Do specific entrepreneurial ecosystems favor high-level networking while others not? Lessons from the Hungarian IT sector

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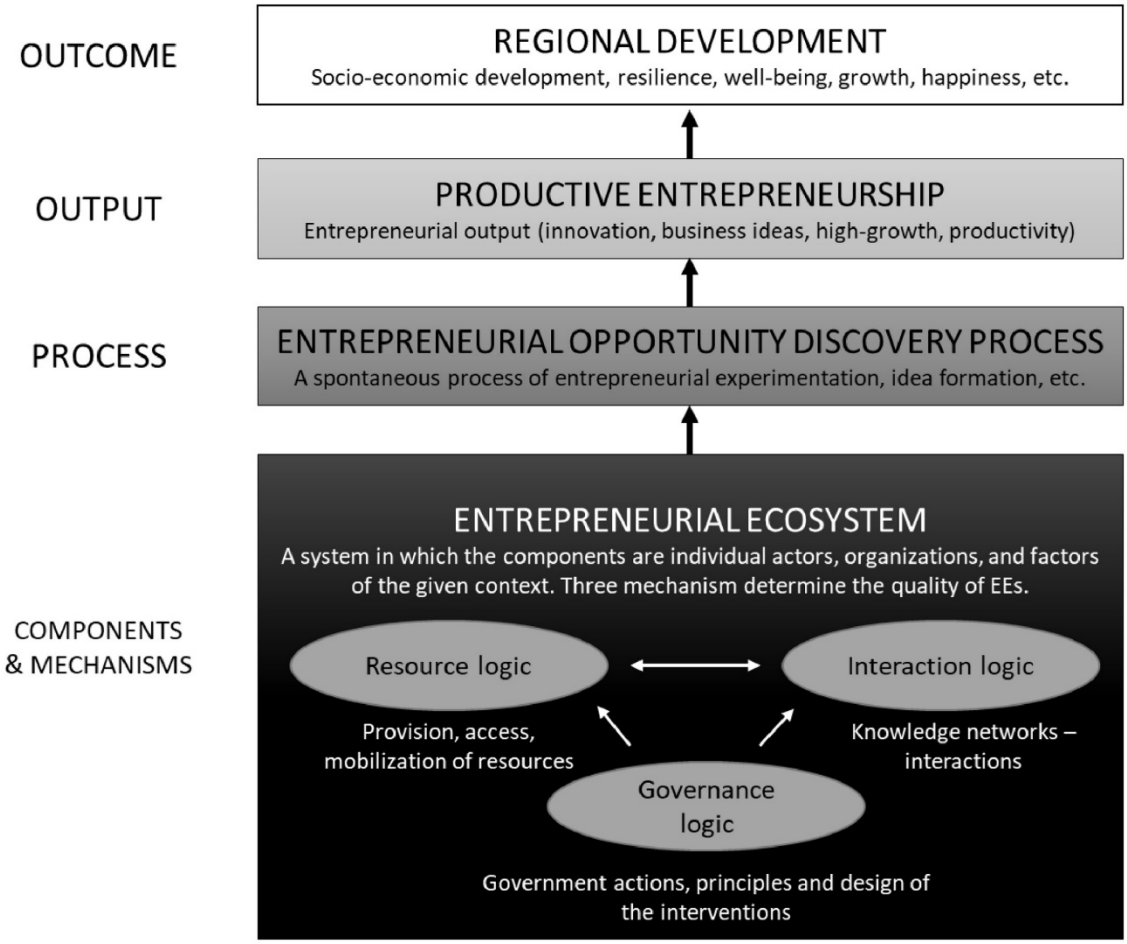
Entrepreneurial innovation is an essential resource for territorial competitiveness, development and resilience. *Entrepreneurs* play a key role in creating this resource by initiating the *entrepreneurial opportunity discovery process*, which is the spontaneous process of developing new innovative business ideas and the trial-and-error process of entrepreneurial experimentation. Each territorial unit is characterized by a specific *entrepreneurial ecosystem* (EE) that supports or limits entrepreneurial innovation. Recent literature suggests that the quality of the EE determines entrepreneurial opportunities and their discovery (*Acs et al.*, 2014; *Autio et al.*, 2019). Thus, high-quality EE can better support the process of entrepreneurial discovery, which ultimately results in a higher level of *productive entrepreneurship* (*Stam*, 2015, 2018). There is no consensus among researchers on the definition of productive entrepreneurship, but its important contribution to *(regional) economic development* is clear (*Wennekers and Thurik*, 2005; *Sternberg et al.*, 2019).

