

*Maria Miczyńska-Kowalska, dr hab. prof. UP<sup>1</sup>* 

Department of Agro-bioengineering  
University of Life Sciences in Lublin

*Marina Slonimska, dr hab. prof. PSU<sup>2</sup>* 

Department of Business Accounting and Finance, Logistics and Management  
Polotsk State University

## **Network mechanisms for supporting entrepreneurially weak regions**

### INTRODUCTION

Over the past two decades, endogenous theories of regional development based on innovation and knowledge, entrepreneurship development and networks have been widely discussed (Porter, 2003; Braunerhjelm, 2010; Harris, 2011; Huggins, Johnston, 2009; Polverari, 2018). Recent models of regional development link the endogenous factors, integrating network dimensions with entrepreneurial- and innovation-related components (Huggins, Thompson, 2015). Therefore, entrepreneurial network creation can be considered one of the important factors of regional development.

In more entrepreneurial regions, network mechanisms are formed through the emerging evolutionary interdependency between entrepreneurs and other economic agents, but such mechanisms are less apparent in entrepreneurially weak regions (Huggins, Johnston, 2009). Given the overall importance of entrepreneurial networks for entrepreneurship development (Dodd, Keles, 2014), the actual problem is to develop a policy tool which can stimulate entrepreneurial networking initiatives in entrepreneurially weak regions.

---

<sup>1</sup> Correspondence address: University of Life Sciences in Lublin Department of Agro-bioengineering, Akademicka st. 15, 20-950 Lublin; e-mail: Maria.Miczynska@up.lublin.pl. ORCID: 0000-0003-0013-6349.

<sup>2</sup> Correspondence address: Polotsk State University, Faculty of Finance and Economics, Department of Business Accounting and Finance, Logistics and Management, 29 Blokhin, 120, Novopolotsk, Belarus, 211440; e-mail: m.slonims kaya@pdu.by. ORCID: 0000-0002-4836-3156.

The purpose of the article is to propose and to justify network mechanisms for entrepreneurially weak regions. The research assesses the hypothesis that an ICT-based platform is a useful tool for enhancing inter-firm network collaboration in such regions and it may reduce barriers to entrepreneurs' cooperation.

The paper focuses on the problem of entrepreneurial network development in entrepreneurially weak regions, for example, the Vitebsk region of Belarus. The region has the lowest indicators of entrepreneurial activity (the number of entrepreneurs per 1000 residents) when compared to other regions of Belarus. The paper draws on quantifiable data from 400 respondents and qualitative data from 21 interviews with owner-managers from a study of small and medium enterprises (SMEs) in the Vitebsk region, to assess the nature of their networking activity.

The paper begins by examining the role of networking by owner-managers in regional economic growth, and in enhancing their business performance, on the basis of a literature review in the context of the research. This is followed by an outline of the context underlying our choice of the Vitebsk region as a case study. The methodology explains the means by which data was gathered and analysed based on a sample of knowledge-based SMEs in the region. The discussion of the methodology is followed by a presentation and discussion of the main results, which are used to indicate relevant policy implications prior to the conclusion. This paper concludes that regional authorities should use platforms based on information and communication technologies as a network mechanism for entrepreneurially weak regions.

#### NETWORK EFFECTS, ICT-BASED PLATFORMS AND REGIONAL ECONOMIC GROWTH: THEORETICAL BACKGROUND

Many theoretical approaches and concepts of regional economic growth recognize the importance of links between firms and organizations, including the concept of territorial industrial agglomeration (Marshall, 1920), regional clusters (Porter, 1990), innovative milieus and regional systems of innovation (Camagni, 1991), new industrial districts (Bellandi, De Propris, 2015), and entrepreneurial ecosystems (Moor, 1993). The entrepreneurial ecosystem concept has been dominant since 2016 (Malecki, 2018).

An entrepreneurial ecosystem is defined as “*a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory*” (Stam, Spigel, 2016, p. 1), “*a dynamic, self-regulating network of many different types of actors*” (Isenberg, 2014) or as “*a generic context aiming to foster entrepreneurship within a given territory. .... Therefore, it consists of a horizontal network (customers and providers) and a vertical network (competitors and complementors). .... It also includes organizations supporting entrepreneurs: public or private funding agencies (banks, business angels, venture capital, etc.);*”

*support entities (business incubators, consultants, etc.); research organizations (research centers, laboratories, etc.); and business consortia (active businesses, associations and trade unions, etc.)”* (Theodoraki et al., 2018, p. 56).

Entrepreneurship plays an important role in theories of regional economic growth (Fritsch, Wyrwich, 2017). But, as F.-W. Chen *et al.* (2018, p. 2) noted, the effect of entrepreneurship is significantly enhanced after introducing the joint effects of entrepreneurship and social networks. Social networks help reduce the cost of knowledge transfer, access and spillovers, thereby promoting the accumulation of entrepreneurship capital and accelerating the entrepreneurial spirit to play an economic role (Chen et al., 2018, p. 2). Entrepreneurship accelerates the commercialization of knowledge by spillover effects (Audretsch et al., 2006). Economic growth is the consequence of education (human capital formation) and can be the result of innovation introduced by a fraction of the population with higher education (Martins et al., 2009, p. 2212). The innovation performance of firms is significantly related to network capital investment in dynamically configured networks (Huggins, Thompson, 2015, p. 534).

