NETWORKS AND SUPPORT FOR TECHNOLOGICAL ENTREPRENEURSHIP

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Abstract- The aim of this study is to establish which factors have an impact on collaboration between technological enterprises and support institutions. Factors identified from a review of the subject literature underwent empirical verification based on a 650-element sample of small and medium-sized technological firms. A survey was carried out among the firms using a specially prepared questionnaire. In view of the qualitative nature of the factors influencing collaboration, it was decided to use probit modelling [Albert, Chib 1993]. Analysis was performed using Statistica software.

Index Terms- collaboration, networks, probit modelling, technological entrepreneurship.

I. INTRODUCTION

Technological enterprises constitute an interesting and current research challenge in management studies, in view of their significant development and the specific conditions to which they are subject. It is remarked in the literature that, thanks to the use of scientific knowledge, not only large concerns but also small and medium-sized technological firms function in the marketplace and play an important role in creating innovative solutions. They are characterised by a propensity for innovative action and a high degree of activity in bringing onto the market new technological solutions that have been developed by scientists. In the published literature there is no uniform definition of a technological enterprise [Beckman et al. 2012] and several different models for the realisation of this type of business can be encountered. Its essence is the use of technological opportunities to improve the business itself or to make products for the market. Anders [2013] notes that the source of a developed solution is the scientific knowledge of its creators – representatives of higher education institutions or scientific research centres. Thus the operations of a technological enterprise are based on the use of knowledge from and/or collaboration with research centres through the creation of networks [Pyka, Kuppers 2002, p. 5]. Network interaction enables them to propagate technological changes, knowledge and access to the market. Specialisation on the part of each network member enables the creation of a unique value for the network [Czakon 2005]. Schumpeter's creative destruction requires a technological enterprise to establish relations through which it connects with itself, with its trading partners and with business-related institutions, creating systems that facilitate the transfer of knowledge or technology, and thus also of technological innovation. Many definitions of a network can be found in the literature; here it is taken to mean an organisational form engaging multiple organisations linked by instrumental goals relating to the transfer of technology. Members of the network contribute unique value-forming abilities, such as resources of knowledge or access to a market. Key partners will include a firm's competitors, customers, suppliers and strategic allies, support institutions, and the press and media. One of the more serious problems in such networks is limited trust.

From a practical standpoint, then, it is very important to identify the factors that have an impact on the establishment of such collaboration. In this work, support institutions will be taken to include:

— national and local government institutions such as enterprise centres and centres for the support of small and medium-sized enterprises (SMEs), tasked with the wide promotion and incubation of enterprise;
— technology transfer institutions, namely technological parks, technological incubators, technology transfer centres and academic enterprise incubators, having as their goal the transfer of technologies, delivery of pro-innovative services and technological activation;
— higher education institutions, research and development units and other bodies providing support through science and research, having as their goal the supply of new technologies or seeking of new solutions;
— bank-like financial institutions (business angel networks, loan funds, credit guarantee funds), aiming to reduce financial discrimination and to supply financial services tailored to businesses of the type being considered.

The present research is based on a variety of available empirical and source materials relating to collaboration between technological enterprises and

support institutions. A key element of the work is a review of the subject literature, which serves:
– to describe such collaboration from the point of view of various theoretical schools;
– to identify gaps in the research and to verify whether the results of the present empirical study are satisfactory and/or contradictory with respect to previously published results.
The following research questions were posed:
1. Does market level – local, regional, national, international – have an impact on collaboration between technological enterprises and support institutions?
2. Do support services act as a substitute for the seeking of new knowledge and transfer of technologies?
3. Does the perception of market or technological competition have an impact on collaboration between technological enterprises and support institutions?
4. Does environmental turbulence have an impact on collaboration between technological enterprises and support institutions?