Although the EE is a very *„seductive"* concept today (*Stam*, 2015, p. 1764), and the growing literature provides a number of theoretical frameworks, a deeper understanding remains a major challenge. EE literature points out that the ecosystem, as the natural soil for spontaneous entrepreneurial discovery process, is a *complex adaptive system* (CAS), i.e. configurations of many interdependent factors (*Roundy et al.*, 2018).
Acs et al. (2014) and *Szerb et al.* (2017) also point out the *systemic relationship* of institutionally embedded individual actors and emphasize that (1) the elements of the ecosystem are *in quasi-complementary relationship* (i.e. only partially substitutable for each other), and (2) suggest that *all EE components are important*, thus well-performing ecosystems are those that are *balanced*. We also agree that none of the EE factors can simply be replaced by another. For example, if the entrepreneurial attitude is low or the level of entrepreneurial skills is inadequate in a country even though the state provides sufficient public venture capital, EE will not improve. Indeed, EEs show *"multilateral dependencies based on various types of complementarities"* (*Jacobides et al.*, 2018, p. 2255), but *it has been not tested empirically whether all elements are of equal importance within a given ecosystem to achieve a given performance*. As exploratory case studies on the life cycle of ecosystems have posed, the weight and role of ecosystem factors can change over time (*Mack and Mayer* 2016).

Another finding of EE research is that the identification of its elements alone is not sufficient to understand the function and evolution of EEs. Exploring the *interactions* between the elements is equally important (*Alvedalen and Boschma*, 2017). *Cao and Shi* (2020) further nuanced this conclusion, and identified three EE mechanisms in their conceptual model. The *resource mechanism* refers to the provision, access and mobilization of entrepreneurship-related resources (e.g. human and physical infrastructure). However, not all entrepreneurs can do this, as access to resources and their mobilization are not equally facilitated by their social networks. That is why EEs are *interaction systems* of different actors whose knowledge acts as a key resource for the ecosystem. Actors' knowledge can be shared through their interactions in order to generate innovation. The third mechanism relates to *governance*: entrepreneurship is a highly context-related phenomenon, so government actions also have a significant impact on entrepreneurial ecosystems. Based on these findings, we consider networking to be the

output of the EEs, as its extent and quality are determined by the various characteristics of the ecosystem. We assume that networking works as a *cohesive mechanism ("lubricant"*) between the actors and institutions at different levels, so its absence or low level has a negative impact on entrepreneurship. *Figure 1* illustrates the logical relationships among the theoretical considerations mentioned above.

Figure 1. Relationship between regional development, productive entrepreneurship, and entrepreneurial ecosystem (EE)



Source: own edition based on *Stam and van de Ven,* 2019, and *Cao and Shi*, 2020.

Szerb et al. (2020) pointed out that several, especially less developed regions (LDRs) of the EU lack the essential elements of EE. Many LDRs in Europe suffer from all kinds of capacity shortages or obstacles that hamper them from successfully implementing their innovation domain-seeking smart specialization strategies (S3) (*Krammer*, 2017; *Hassink and Gong*, 2019). Thus, researchers emphasize prior improvement of the institutional capacities (*Kroll*, 2015; *Magro and Wilson* 2019). Institutional capacity refers to the ability of regions to support the absorption of *new knowledge* that constantly challenge their existing institutional arrangement (*Capello and Kroll*, 2016). One of the problems of LDRs stems mainly from the lack of new resources (e.g. new knowledge, technology or competencies). To discover new (business) opportunities, an entrepreneur either relies on its *inner resources* (experience) or