Trust-creating initiatives are of utmost relevance to fostering successful business networks (Strobl et al., 2014). Trust is a crucial aspect of the organizational preparedness that is required to enhance chances of participating in networks of legally independent partners to smooth the sharing of resources, knowledge, and competence, and in turn facilitate organizational collaboration (Msanjila, Afsarmanesh, 2008). Trust can act as a substitute for governance mechanisms, which are currently time-consuming and costly activities (Gustafsson, Magnusson, 2016).

Due to trust, entrepreneurs can form various types of linkages to attain technological support and other financial benefits. These linkages include: collaborations with large organizations, forming SME networks of similar type of firms and linkages with universities and institutes (Gupta, Kumar, 2018).

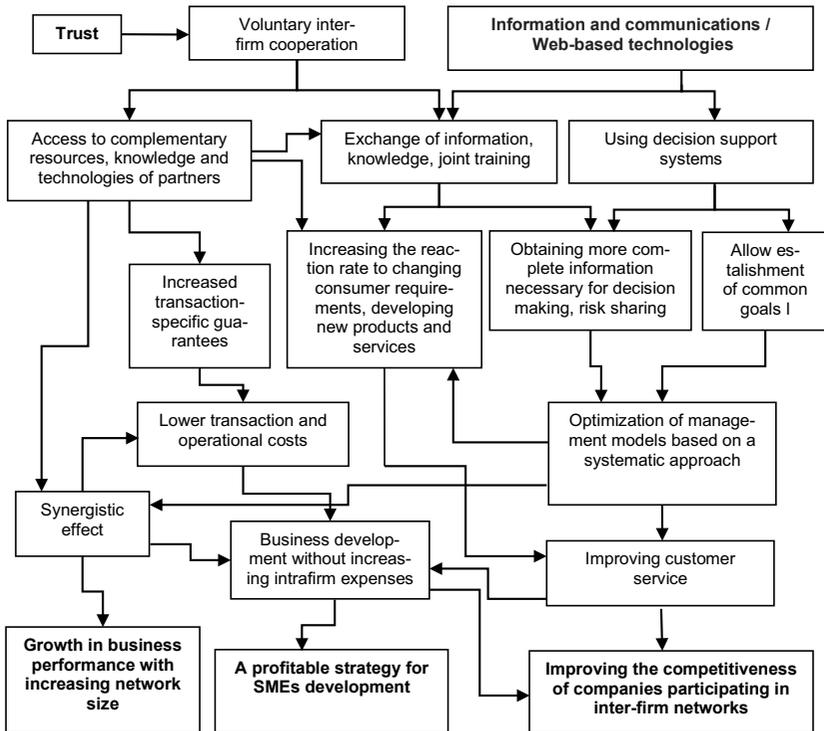
The growing interest in business collaboration motivates today's industries, especially SMEs, to establish business networks to respond to market opportunities with added business benefits. SMEs often lack sufficient resources and knowledge to deal with the rapidly changing environment in which they operate. Through networking they can obtain the knowledge and skills necessary to remain competitive. In addition, they can benefit from economies of scale without having the disadvantages of being large-scale (Schoonjans et al., 2013).

Communication behaviour is critical in achieving the benefits of cooperation between partners. There are three aspects of communication behaviour: communication quality, extent of information sharing between partners and participation in planning and goal setting (Nagy, 2007, p. 10).

We intend to show that a modern environment is increasingly permeated with digital technologies and the technologies are key elements of a modern entrepreneurial ecosystem. In such environments, an information and communication technology

(ICT)/ Web-based technology supports real-time information sharing between key business partners for the collaborative design and manufacturing of customized products. The combination of the ICT-based platform and collaborative innovation can facilitate the creative process and be a driver of operational synergies. The adoption of ICT-based platforms for collaborative innovations reduces transaction costs (Esposito De Falco et al., 2017). The design and development of ICT-based platforms contributes to the building of collaborative business networks and supports real-time process monitoring and management of collaborative processes. Such real time process monitoring systems enable partners to discover any process bottlenecks, and adopt necessary actions to eliminate or minimize them (Shamsuzzoha et al., 2016).

Systematization of network effects (see Figure 1) allows us to conclude that the main conditions for their occurrence are trust and ICT-based platforms.



**Figure 1. The network effects systematization**

Source: own study based on National Statistical Committee of the Republic of Belarus data.