II. LITERATURE REVIEW

The nature of technological enterprises means that it is essential for them to collaborate with scientific and research institutions, broadly defined: higher education institutions, research and development units, centres for the support of SMEs, technology transfer institutions, and the like. The literature describes various models and forms which this collaboration may take [McMullen, Shepherd 2006, pp. 142–147; Lachiewicz et al. (eds.) 2013, pp. 77–92]. The following are example scenarios:
– a firm collaborates unwillingly with a support institution, commissioning it to perform only essential work and only when absolutely necessary;
– a firm collaborates with a support institution only when it is necessary for the firm's operations;
– a firm collaborates closely with a support institution, commissioning it to solve a specific problem, develop a new solution, etc.;
– a firm collaborates on a permanent basis with a specific support institution for the purpose of continuous improvement of its business operations.
The above forms of relation may be denoted respectively as: unwilling collaboration, collaboration only when necessary, close collaboration, and permanent collaboration. In addition, a technological enterprise that functions in a turbulent environment, as defined by Ansoff [2007, p. 58], is required continually to self-adapt, and thus to function in the conditions of Schumpeter's creative destruction [Schumpeter 1934]. According to Ansoff [2007, p. 58] collaboration by a technological enterprise is determined by four fundamental tendencies:
1. Growth in the novelty of change, that is, events deviate more and more from the experience of the organisation's employees;
2. Growth in the intensity of the environment, that is, the maintenance of relations absorbs more and more energy, resources and management focus;
3. Growth in the rate of change in the environment;
4. Increasing complexity of the environment.
Faced with these trends, firms most frequently begin to function in networks with a view to the possibilities of mutual learning and knowledge sharing [Pyka, Kuppers 2002, p. 5]. Collaboration in a network is conditioned by the choice of partners and an appropriate scope of cooperation. In seeking partners, firms may make use of personal relationships, limiting themselves to local contacts, or may seek partners from the whole of the market. Decisions to collaborate are affected by the experience and attitudes of managers and the degree of trust felt towards partners. A firm's collaboration network may thus have an impact on its innovativeness [Golonka 2015, Raco 1999] and competitiveness [Ratajczak-Mrozek 2012]. In the case of technological enterprises, significant importance attaches to the transfer of technology taking place through collaboration with other firms and scientific institutions, and to the related risk. Kordel [2014, p. 23] has shown that a critical role in the process of transforming opportunities into new values is played by the time factor. When a technological opportunity is being explored, there is interaction between the firm's operations and the changes taking place in its environment. This involves what are called recursive interactions, enabling the shaping of entrepreneurial skills as a result of external influences. These lead to dynamic skills in the development of technological enterprise, from the stage of exploration of a technological opportunity, via its conceptualisation, to the phase of implementation leading to a technological innovation.
Collective economics [Belleamme, Peitz 2010, Doeringer, Terkla 1995] shows that conflicts between productivity and effectiveness of allocation in the SME sector can be resolved by expanding operations beyond the region (that is, by seeking an external market). Research by Dodgson and Hinz [1999, p. 5] concerning the increased importance of horizontal cooperation, and a set of indicators designed by them, show that understanding of the essence and significance of competition and spatial proximity for the division of work in innovations and the quality and effectiveness of regional innovation systems remains unclear. According to a study by Świadek [2013, p. 130] Polish firms are still at the stage of absorbing technologies originally developed outside their own regions – either within Poland or abroad. Particularly unfavourable conditions for innovative activity are found in regional industrial systems at local level. In research on the subject of competitive advantage, M.

E. Porter [1998, p. 225] notes that many US states and European regions have directed their policies towards promoting collaboration between firms. Trust strengthens the mutual benefits resulting from links between firms, and is found to be stronger in geographically concentrated networks that in those that are more dispersed [Belussi 1996, p. 23]. A condition for the absorption of knowledge generated outside a region to stimulate technological enterprise within it is the existence of horizontal local networks with significant links to the outside world, since concentrating on local connections leads to a worsening in firms' competitive position [Fritsch 2001, p. 298]. Studies by Fritsch [2001] and Fritsch and Franke [2000] carried out in the regions of Vienna and Slovenia have shown that "cooperation is positive for innovation." Świadek and Wiśniewska [2015, pp. 5, 11] note in a study of firms that sources of firms' market advantage are dependent on the results of collaboration with related organisations in response to the risk of technological change – such collaboration leads to a reduction of costs and uncertainty and an increase in trust, particularly when the collaboration is systematic and long-lasting. Collaboration and technology transfer have a synergic effect on the activity of technological enterprises [Todtling, Lehner, Kaufmann 2008].

To sum up, the studies reported in the literature indicate that technological enterprises' collaboration with support institutions is determined by factors that include:

- the market in which the firm operates;
- the turbulence of its environment;
- market or technological competitiveness;
- identification of risk of technological change.

III. METHODOLOGY

To answer the research questions posed at the outset, use was made of data collected in surveys carried out by staff of the Faculty of Management at Lodz University of Technology in 2014–2015. An empirical study was made of a randomly selected 650-element sample. The random selection was performed by a research company based on a purchased database of SMEs, indicating their codes in the Polish Business Classification (PKD) system. The surveyed firms were SMEs which make use of new technical solutions being the result of their own R&D work or solutions developed by other parties (higher education institutions and scientific institutes, research and development units, etc.), including the ideas of individual persons.