adopts *external knowledge*. In the latter case, the existence of appropriate (local/interregional) *networks* is a precondition for acquiring the necessary new knowledge. These networks are of particular importance for LDRs suffering from a lack of institutional capacities. In LDRs, if the size/quality of the internal entrepreneurial knowledge base does not reach the critical level that could be an internal source for exploring entrepreneurial opportunities, then the new knowledge must be acquired from outside the region. This requires appropriate networks among EE actors that provide access to a wide variety of impulses and more abundant resources in other areas. Findings of *Sebestyén and Varga* (2013) and *Varga and Sebetyén* (2017) for instance show that network connections with more developed regions have a significant impact on innovation activity in European resource-deficient LDRs, while in developed regions this effect is not observed. Furthermore, *Audretsch and Belitski* (2021) emphasize that regional economic structure is important in shaping the effect of different entrepreneurial types on regional development, which also points to challenges for LDRs with a scarce endowment of creative, productive resources and industries. In sum, developing local and interregional *networking* between EE actors can contribute to updating the malfunctioning ecosystem of lagging regions with new resources which are necessary to facilitate entrepreneurial experimentation. For this reason, this paper focuses primarily on the *interaction mechanism* that drives the EEs in less developed regions.

Fitting in this line of research, our study seeks to address *how specific aspects of networks across firms are associated with different elements of the entrepreneurial ecosystem*. We posit that different outputs (in this case different level and/or quality of networking) might require different configurations of the ecosystem elements. By using fuzzy-set Qualitative Comparative Analysis (fsQCA), we explore those configurations of micro, meso and macro elements of the entrepreneurial ecosystem of ICT firms in a Hungarian city (Pécs) that result in low or high level networking performance. The ICT industry is one of the creative industries mentioned by *Audretsch and Belitski* (2021) as having significant potential for nurturing productive entrepreneurship. We used fsQCA which is well suited for the analysis of cases where outcomes can result from several different combinations of conditions, and while it works well even for small sample sizes (*Ragin* 2008).

From a methodological perspective, this study is based on the results of semi-structured interviews between the CEOs of ICT companies operating in the center of the Southern Transdanubia region of Hungary, in the city of Pécs. Being mostly rural, with formerly well-functioning, but now abandoned heavy industrial basis, this region serves as a typical case for LDRs with scarce local innovative resources and a weak entrepreneurial ecosystem. The survey focuses on how the 29 ICT firms in the sample assess the individual (micro), organizational (meso) and environmental (macro) elements of their entrepreneurial ecosystem. The focus on the ICT sector is driven by the common perception that these companies belong to the high-tech sectors which are traditionally believed to be conducive to innovation. Thus, our case is able to shed light on the particular circumstances of such an industry in an LDR, by providing evidence on the relationship between the extent of their networking activity within and outside the region and the characteristics of the local entrepreneurial ecosystem. In addition, we agree with *Roundy* (2017) that the EE literature focuses primarily on the study of strong ecosystems, while the study of struggling EEs is also essential to answer why there are ecosystems that are centers of the business discovery process while others are weak and dwindling.

The structure of the paper is as follows. *Section 2* begins with a discussion of the theoretical framework from the entrepreneurial ecosystem perspective and introduces our theoretical

model used for the investigation. Next, *Section 3* explains the data source and methodology. *Section 4* describes the results of the analyses. Finally, *Section 5* presents the discussion and conclusions of the study.

Bibliography

Z. J. Acs, E. Autio, L. Szerb, National systems of entrepreneurship: Measurement issues and policy implications, Research Policy 43 (2014) 476 494. http://dx.doi.org/10.1016/j.respol.2013.08.016

J. Alvedalen, R. Boschma, A critical review of entrepreneurial ecosystems research: towards a future research agenda, European Planning Studies, 25(6) (2017) 887 903. http://dx.doi.org/10.1080/09654313.2017.1299694

D. B. Audretsch, M. Belitski, Entrepreneurial ecosystems in cities: Establishing the framework conditions, Journalof Technology Transfer, 42, (2017) 1030 1051. http://dx.doi.org/10.1007/s10961-016-9473-8

E. Autio, Z. Cao, Fostering Digital Start-ups: Structural Model of Entrepreneurial Ecosystems, Proceedings of the 52nd Hawaii International Conference on System Sciences (2019) https://scholarspace.manoa.hawaii.edu/bitstream/10125/59979/0539.pdf