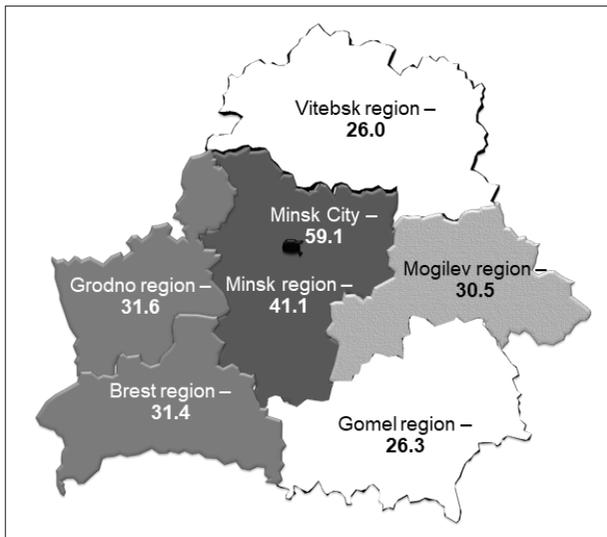
An inter-firm network has to go through cooperation, coordination and collaboration as subsequent stages. Coordination and collaboration aim at enforcing mutual understanding of the collaborating tasks, thus producing alignment as an outcome. Trust is a key component in enabling cooperation between firms and

facilitating the alignment of incentives between them, and ICT-based platforms play an important role at all the stages (Cremona et al., 2014).

In order to test our hypothesis on the possibility of using ICT-based platforms to enable cooperation between firms in an entrepreneurially weak region, we used the results of a survey of entrepreneurs in the Vitebsk region of the Republic of Belarus which is an example of such a region.

### VITEBSK REGION AS AN ENTREPRENEURIAALLY WEAK REGION

One of the main indicators of entrepreneurial activity in a population is the number of SMEs per 1000 residents. Figure 2 below represents Belarusian territorial distribution of the indicator as of 1 January 2019. As might be noticed from the figure, SMEs are unevenly distributed in the territory. Their main share (50.2 per cent) is concentrated in the capital city of Minsk and the Minsk region. The western regions of the Republic of Belarus, which border with the EU, are relatively stronger entrepreneurially compared to those in the eastern areas which border with Russia. The Vitebsk region is the only Belarusian region which borders both with the EU and with Russia. The number of SMEs per 1000 residents here was at an intermediate level before 2014. However, the value of this indicator has fallen rapidly in the past five years, and the Vitebsk region became entrepreneurially the weakest by the end of 2018 compared to other Belarusian regions.



**Figure 2. The number of entrepreneurs per 1000 residents by regions of the Republic of Belarus, as of 1 January 2019**

Source: own study based on National Statistical Committee of the Republic of Belarus data.

In the whole Republic of Belarus, for 2014–2018, the number of SMEs increased by 5.9%, in the Vitebsk region over the same period the number of SMEs decreased by 12.9%.

Since 2014, there has been a decrease in the number of workers employed in SMEs both in the Vitebsk region and in the Republic of Belarus as a whole. However, in the Vitebsk region this process is proceeding at a faster pace, and as a result, employment in SMEs in the Republic of Belarus for the years 2014–2018 decreased by 0.5%, and in the Vitebsk region over the same period – by 6.7%.

The Vitebsk region lags behind in almost all indicators characterizing the contribution of SMEs to the development of the territory from the national average, but its role in the region's economy is significant, primarily in ensuring employment. Thus, SMEs are an important component of the economy of Vitebsk region. Therefore, identifying barriers to its development and developing effective measures to overcome them is an urgent task for the region.

The Association of Employers and Entrepreneurs of the Vitebsk region (as a regional partner of the IPM Research Center) conducted a regional study of the opportunities and priority areas for SME development (Slonimska et al., 2019). One of the authors was a leader of the research. The study was carried out as part of the international technical assistance project “Development of the October Economic Forum”, registered in the database of international technical assistance projects and programs of the Ministry of Economy of the Republic of Belarus on July 20, 2016 under No 2/16/000810. The project goal was to increase the potential of Belarusian non-governmental organizations (NGOs) in promoting responsible economic policies at local and national levels. Some questions were included in the questionnaire about the role of networking and business-cooperation in SME activity.

## RESEARCH METHODOLOGY

The survey of SME leaders was conducted using the method of in-depth interviews (21 respondents) and the method of a structured questionnaire survey (400 respondents). The indicated sample size allowed us to obtain results with a reliability of 95% and an accuracy of no less than  $\pm 5\%$ . The in-depth interviews were conducted in July–August 2018, whereas the questionnaire survey was conducted in February–August 2019.

Respondents interviewed by in-depth interviews were leaders of SMEs located in six settlements of the Vitebsk region: twelve in the regional center, four in the cities of Polotsk and Novopolotsk, two in the village of Shumilino, and one in each of the cities of Orsha, Glubokoe and in the Vitebsk district. According to the type of activity, the respondents were distributed as follows: in the manufacturing sector there were thirteen of them (mechanical engineering, instrument making,

sewing and food), and in the services sector there were eight (ICT, logistics, service stations, medical and travel services, accommodation and food services). Eleven members of the Association of Employers and Entrepreneurs of the Vitebsk region and ten managers (business owners) who are not members of this organization were interviewed.