A random selection was made of 2000 technological firms throughout Poland (125 from each of the country's 16 provinces). Requests for participation in the survey were made to all of those firms, but interviews were ultimately conducted at only 650 of them, representing a response rate of approximately 32.5%.

To identify factors influencing collaboration between technological enterprises and support institutions, a specific type of logistic regression was applied, namely probit regression – one of the methods used when both the explained and explanatory variables are measured on a dichotomous scale [Kleinbaum, Klein 2002]. Probit regression was used to determine the odds of the existence of collaboration, measured as the ratio of the number of successes to the number of failures.

In probit modelling, the parameters are calculated by the maximum likelihood method, seeking values that maximise the likelihood of the sample on whose basis the model is estimated. The likelihood measure used is given by the expression –2 ln L, where L denotes a likelihood function. For a perfect model, with a likelihood of 1, the value of –2 ln L is zero. The correctness of the model is evaluated using Wald's chi-square statistic, a high value of the statistic indicating a significant difference between the current model and a model with a free term only. The significance of individual parameters is verified using Student's t statistic. A positive value of the parameter for an analysed factor means that the probability of the existence of collaboration with a support institution is greater among the firms to which that factor applies than among all other firms. In turn, a negative value of the parameter indicates that the probability of such collaboration is lower among the firms to which the factor applies than among all other firms.

IV. RESULTS

The study of the factors affecting collaboration between technological enterprises and support institutions was based on a survey of 650 SMEs which make use of new technical solutions being the result of their own R&D work or solutions developed by other parties. In the majority of cases the firms were described as local (33.23%) or regional (32.46%) marketers. Firms operating on a national level accounted for 25.54% of the total. The smallest group was that consisting of international marketers, which made up only 8.77% of the firms surveyed.

Table 1. Breakdown of surveyed firms by market level and environmental turbulence

Market level	Number of firms	% of total	Environmental turbulence	Number of firms	% of total
local	216	33.23%	growth in novelty of change	327	50.31%
regional	211	32.46%	growth in intensity of environment	272	41.85%

national	166	25.54%	growth in rate of change in environment	605	93.08%
international	57	8.77%	increasing complexity of environment	299	46.00%

Based on the definition of environmental turbulence given by Ansoff [2007], the following results were obtained:

— 52.46% of respondents consider that the technological enterprise's collaboration is affected by growth in novelty of change;

— 41.85% consider that its collaboration is affected by growth in the intensity of the environment;

— 93.08% consider that its collaboration is affected by growth in the rate of change in the environment;

— 46.00% consider that its collaboration is affected by increasing complexity of the environment.

Another significant piece of information from the standpoint of risk management is that as many as 82.46% (536) of the surveyed firms identify the risk of technological change as a significant factor for their business. Moreover, 51.08% (332 firms) consider that technological competition is insignificant in their business, while the remaining 48.92% (318 firms) state that such competition is significant in the area of their operations. In the case of market competition the difference in numbers is greater: 53.54% (348) of the surveyed firms consider market competition to be insignificant, while 46.46% (302 firms) state that there is significant market competition in the area of their operations.

Table 2.Breakdown of surveyed firms according to collaboration with support institutions

Market level	Number of firms	% of total
higher education institutions etc.	341	52.46%
technology transfer institutions	356	54.77%
bank-like financial institutions	559	86.00%
national/local government institutions	507	78.00%

Among the surveyed firms, more than half maintain contacts whose purpose is the supply of new technologies or seeking of new solutions, with higher education institutions, research and development units or other scientific and research bodies. Slightly more of the firms have contacts with technology transfer institutions, namely technological parks, technological incubators, technology transfer centres or academic enterprise incubators, for the purpose of transfer of technology, delivery of pro-innovative services or technological activation. The greatest number, as many as 86% of the firms surveyed, collaborate with bank-like financial institutions (business angel networks, loan funds, credit guarantee funds) for the purpose of overcoming financial limitations.

78% of surveyed firms collaborate with national and local government institutions such as enterprise centres and centres for the support of SMEs, for the purpose of promoting their products and services.

Table 3.Probit model – effect of individual factors on the existence of collaboration with higher education institutions etc.