Cao, Z., Shi, X. A systematic literature review of entrepreneurial ecosystems in advanced and emerging economies. Small Bus Econ (2020). https://doi.org/10.1007/s11187-020-00326-y

R. Capello, H. Kroll, From theory to practice in smart specialization strategy: Emerging limits and possible future trajectories, European Planning Studies, 24 (2016) 1393 1406. http://dx.doi.org/10.1080/09654313.2016.1156058

R. Hassink, R., H. Gong, Six critical questions about smart specialization, European Planning Studies, 27 (2019) 2049 2065. http://dx.doi.org/10.1080/09654313.2019.1650898

M.G. Jacobides, C. Cennamo, A. Gawer Towards a theory of ecosystems Strategyic Management Journal, 39 (8) (2018), pp. 2255-2276, 10.1002/smj.2904E.

S. M. S. Krammer, Science, technology, and innovation for economic competitiveness: The role of smart specializa-tion in less-developed countries, Technological Forecasting and Social Change, 123 (2017) 95 107. http://dx.doi.org/10.1016/j.techfore.2017.06.028

H. Kroll, Efforts to implement smart specialization in practice: Leading unlike horses to the water, European Planning Studies, 23, (2015) 2079 2098. http://dx.doi.org/10.1080/09654313.2014.1003036

Mack, H. Mayer, The evolutionary dynamics of entrepreneurial ecosystems, Urban Studies, 53(10) (2016) 2118 2133. http://dx.doi.org/10.1177/0042098015586547

E. Magro, J. R. Wilson, Policy-mix evaluation: Governance challenges from new place-based innovation policies, Research Policy, 48(10) (2019) 1 10. http://dx.doi.org/10.1016/j.respol.2018.06.010

C. C. Ragin, S. Davey, fs/QCA: Fuzzy-Set/Qualitative Comparative Analysis, Version 3.0 [Computer Program], Irvine: Department of Sociology, University of California 2017.

P. T. Roundy, B. K. Brockman, M. Bradshaw, The resilience of entrepreneurial ecosystems. Journal of Business Venturing Insights, 8 (2017) 99 104.

P. T. Roundy, M. Bradshawb, B. K. Brockmanc, The emergence of entrepreneurial ecosystems: A complex adaptive systems approach, Journal of Business Research, 86 (2018) 1 10. https://doi.org/10.1016/j.jbusres.2018.01.032

T. Sebestyén, A. Varga, Research productivity and the quality of interregional knowledge networks, Ann Reg Sci 51 (2013) 155 189. https://doi.org/10.1007/s00168-012-0545-x

E. Stam, Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique, European Planning Studies, 23(9) (2015) 1759 1769. http://dx.doi.org/10.1080/09654313.2015.1061484

E. Stam, Measuring Entrepreneurial Ecosystems, in: A. O'Connor, E. Stam, F. Sussan, D. Audretsch (Eds): Entrepreneurial Ecosystems. International Studies in Entrepreneurship, vol 38. Springer, Cham, 2018. https://doi.org/10.1007/978-3-319-63531-6_9

E. Stam, A. van de Ven, Entrepreneurial ecosystem elements, Small Business Economics, (2019) https://doi.org/10.1007/s11187-019-00270-6

R. Sternberg, J. von Bloh, A. Coduras, A new framework to measure entrepreneurial ecosystems at the regional level, Zeitschrift für Wirtschaftsgeographie, 63(2-4) (2019) 103 117. https://doi.org/10.1515/zfw-2018-0014

L. Szerb, Zs. Vörös, É. Komlósi, Z. J. Acs, B. Páger, G. Rappai, The Regional Entrepreneurship and Development Index: Structure, Data, Methodology and Policy Applications. (2017) Source: http://www.projectfires.eu/publications/reports/

A. Varga, T. Sebestyén, Does EU Framework Program Participation Affect Regional Innovation? The Differentiating Role of Economic Development, International Regional Science Review, 40(4) (2017) 405 439. https://doi.org/10.1177/0160017616642821