The selection of respondents for a structured questionnaire was carried out by random sampling from the list of enterprises located in the national business directory on goods and services “Business Belarus 2018”, stratified by the number of SMEs in districts and cities of the Vitebsk region. The planned sample structure was partially changed due to the refusal of individual respondents to participate in the survey.

According to the location of enterprises, the respondents were distributed as follows: 175 (43.8%) in Vitebsk city, 83 (20.8%) in the cities of Polotsk and Novopolotsk, 34 (8.5%) in Osha city, 108 (26.9%) in the countryside and small towns of the region. By type of activity, 89 wholesale and retail trade enterprises were represented (22.2%), 70 in production (17.5%), 49 in services to the population (12.3%), 42 in transport services (10.5%), 32 in hotel and restaurant services (8%), 31 in construction and design of facilities (7.8%), 27 in agriculture, forestry and fish farming (6.7%), 15 in information technology (3.7%), 8 in tourism and agritourism (2%), 6 in health care (1.5%), and 31 in other activities (7.8%).

Among the respondents, 308 (77%) were heads of micro-organizations (employing up to 15 people), 85 (21.2%) from small organizations (employing from 16 to 100 people inclusive) and 7 (1.8%) from medium-sized organizations (employing from 101 to 250 people). Respondents differed in their experience in the market of the Vitebsk region – 9 (2.3%) of them had worked for up to one year, 49 (12.3%) from one to three years, 73 (18.2%) from three to five years, 113 (28.2%) from five to ten years, 148 (37%) for more than ten years, 8 (2%) of the respondents did not indicate how many years their company had been operating on the market.

#### BARRIERS HINDERING THE DEVELOPMENT OF INTER-FIRM NETWORKS IN THE VITEBSK REGION

The survey did not identify any formal networks of SMEs in the form of consortia or temporary arrangements in the Vitebsk region. However, some of the respondents provided examples of interactions among the members of the Association of Employers and Entrepreneurs. For example, a head of a travel company may exchange information with a head of a hotel, jointly planning tourist accommodation; heads of dental companies may provide joint training for the staff, jointly renting a room and inviting experts from abroad.

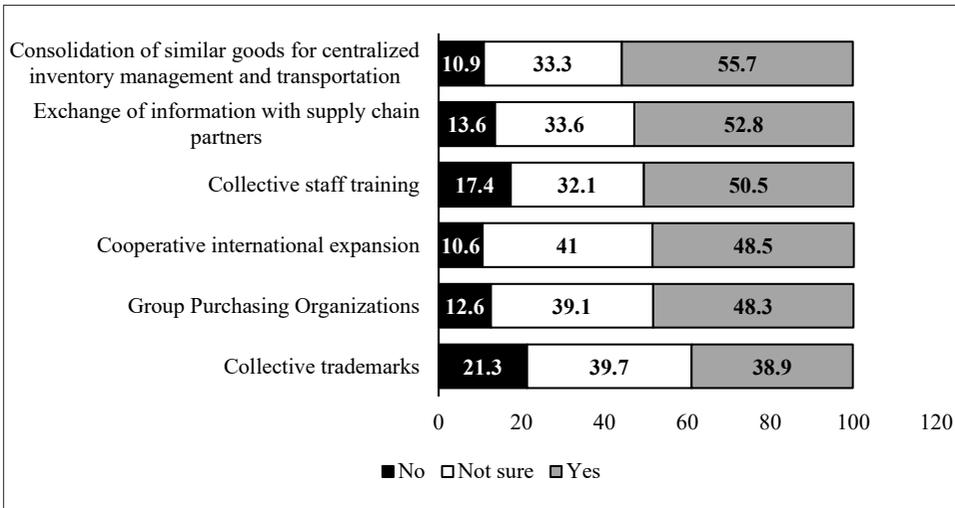
According to the results of the survey, about half of the respondents believe that they need cooperation with partners, and it is important for them to develop various forms of cooperation. As one of the respondents noted during the interview: “We are losing millions due to the fact that we cooperate and communicate too little. There shouldn’t be any lack of information. We need to develop an ICT-based cooperation program”.

About 20% of the respondents do not consider it useful to use any kind of cooperation with other enterprises to develop their own businesses. They commented on their opinion as follows: “We ourselves manufacture components and, due to the specifics of our activities, for us, such forms of interaction are not relevant”; “For our business this is not acceptable. For other small businesses it may be suitable. For example, for a farmer who produces 20 liters of milk, it may be convenient to combine with others and order one tanker for 200 liters; or for those who produce identical goods, it should be possible to develop one brand. The collective farm is voluntary; we have already encountered this. We are individuals, we have our own approaches”; “Now in our field of activity, if something is not clear, then you can turn to the Internet and find everything”; “Cooperation for our company is extremely limited”.