Analysed factor (x)	Collaboration with higher education institutions etc. (y)
Local market level	y=0.371 x -0.222 λ^2=4.920 p=0.0260 OR1=1.444 OR0=0.821
National market level	y=-0.697 x -0.074 λ^2=14.390 p=0.00015 OR1=0.499 OR0=1.077
Identification of risk of technological change	y=0.622 x-0.615 λ^2=8.72 p=0.003 OR1=1.861 OR0=0.544

λ^2 is the value of the chi-square statistic for the estimated model, p is the significance level of the model, OR1 denotes the odds ratio of the existence of collaboration with a higher education institution in the case when the factor in question applies, and OR0 is the odds ratio when the factor does not apply.

The greatest impact on the establishment of collaboration with higher education institutions, research and development units and other bodies providing support through science and research comes from market level and identification of the risk of technological change. In the case of local-level firms, the odds of such collaboration increase by more than 1.4 times. The odds of this type of collaboration increase by 1.8 times in the case of firms identifying a risk of technological change. The fact that a firm operates at national level has a negative influence on the odds of collaboration, which are almost two times lower than in the case of other firms.

Table 4.Probit model – effect of individual factors on the existence of collaboration with technology transfer institutions

Factor (x)	Collaboration with technology transfer institutions (y)
National market level	y=-0.609 x -0.044 λ^2=10.851 p=0.001 OR1=0.545 OR0=0.965
Identification of risk of technological change	y=0.511 x-0.615 λ^2=5.837 p=0.016 OR1=1.661 OR0=0.541
Insignificant market competition	y=-0.309 x -0.026 λ^2=3.842 p=0.049 OR1=0.733 OR0=0.974
Growth in novelty of change	y=0.628 x -0.512 λ^2=15.710 p=0.0001 OR1=1.875 OR0=0.599
Growth in intensity of environment	y=-0.675 x +0.085 λ^2=17.439 p=0.00003 OR1=0.509 OR0=1.088

λ^2 is the value of the chi-square statistic for the estimated model, p is the significance level of the model, OR1 denotes the odds ratio of the existence of collaboration with technology transfer institutions in the case when the factor in question applies, and OR0 is the odds ratio when the factor does not apply.

A significant influence on the establishment of collaboration with technology transfer institutions, namely technological parks, technological incubators, technology transfer centres and academic enterprise incubators, is found for market level, identification of risk of technological change, environmental turbulence, and market competition. In firms with national market level, the odds of collaboration with technology transfer institutions decrease approximately twofold. The odds of such collaboration increase by 1.6 times in the case of firms identifying a risk of technological change.

A negative influence on the establishment of such collaboration is exerted by insignificant market competition and awareness of growth in the intensity of the environment. In the case of firms with insignificant competition the odds of collaboration are two times lower than in the case of other firms, while in the case of firms aware of growth in the intensity of the environment they are 26.7% lower. A positive influence on collaboration between a technological firm and technology transfer institutions results from an awareness of growth in the novelty of change. In this case the odds of collaboration are higher by 87.5%.

Table 5.Probit model – effect of individual factors on the existence of collaboration with bank-like financial institutions

Factor (x)	Collaboration with bank-like financial institutions (y)
increasing complexity of the environment	y=0.395 x -1.283 λ^2=10.286 p=0.0013 OR1=2.08 OR0=0.111

λ^2 is the value of the chi-square statistic for the estimated model, p is the significance level of the model, OR1 denotes the odds ratio of the existence of collaboration with bank-like financial institutions in the case when the factor in question applies, and OR0 is the odds ratio when the factor does not apply.

A significant positive influence on the establishment of collaboration with bank-like financial institutions (business angel networks, loan funds, credit guarantee funds) is exerted only by awareness of increasing complexity of the environment. In firms reporting such awareness, the odds of collaboration with institutions of that type increase more than twofold.

Table 6. Probit model – effect of individual factors on the existence of collaboration with national and local government institutions

Factor (x)	Collaboration with national and local government institutions (y)
Regional market level	y=0.418 x -1.412 λ^2=4.469 p=0.0034 OR1=1.51 OR0=0.243
National market level	y=-1.204 x -1.033 λ^2=22.583 p=0.0000 OR1=0.299 OR0=0.355
International market level	y=0.725 x -1.34 λ^2=5.635 p=0.018 OR1=2.065 OR0=0.262
Identification of risk of technological change	y=0.727 x-1.887 λ^2=6.924 p=0.008 OR1=2.071 OR0=0.152
Insignificant market competition	y=-0.0635 x -0.953 λ^2=11.111 p=0.00009 OR1=0.529 OR0=0.385
Growth in novelty of change	y=0.853 x -1.746 λ^2=19.365 p=0.00001 OR1=1.875 OR0=0.599
Growth in intensity of environment	y=-0.951 x -0.929 λ^2=21.920 p=0.0000 OR1=0.386 OR0=0.395
Increasing complexity of environment	y=-0.508 x -1.049 λ^2=6.941 p=0.0083 OR1=0.601 OR0=0.35

λ^2 is the value of the chi-square statistic for the estimated model, p is the significance level of the model, OR1 denotes the odds ratio of the existence of collaboration with national or local government institutions in the case when the factor in question applies, and OR0 is the odds ratio when the factor does not apply.

