 2 shows that the selected provinces are highly representative as there are provinces with the

Table 1. Number of observations for each locality

Area	HCM city	Hanoi	Danang	Binh Duong	Binh Phuoc	Bac Ninh	Vinh Phuc
Number of observations	1,719,599	1,242,657	145,977	143,359	27,748	57,622	38,666

Table 2. Descriptive statistics

Variable	Explanation	Mean	Standard deviation	Min	Max
DN	Number of enterprises	46,780.4	67,762.2	1,800	254,699
CS	PCI index	18.07	16.2	1	62
CSHT	Ranking quality for infrastructure	12.57	13.41	1	53
TT	Market size in billion VND	239,902.9	274,634.6	22,275.67	990,356
NVCN	Number of students	184,995.9	251,707.7	256	753,068
KHCN	Government spending in science and technology (Billion VND)	114.0082	162.1947	11.58	804

Source: Authors' computation

highest, medium and low market sizes within the country. The rankings of policies and infrastructure in provinces and cities are also chosen in the best, average and lowest level of quality. The largest number of enterprises, government spending on science and technology, market size belongs to Ho Chi Minh City while leading PCI rankings and infrastructure quality rankings belongs to Da Nang and Binh Duong. Binh Duong has maintained the top ranking PCI from 2011 to 2020. Binh Phuoc is the province with all indicators at the lowest level.

The Hausman test in Table 3 shows that the fixed effects model is more appropriate than the random effects model. However, the fixed effects model violated the assumption of heteroskedasticity and autocorrelation, the FGLS method was chosen to analyze the data in this model. The variance inflation factors are all less than 10, so the autocorrelation among variables is acceptable. In addition, the results of Breusch-Pagan test in REM with p-value is 0.000 less than 0.05 and Wooldridge test in FEM and REM show p-value 0.00 < 0.05 further strengthen the selection of FGLS.

The FGLS regression results in Table 3 show that all factors of time (α=0.0877887, p= 0.1) , policy (β_1= 0.0046637,p= 0.001), market size (β_2= 1.309625,p= 0.001), human resources (β_3= 0.1573891,p= 0.001),

infrastructure (β_4= 0.0115113,p= 0.001), and scientific and technological (β_5= -0.0610732,p= 0.001) have a statistically significant impact on the number of enterprises. Among them, the period of 2016 to 2020, market size and infrastructure have the strongest impact on enterprises. Factors such as time, policy, market size, infrastructure, and human resources positively affect the number of businesses. On the contrary, spending on science and technology has a negative impact on the development of enterprises.

MANAGERIAL IMPLICATIONS

The strongest impact among the factors on the number of businesses is the time. During the period from 2016 onwards, national, local policies and action programs for entrepreneurship were officially issued and guided. The number of businesses increased by 8.77% from 2016 onwards. This shows that the positive impact of official policies and action programs on the eco-system. The government's concern and awareness of the importance of the ecosystem have created a good change for the ecosystem in general when compared to other factors of the model such as infrastructure, market size, human capital. Thus, it can be seen that 2016 is a year that creates a major turning point for the entrepreneurial ecosystem and startup activities in Vietnam.

Table 3. Statistical results of the model

Variable	FEM	REM	FGLS	VIF
t	0.2294269***	0.088322***	0.0877887*	1.28
CS	0.0023852	0.0068389***	0.0046637***	2.18
CSHT	-0.0038112	0.0177476***	0.0115113***	2.07
lnTT	0.8214235***	1.354451***	1.309625***	7.25
lnNVCN	- 0.0149579	0.145466***	0.1573891***	5.02
lnKHCN	0.153291***	-0.0686453***	-0.0610732***	3.07
constant	-20.35514	-34.82259	-33.54058	
Observation	70	70	70	
R²	0.9134	77.28		
Breusch Pagan test	706.62 (0.0000)	0.00 (1.0000)		
Wooldridge test	27.814 (0.0019)	27.814 (00019)		
Hausman test	190.91 (0.000)			

Source: Authors' computation

Market size is the second most important influential factor in the economic development ecosystem in Vietnam. When the market size increases by 1%, the number of businesses increases by about 1.31%. Infrastructure plays another important role for local businesses. When the infrastructure ranking of localities increases by one level, the number of businesses will increase by 1.15%. Infrastructure is the foundation that creates conditions for the development of the economy which attract more investment from businesses. Enterprises can save money when operating in places with good infrastructure. However, the paradox is that the leading provinces in terms of infrastructure rankings have a number of businesses over the years studied that is lower than the average value as Da Nang and Binh Duong. This shows that good infrastructure in these localities has not been fully and effectively exploited to create a great boost for startup activities. Although Ho Chi Minh City and Hanoi possess the largest number of businesses, infrastructure quality ratings are much lower than the average value from 2019 and earlier. In 2020, Ho Chi Minh city and Hanoi are gradually improving the quality of infrastructure mainly due to large market scale. Although the two factors market size and local infrastructure play the first important role, the impact of these two factors on the cities' ecosystem is not strong enough. The reason may come from the fact that all factors in the eco-system have not developed synchronously such that individual factor has not had the opportunity to maximize its own positive impact. In addition, in a startup ecosystem where regions develop equally will have mutual impacts each other. Meanwhile, mutual support relationships among cities have been found to be not strong enough.