About 30% of the respondents find it difficult to answer the question concerning the usefulness of projects to develop interaction between entrepreneurs: “It is important that cooperating small businesses behave correctly”. “When I work together with someone, there is a risk that my customers will be taken away. We do not have this culture. If there are people whom you can trust, then you can work with them”; “We thought about this in order to work in cooperation with several set-ups, but no one supported me. In addition, someone should be responsible for this”; “I believe that this is unrealistic. All this is great and all these points in the category of different spheres have the right to exist, but there is a problem with our mentality. All of these points “stumble” over a lack of trust. Our psychology is that nobody trusts anyone”.

The respondents were asked whether any particular form of inter-firm cooperation could be useful for their business development. As Figure 3 shows, the most useful type of collaboration for SMEs (according to the respondents) was collaborative logistics, and the least useful for them were collective trademarks. It should be noted that more than a third of the interviewed SME leaders find it difficult to answer this question, since they are not familiar with any forms of network cooperation among SMEs.

According to the respondents, the problems hindering the development of SME cooperation in the Vitebsk region are lack of information about potential partners (noted by 76.8% respondents), low level of trust between entrepreneurs (76%), lack of infrastructure and services for business community cooperation support (61%).



**Figure 3. Distribution of respondents according to the answers to the question: “Do you find the following types of cooperation useful for the development of your business?”**

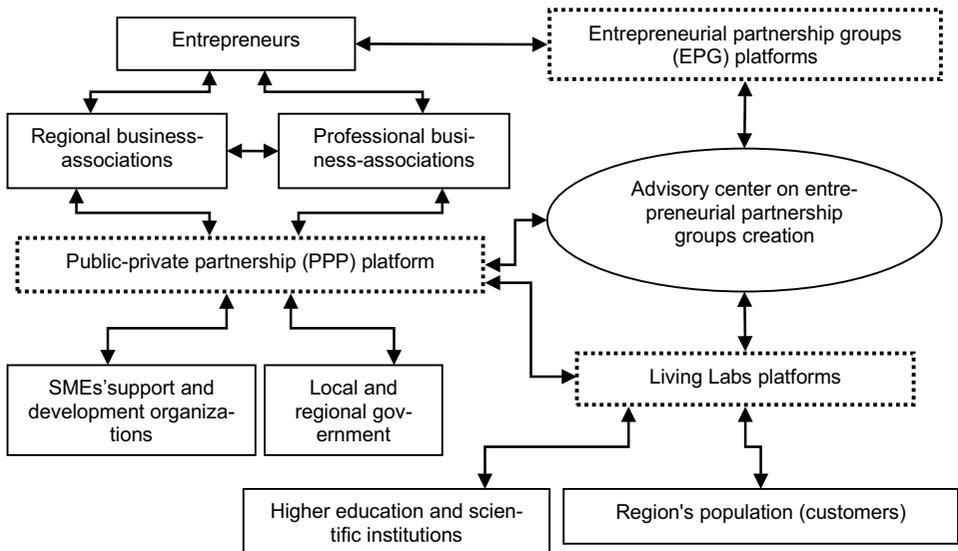
Source: own study based on survey data.

Thus, to facilitate participation of SMEs in networks Vitebsk regional government measures, first of all, should be directed to creating the conditions for regional SMEs, enabling them to share information and helping them to build trust. And, as we consider, the best way to achieve the goal is to develop a regional system for entrepreneurs networking development using ICT-based platforms. The structure of the system we are proposing is described below.

### A REGIONAL SYSTEM FOR ENTREPRENEURS NETWORKING DEVELOPMENT

A regional system for entrepreneurs networking development, we propose, includes three types of ICT-based platforms: a public-private partnership (PPP) platform, entrepreneurs’ partnership groups (EPG) platforms and Living Labs platform (see Figure 4). The system also includes an advisory center on the creation of entrepreneurial partnership groups.

Good communication is critical in ICT-based platforms, where a large number and diversity of stakeholders make communication potentially complicated or cumbersome. Building effective platforms requires the design of an appropriate and effective management structure to implement platform tasks and produce its stated outputs (Reid et al., 2014).



**Figure 4. A regional system for entrepreneurial networking development**

Source: own study.

It is assumed that a PPP-platform would operate as a space for engaging stakeholders and identifying partnerships. Every regional business must be registered and represented on the platform. This would address the issue of lack of information about potential partners. Communication between SME managers on the platform and discussion of common issues would enable the building of trust. It is proposed that SME managers will have an opportunity to communicate with representatives of regional authorities and other stakeholders on how to improve the business environment and how to develop the regional economy focusing on new ideas.

An “advisory center on entrepreneurial partnership groups creation” is composed of experts (legal professionals, marketers, IT professionals, psychologists et al.), who advise entrepreneurs on the organization of new SME networks. This would address the issue of lack of knowledge on the subject among SME managers.