A statistically significant influence on the establishment of collaboration with national and local government institutions such as enterprise centres and centres for the support of SMEs is exerted by market level, environmental turbulence, identification of the risk of technological change, and market competition. In the case of firms operating on regional markets, the odds of such collaboration are 1.5 times higher, while in the case of firms operating at international level they are 2.06 times higher. In the case of national-level firms, however, the odds decrease by 70%. The odds of collaboration increase by 2.07 times in the case of firms identifying a risk of technological change. A negative effect on the establishment of collaboration with national and local government institutions comes from insignificant market competition, awareness of growth in the intensity of the environment, and awareness of growing complexity of the environment. In the case of firms reporting insignificant competition the odds of such collaboration are two times lower than in other cases, in the case of awareness of growth in the intensity of the environment they are 71.4% lower, and in the case of awareness of increasing complexity of the environment they are approximately 40% lower. A positive influence on the establishment of collaboration between technological enterprises and national and local government institutions is exerted by awareness of growth in novelty of change. In this case the odds of collaboration of this type are 2.34 times higher.

CONCLUSION

The empirical study has confirmed the theoretical rule that the market level of a technological enterprise has a significant impact on the establishment of collaboration with support institutions. Firms operating on local markets eagerly undertake collaboration with higher education institutions, research and development units or other bodies providing support through science and research. Meanwhile, firms operating on regional and international markets frequently collaborate with national and local government institutions such as enterprise centres and centres for the support of SMEs. An interesting finding is that firms with operations on a national level are negatively disposed to collaboration with support institutions, and are not interesting in cooperating either with higher education institutions, technology transfer institutions or national and local government institutions. This implies that the networks of relationships that such firms create themselves are sufficient for them and satisfy their needs in this area. The results therefore enable an answer to be given to the first question posed at the outset – namely that market level in terms of local, regional, national or international reach has an impact on collaboration between technological enterprises and support institutions.

The results also demonstrate that the identification of risk of technological change has a significant positive effect on the establishment of collaboration with higher education institutions, research and development units or other science and research support bodies, technology transfer institutions (technological parks, technological incubators, technology transfer centres, academic enterprise incubators) and national and local government institutions (such as enterprise centres and centres for the support of SMEs). It can thus be concluded, in answer to the second research question posed, that support services constitute a substitute for the seeking of new knowledge and transfer of technology.

The empirical study failed to show that technological competition has any significant impact on collaboration with support institutions. It was shown, however, that the existence of an insignificant level of market competition has a significant negative impact on the establishment of collaboration with technology transfer institutions (technological parks, technological incubators, technology transfer centres, academic enterprise incubators) and national and local government institutions (such as enterprise centres and centres for the support of SMEs). To give a full answer to the third research question, therefore, it will be necessary to carry out further and deeper analysis.

In the case of the factors determining environmental turbulence, as identified by Ansoff [2007], it was found that awareness of growth in novelty of change has a positive impact on the establishment of collaboration with technology transfer institutions and with national and local government institutions. Awareness of increasing intensity of the environment has a negative effect on collaboration with technology transfer institutions and with national and local government institutions. On the other hand, awareness of increasing complexity of the environment has a positive effect on collaboration with bank-like financial institutions, but a negative effect on collaboration with national and local government institutions. This enables an answer to be given to the fourth question, namely that environmental turbulence (understood as growth in the novelty of change, growth in the intensity of the environment and increasing complexity of the environment) does have an impact on collaboration between technological enterprises and support institutions. The study failed to show that the fourth turbulence factor, namely growth in the rate of change in the environment, has any impact on collaboration with support institutions. This is because more than 93% of the surveyed firms identify with and are aware of this factor.

The results of this study show the question of the functioning of enterprises in network structures to be a complex problem. It would therefore seem necessary to include in the analysed factors the profile of firms using the services of specific support institutions; this will enable the identification of further determinants of such collaboration.