Policy and human capital factors also play a very important role, yet the impact on eco-system is not significant. When businesses' assessment of the overall local policies increases by 1%, the number of enterprises marginaly increases by 0.46%. If the number of college students rises by 1%, the number of enterprises increases at a very low rate, approximately 0.15%. Expenditure on science and technology in the provinces and cities has an impact that is not as expected. One of the reason comes from the modest amount of expenditure on science and technology. The proportion of spending on science and technology in localities make up on average of about 0.2% over the years. Another reason is a small portion of expenditure on science and technology is spent on science and techonology investment, the rest is for other activities which also accounted in expenditure on science and technology. The third reason is the application of science and technology works is limited.

CONCLUSIONS

Research results show that proxies for factors in an ecosystem such as policy, market size, infrastructure, human capital, science and technology have a significant impact on the number of enterprises in the Vietnam. Of which, market size and human capital have the strongest impact on businesses. Factors such as policies, market size, infrastructure, and human captial affect the number of businesses in the same direction.

Research results also show that the elements of the eco-system are interdependent and develop together in province and city. Most of the studies on the Ecosystem are typical qualitative that help provide rich descriptions of the structure and properties of the ecosystem, yet provide information about the relationship of the components to the ecosystem. This study has taken a quantitative approach to identify and evaluate the relevance of the attribute factors of the ecosystem. The results show that the elements of the ecosystem provide valuable evidence of a systematic approach to the ecosystem. It emphasizes that any individual component of the ecosystem can only perform a few roles and depends on many other factors to promote the development of the ecosystem. On the other hand, although the concepts of an ecosystem can be generalized to most ecosystems in real situation, the availability of data as well as the research context is limited, researchers will need

to identify and specify the main components of the HSTKN. One limitation of the study is the large variation in the number of observations of enterprises, which varies greatly between major cities and provinces. This may bias the results of the study towards data from cities with a large number of enterprises. ■

REFERENCES

Acs, Z. J., Autio, E., & Szerb, L. (2014), 'National systems of entrepreneurship: Measurement issues and policy implications', *Research Policy*, 43(3), 476-494,

Ahmad, N., & Hoffmann, A. (2008), 'A framework for addressing and measuring entrepreneurship'.

Alvedalen, J., & Boschma, R. (2017), A critical review of entrepreneurial ecosystems research: Towards a future research agenda, *European planning studies*, 25(6), 887-903.

Audretsch, D. B., & Belitski, M. (2017), 'Entrepreneurial ecosystems in cities: establishing the framework conditions', *The Journal of Technology Transfer*, 42, 1030-1051.

Blackburn, R., De Clercq, D., & Heinonen, J. (Eds.). (2017), *The SAGE handbook of small business and entrepreneurship*, Sage.

Boschma, R. A., & Martin, R. L. (Eds.). (2010), *The handbook of evolutionary economic geography*, Edward Elgar Publishing.

Borissenko, Y., & Boschma, R. (2016), 'A critical review of entrepreneurial ecosystems: Towards a future research agenda', *Utrecht University-Urban & Regional Research Centre*.

Cooke, P. (2001), 'Regional innovation systems, clusters, and the knowledge economy', *Industrial and corporate change*, 10(4), 945-974.

Isenberg, D. (2011), The entrepreneurship ecosystem strategy as a new paradigm for economic policy: principles for cultivating entrepreneurship*, Institute of International and European Affairs,* 1-13.

Levie, J., & Autio, E. (2013), Assessing regional innovative entrepreneurship ecosystems with the global entrepreneurship and development index: the case of Scotland.

Mack, E., & Mayer, H. (2016), 'The evolutionary dynamics of entrepreneurial ecosystems', *Urban studies*, 53(10), 2118-2133.

Mason, C., & Brown, R. (2014), 'Entrepreneurial ecosystems and growth oriented entrepreneurship', *Final report to OECD, Paris*, 30(1), 77-102.

Neck, H. M., Meyer, G. D., Cohen, B., & Corbett, A. C. (2004), 'An entrepreneurial system view of new venture creation', *Journal of small business management*, 42(2), 190-208.

Qian, H., Acs, Z. J., & Stough, R. R. (2013), 'Regional systems of entrepreneurship: the nexus of human capital, knowledge and new firm formation', *Journal of economic geography*, 13(4), 559-587.

Spilling, O. R. (1996), 'The entrepreneurial system: On entrepreneurship in the context of a mega-event', *Journal of Business research*, 36(1), 91-103.

Stam, E. (2018), 'Measuring entrepreneurial ecosystems'. *Entrepreneurial ecosystems: Place-based transformations and transitions*, 173-197.

Spigel, B. (2017), 'The relational organization of entrepreneurial ecosystems', *Entrepreneurship theory and practice*, 41(1), 49-72.

Spigel, B. (2017), 'The relational organization of entrepreneurial ecosystems', *Entrepreneurship theory and practice*, 41(1), 49-72.

Stam, E. (2015), 'Entrepreneurial ecosystems and regional policy: a sympathetic critique', *European planning studies*, 23(9), 1759-1769.

Stam, E., Bosma, N., Van Witteloostuijn, A., De Jong, J., Bogaert, S., Edwards, N., & Jaspers, F. (2012), 'Ambitious entrepreneurship', *A Review of the Academic Literature and New Directions for Public Policy, Report for the Advisory Council for Science and Technology Policy (AWT) and the Flemish Council for Science and Innovation (VRWI)*.

Stam, E., & Van de Ven, A. (2021), 'Entrepreneurial ecosystem elements', *Small business economics*, *56*, 809-832.

Van de Ven, H. (1993), 'The development of an infrastructure for entrepreneurship' *Journal of Business venturing*, *8*(3), 211-230.