EPG-platforms are sets of collaboration tools for virtual teams supporting SME network collaboration, through the Web and other digital technologies. There are many ready-made software solutions related to the subject. For example, A. Shamsuzzoha *et al.* (2016) propose an innovative ICT platform, supporting SME collaboration, which follows the Net-Challenge conceptual approach and methodological guidelines for SMEs to form and operate virtual organizations (VO) for the collaborative development and delivery of customized products. It is expected that IT professionals of the “advisory center on entrepreneurial partnership groups creation” would help SMEs to choose appropriate ready-made software solutions or to develop individual ones.

Living Labs are defined on the EU Smart specialization platform site (<https://s3platform.jrc.ec.europa.eu/living-labs>) as “user-centred, open innovation ecosystems based on a systematic user co-creation approach, integrating research and innovation processes in real life communities and settings. In practice, Living Labs place the citizen at the centre of innovation, and have thus shown the ability to better mould the opportunities offered by new ICT concepts and solutions to the specific needs and aspirations of local contexts, cultures, and creativity potentials”. Living labs platforms as collaborative development platforms should bring together all the relevant parties: developers, public sector agencies, exploiters, and users of new technologies and related products and services (Leminen et al., 2012). Universities have to act as brokers between researchers and local entrepreneurs (Hapenciuc et al., 2016, p. 5312) and to change the teaching processes based on knowledge transfer into developing students’ skills (Hapenciuc et al., 2016; Bejinaru, 2018). Living Labs allow these important roles to be performed. Therefore, the proposed policy measures for regional authorities are expected to be allowed to contribute to creating an effective entrepreneurial ecosystem.

The project on the creation of platforms needs, for secure funding at the outset of the initiative, to demonstrate the value of the platforms to its “clients” and partners. This might be provided by a combination of private and public sources. Any partnership projects need to be closely aligned with the needs of local actors, with local communities and organisations taking a leading role in such initiatives. Too great a dependence on external “top-down” funding can endanger the credibility and viability of the platform at national and local level (Reid et al., 2014). Nevertheless, there are some examples of successful external assistance for implementing similar projects. For example, the Family Business Initiative Association implemented the project: “Purchasing groups as an alternative source of financing, increasing the sustainability and competitiveness of Ukrainian small family businesses” co-financed under the Polish development cooperation program of the Ministry of Foreign Affairs of the Republic of Poland in 2015–2016<sup>3</sup>.

## CONCLUSION

Since entrepreneurial network creation can be considered as one of the important factors of regional economic growth and network mechanisms are less apparent in entrepreneurially weak regions, we have examined the hypothesis that ICT-based platform is a useful tool for enhancing inter firm network collaboration in such regions.

Literature analysis showed that ICT-based platforms play an important role at all stages of inter-firm network creation. The results of a survey of entrepreneurs in

---

<sup>3</sup> <http://firmyrodzinne.pl/o-nas/projekty-i-inicjatywy/pomoc-dla-ukrainy/>

an entrepreneurially weak region (the Vitebsk region of the Republic of Belarus) allowed the identification of such barriers to entrepreneurs' cooperation there as lack of information about potential partners, low level of trust between entrepreneurs and lack of infrastructure and services for business community cooperation support. Therefore, ICT-based platforms may reduce barriers to entrepreneurs' cooperation and enable the conditions for network effects occurrence in an entrepreneurially weak region.

The research enables policy recommendations for regional authorities to develop entrepreneurial networks in entrepreneurially weak regions. We proposed a regional system for entrepreneurial networking development consisting of a public-private partnership platform, entrepreneur's partnership groups platforms, the Living Labs platform and an advisory center on the creation of entrepreneurial partnership groups. These would bring regional partners together, enable the building of trust among them and would be expected to allow them to contribute to creating an effective entrepreneurial ecosystem.

#### BIBLIOGRAPHY

- Audretsch, D. B., Keilbach, M. C., Lehmann, E. E. (2006). *Entrepreneurship and Economic Growth*. Oxford: Oxford University Press. DOI: 10.1093/acprof:oso/9780195183511.001.0001.
- Bejinaru, R. (2018). Assessing students' entrepreneurial skills needed in the knowledge economy. *Management & Marketing, Challenges for the Knowledge Society*, 13(3), 1119–1132. DOI: 10.2478/mmcks-2018-0027.
- Bellandi, M., De Propriis, L. (2015). Three Generations of Industrial districts. *Journal of Regional Research*, 32, 75–87.
- Braunerhjelm, P., Acs, Z. J., Audretsch, D. B., Carlsson, B. (2010). The missing link: knowledge diffusion and entrepreneurship in endogenous growth. *Small Business Economic*, 34, 105–125. DOI: 10.1007/s11187-009-9235-1.
- Camagni, R. (1991). Local 'Milieu', Uncertainty and Innovation Networks: Towards a New Dynamic Theory of Economic Space. In: R. Camagni (Ed.), *Innovation Networks: Spatial Perspectives* (pp. 121–144). London: Belhaven Press.
- Chen, F.-W., Fu, L.-W., Wang, K., Tsai, S.-B., Su, C.-H. (2018). The Influence of Entrepreneurship and Social Networks on Economic Growth – From a Sustainable Innovation Perspective. *Sustainability*, 10(7), 1–19. DOI: 10.3390/su10072510.
- Cremona, L., Lin, T., Ravarini, A. (2014). The role of digital platforms in inter-firm collaboration. *Conference Paper: Mediterranean Conference on Information Systems (MCIS)*. pp. 1–13. Retrieved from: [https://www.researchgate.net/publication/265397260\\_The\\_role\\_of\\_digital\\_platforms\\_in\\_inter-firm\\_collaboration](https://www.researchgate.net/publication/265397260_The_role_of_digital_platforms_in_inter-firm_collaboration) (2019.08.28).
- Dodd, S. D., Keles, J. (2014). *Expanding the networks of disadvantaged entrepreneurs. A background paper for the OECD Centre for Entrepreneurship, SMEs and Local Development*. Paris: OECD.