A limitation of the analysis carried out here was the absence of a possibility of introducing additional determinants of collaboration. In further studies, it should be borne in mind that it can often be valuable to consider a larger number of models or models with a larger number of variables, since this enables the problem to be studied with greater depth and accuracy, and prevents the drawing of rash conclusions which may result from specific features of the analysed sample.

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REFERENCES

[1] Albert J. H., Chib S. (1993). Bayesian Analysis of Binary and Polychotomous Response Data. Journal of the American Statistical Association 88 (422): 669–679. doi:10.1080/01621459.1993.10476321.

[2] Anders J. (2013). Przedsiębiorczość technologiczna, czyli przedsiębiorczość dla ambitnych. Przedsiębiorczość technologiczna 19/11/2013. http://www.scitt.paip.pl/okiem-eksperta/przedsiebiorczosc-technologiczna-czyli-przedsiebiorczosc-dla-ambitnych.html (accessed 12 Oct 2015).

[3] Ansoff H. I. (2007). Strategic Management Classic Edition.

[4] Beckman C., Eisenhardt K., Kotha S., Meyer A., Rajagopolan N. (2012). Technology entrepreneurship. Strategic Entrepreneurship Journal, vol. 6, no. 2: 89–93.
[5] Belleamme P., Peitz M. (2010). Industrial Organization: Markets and Strategies. Cambridge; New York: Cambridge University Press.
[6] Belussi F. (1996). Local systems, industrial districts and institutional networks: towards an evolutionary paradigm of industrial economics? European Planning Studies 1996, No. 4.
[7] Dodgson M., Hinze S. (1999). Measuring the innovation process. Conference "Data and Strategies in Evaluating Research and Development", Canberra, 15–16 November 1999.
[8] Doeringer P. B., Terkla D. G. (1995). Business strategy and cross-industry clusters. Economic Development Quarterly 1995, No. 9 (3).
[9] Fritsch M. (2001). Co-operation in Regional Innovation Systems, Regional Studies 2001, No. 35 (4).
[10] Fritsch M., Franke G. (2000). Innovation, regional knowledge spillovers and R&D. Working Paper 2000/25, Faculty of Economics and Business Administration, Technical University Bergakademie, Freiberg.
[11] Golonka M. (2015). Proactive cooperation with strangers: Enhancing complexity of the ICT firms' alliance portfolio and their innovativeness, European Management Journal, vol. 33, no. 3.
[12] Kleinbaum D. G., Klein M. (2002). Logistic Regression – A Self-Learning Text (2nd edn.). New York: Springer.
[13] Kordel P. (2014). Przedsiębiorczość technologiczna jako mechanizm rozwoju strategicznego organizacji, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu no. 356: 20–28.
[14] Lachiewicz S., Matejun M., Walecka A. (eds.) (2013). Przedsiębiorczość technologiczna w małych i średnich firmach. Czynniki rozwoju, Wydawnictwo WNT: Warsaw.
[15] McMullen J. S., Shepherd D. A. (2006). Entrepreneurial Action and the Role of Uncertainty in the Theory of the Entrepreneur. Academy of Management Review, no. 1: 132–151.
[16] Porter, M. E. (1998). On Competition. Boston: Harvard Business School.
[17] Pyka A., Kuppers G. (2002). Innovation Networks: Theory and Practice. Edward Elgar Publishing Limited, Cheltenham.
[18] Raco M. (1999). Competition, collaboration and the new industrial districts: examining the institutional turn in local economic development. Urban Studies 1999, No. 36.
[19] Ratajczak-Mrozek M. (2012). Global Business Networks and Cooperation within Supply Chain as a Strategy for High-Tech Companies' Growth. Journal of Entrepreneurship, Management & Innovation, vol. 8, no. 1.
[20] Schumpeter J. A. (1934). The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. Harvard University Press, Cambridge, Mass.
[21] Świadek A. (2013). Lokalizacja konkurenta a aktywność innowacyjna systemów przemysłowych w Polsce. Organizacja i Kierowanie no. 5/2013 (158): 123–132.
[22] Świadek A., Wiśniewska J. (2015). Współpraca przedsiębiorstw, a innowacje i transfer technologii – wybrane aspekty. Naukowe wydawnictwo IVG Szczecin.
[23] Todtling F., Lehner P., Kaufmann A. (2008). Do different types of innovation rely on specific kinds of knowledge interactions? Institute of Regional Development and Environment, Vienna. Accessed at www.epub.wu.ac.at

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