- Esposito de Falco, S., Renzi, A., Orlando, B., Cucari N. (2017). Open collaborative innovation and digital platforms. *Production Planning & Control*, 28(16), 1344–1353. DOI: 10.1080/09537287.2017.1375143.
- Fritsch, M., Wyrwich, M. (2017). The effect of entrepreneurship on economic development – An empirical analysis using regional entrepreneurship culture. *Journal of Economic Geography*, 17, 157–189. DOI: 10.1093/jeg/lbv049.
- Gupta, H., Kumar, M. (2018). Modelling cause and effect relationship among enablers of innovation in SMEs. *An International Journal*, 25(5), 1597–1622. DOI: 10.1108/BIJ-03-2017-0050.
- Gustafsson, O., Magnusson, J. (2016). *Inter-organizational collaboration in theory and practice: Based on a multiple-case study in the automotive industry*. Gothenburg: Chalmers Reproservice.
- Hapenciuc, C. V., Bejinaru, R., Roman, C., Neamtu, D. M. (2016). The role of HES within the evolution of the business sector. *EDULEARN – 8th Annual International Conference on Education and New Learning Technologies, Barcelona (Spain). 4th – 6th of July*. DOI: 10.21125/edulearn.2016.2269.
- Harris, R. G. (2011). Models of regional growth: Past, present and future. *Journal of Economic Surveys*, 25(5), 913–951. DOI:10.1111/j.1467-6419.2010.00630.x.
- Huggins, R., Johnston, A. (2009). Knowledge networks in an uncompetitive region: SME innovation and growth. *Growth and Change*, 40(2), 227–259. DOI: 10.1111/j.1468-2257.2009.00474.x.
- Huggins, R., Thompson, P. (2015). Entrepreneurship, innovation and regional growth: a network theory. *Small Business Economics*, 40(2), 227–259. DOI: 10.1007/s11187-015-9643-3.
- Isenberg, D. (2014). What an entrepreneurship ecosystem actually is. *Harvard Business Review*, 5. Retrieved from: <https://hbr.org/2014/05/what-an-entrepreneurial-ecosystem-actually-is> (2020.05.11).
- Leminen, S., Mika, W., Nyström, A.-G. (2012). Living Labs as Open-Innovation Networks. *Technology Innovation Management Review*, 2, 6–11. DOI: 10.22215/timreview/602.
- Malecki, E.L. (2018). Entrepreneurship and entrepreneurial ecosystems. *Geography Compass*, 12(3), 1–21. DOI: 10.1111/gec3.12359.
- Marshall, A. (1920). *Principles of Economics*. London: Macmillan and Co.
- Martins, T. V., Araújo, T., Santos, A. M., St Aubyn, M. (2009). Network Effects in a Human Capital Based Economic Growth Model. *Physica A: Statistical Mechanics and its Applications*, 388(11), 2207–2214. DOI: 10.1016/j.physa.2009.02.006.
- Moore, J. F. (1993). Predators and prey: A new ecology of competition. *Harvard Business Review*, 71(3), 75–86.
- Msanjila, S. S., Afsarmanesh, H. (2008). FETR: a framework to establish trust relationships among organizations in VBEs. *Journal of Intelligent Manufacturing*, 21(3), 251–265. DOI: 10.1007/s10845-008-0178-1.
- Nagy, J. (2007). *Interfirm relationships – a literature review*. Budapesti Corvinus Egyetem: Műhelytanulmányok Sorozat.
- Polverari, L. (2018). Innovation as a regional development driver: Necessary shift or policy misdirection? *European Policy Research Paper*, 102, 1–74.
- Porter, M. E. (1990). *The competitive advantage of nations*. New York: Free Press.

- Porter, M. E. (2003). The economic performance of regions. *Regional Studies*, 37(6), 545–546. DOI: 10.1080/0034340032000108688.
- Reid, S., Hayes, J. P., Stibbe D. (2014). *Platforms for Partnership: Emerging good practice to systematically engage business as a partner in development*. Oxford: The Partnering Initiative.
- Schoonjans, B., Van Cauwenberge, P., Vander Bauwhede, H. (2013). Formal business networking and SME growth. *Small Business Economics*, 41, 169–181. DOI: 10.1007/s11187-011-9408-6.
- Slonimska, M., Asheva, G., Dubko, N. (2019). Predprinimatel'stvovitebskoj oblasti: problemy i perspektivy razvitiâ. Vitebsk: OO "Associaciânanimatel'ej i predprinimatelej". Retrieved from: kef.by/publications/research/ konkurentosposobnost-regionov-belarusi/ predprini-matelstvo-vitebskoy-oblasti-problemy-i-perspektivy-razvitiya (2019.08.28).
- Shamsuzzoha, A., Toscano, C., Carneiro, L., Kumar, V., Helo, P. (2016). ICT-based solution approach for collaborative delivery of customized products. *Production Planning & Control*, 27(4), 280–298. DOI: 10.1080/09537287.2015.1123322.
- Stam, E., Spigel, B. (2016). Entrepreneurial ecosystems. *U.S.E. Discussion Paper Series*, 16–13. Tjalling C. Koopmans Research Institute, Utrecht School of Economics, Utrecht University.
- Strobl, A., Peters, M., Raich, M. (2014). Entrepreneurial Networks: Exploring the Role of Social Capital. *International Review of Entrepreneurship*, 12, 103–132.
- Theodoraki, C., Messeghem, K., Rice, M. P. (2018). A social capital approach to the development of sustainable entrepreneurial ecosystems: an explorative study. *Small Business Economics*, 51(1), 153–170. DOI: 10.1007/s11187-017-9924-0.

### Summary

Entrepreneurial network creation can be considered one of the important factors of regional development. The paper focuses on the problem of entrepreneurial network development in entrepreneurially weak regions. It shows that digital technologies are key elements of a modern entrepreneurial ecosystem. Systematization of network effects allowed for the conclusion that the main conditions for their occurrence are trust and ICT-based platforms. The paper draws on quantitative and qualitative data from interviews with owner-managers from a study of SMEs in an entrepreneurially weak region of Belarus to assess the nature of their networking activity. The survey did not identify any formal networks of SMEs in the form of consortia or temporary arrangements in the Vitebsk region, and showed that the problems hindering the development of SME cooperation in the Vitebsk region are lack of information about potential partners, a low level of trust between entrepreneurs, lack of infrastructure and services for business community cooperation support. This article offers a regional system for entrepreneurs networking development using three types of ICT-based platforms: a public-private partnership (PPP) platform, entrepreneur's partnership groups (EPG) platforms and Living Labs platform. The proposed policy measures for regional authorities would be expected to allow them to contribute to creating an effective entrepreneurial ecosystem in entrepreneurially weak regions.

**Keywords:** entrepreneurial network, regional development, digital technologies, ICT-based platforms.

## **Mechanizmy sieciowe wsparciem dla rozwoju regionów o niskiej przedsiębiorczości**

### *Streszczenie*

Tworzenie sieci przedsiębiorczości można uznać za jeden z ważnych czynników rozwoju regionalnego. Artykuł koncentruje się na problemie rozwoju sieci przedsiębiorczości w regionach słabych pod względem przedsiębiorczości. Pokazuje, że technologie cyfrowe są kluczowymi elementami nowoczesnego ekosystemu przedsiębiorczości. Systematyzacja efektów sieciowych pozwoliła stwierdzić, że głównymi warunkami ich występowania są zaufanie i platformy oparte na ICT. W artykule wykorzystano dane ilościowe i jakościowe z wywiadów z właścicielami – menedżerami z badania MŚP w słabo rozwiniętym pod względem przedsiębiorczości regionie Białorusi w celu oceny charakteru ich działalności sieciowej. Badanie nie zidentyfikowało żadnych formalnych sieci MŚP w formie konsorcjów lub tymczasowych porozumień w regionie witebskim i wykazało, że problemami utrudniającymi rozwój współpracy MŚP w regionie witebskim są brak informacji o potencjalnych partnerach, niski poziom zaufania między przedsiębiorcami, brak infrastruktury i usług do wspierania współpracy środowisk biznesowych. W artykule przedstawiono regionalny system rozwoju sieci przedsiębiorców za pomocą trzech rodzajów platform opartych na ICT: platformy partnerstwa publiczno-prywatnego (PPP), platformy grup partnerstwa przedsiębiorców (EPG) i platformy Living Labs. Oczekuje się, że proponowane narzędzia mogą przyczynić się do stworzenia skutecznego ekosystemu przedsiębiorczości w regionach słabych pod względem przedsiębiorczości.

*Słowa kluczowe:* sieć przedsiębiorczości, rozwój regionalny, technologie cyfrowe, platformy oparte na ICT.

JEL: L26, L14.