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IMPACT OF NETWORKS ON INNOVATIVE DEVELOPMENT OF COMPANIES IN LUBELSKIE REGION

Abstract: For an enterprise, innovation is key to creating a competitive advantage on the market and a superior customer value. Development of innovation market and the implementation of EU innovation policy in our state should be conducive to increasing the activity of the companies in cooperating with their partners in innovation processes in the forthcoming years. Our goal in this paper is to assess the results of questionnaire research on the role of company cooperation with partners and consumers during innovation process execution in the network. This research was carried out in Lubelskie region companies in 2009.

Key words: networks of innovators, research in Lubelskie region.

1. Introduction

Innovation is crucial for long-term economic growth. The function of innovation is to introduce novelty (variety) into the economic sphere. Innovation can refer to new products/services, improved business processes or new solutions in the area of management (finance, marketing, and/or human resources). Technological innovations, which derive from research, comprise the implementation of technologically new products and processes and also significant technological improvements in products and processes. An innovation has been implemented if it has been introduced on the market (product innovation) or used within a production or business process (process innovation). The product or process should be new (or significantly improved) to the enterprise (it does not necessarily have to be new to the relevant domestic or foreign market).[1]

Innovations are knowledge products resultant from the execution of innovation processes. The innovation process consists of the following activities: development of a new solution concept, innovation elaboration, its application, promotion and selling on the innovation market, and also its improvement in time. It is a process of

[1] M. Dolińska, Innowacje w przedsiębiorstwie, na rynku, w regionie, *Ekonomika i Organizacja Przedsiębiorstwa* 2004, No. 9 (656), p. 18; A. Pomykalski, *Zarządzanie innowacjami*, Wydawnictwo Naukowe PWN, Warszawa 2001, pp. 17, 20.

knowledge management and mutual learning of the network organization partners. The completion of any stage of an innovation process is considered to be an innovative solution which can be offered for sale on the market. During the course of the process relations are shaped among its contractors connected with the flow, application, and development of shared knowledge and information. This, in turn, becomes a source of new innovative solutions.

Innovation results from continuing interactions and relationships between different actors and organizations. This paper focuses on the process through which innovations occur and the actors that take part: firms and their employees, organizations, and networks.

Increasingly, innovations have come to be based on the interactions, relationships, knowledge, and information flow between economic entities such as firms (partners, suppliers, competitors and their consumers), research organizations (universities, other public and private research and development institutions), public agencies (innovation transfer centres, development agencies, industry or science and technology parks), finance institutions (innovation financial support: venture capital, funds, and loans) and regional or local authorities. These entities may collaborate among themselves as partners of a network organization during the execution of innovation process activities.

The objective of this work is to examine whether Lubelskie region companies cooperate with partners and consumers in the innovation area and during innovation process execution in the network. Summary results of questionnaire research[2] on this subject are described in this work.

2. Innovation development in the network

At present we can observe an increased reliance on external sources of R&D, knowledge, universities, R&D institutes, laboratories, as well as other firms, and customers in the development of new products and innovation processes execution. Meeting customer needs and expectations guarantees the sales of company's new products and its continued existence, and also innovative development on the market.

In fields where scientific or technological progress is developing rapidly, and the sources of knowledge are widely distributed, no single firm has all the necessary skills to stay on top of all areas of progress and bring significant innovations to market. In such settings, networks can become the locus of innovation, as the creation of knowledge is crucial to improving competitive position.[3]

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[2] The questionnaire research was financed by the Polish Ministry of Science and Higher Education as Research Project No. 1 H02D 060 30.

[3] W. Lazonick, The innovative firm, [in:] J. Fagerberg, D.C. Mowery, R.R. Nelson (eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford 2006, p. 29.

The increasing worldwide competitive pressure, especially concerning factor costs, has led to a wide consensus in developed countries that sustained innovation is the key to economic success. However, the global environment is changing and makes innovation management more competitive. In order to sustain an advantage, companies seem to adopt more flexible schemes of organization. Specifically, innovation networks appear useful to researchers and practitioners. The most important goals that the companies aim to realize by using innovation network include flexible access to technologies, intensified contact with good performance of their innovation networks.[4] Flexibility allows the network organization to react quickly to unexpected situations and changes on the market, and also create and exploit effectively knowledge of their partners during innovation process execution.

In this paper, networks are understood as a mode of organization which legally independent companies voluntarily chose over hierarchical or market modes of organization by establishing flexible ties and sharing collective assets among each other, in order to sustain or strengthen their competitive position. Based on this definition, innovation networks can be understood as a mode of organization in which two or more independent firms aim at jointly researching, developing or dispersing innovations. In such a relatively stable and cooperative collaboration, the partner firms find support during one or more activities of the innovation process, which may increase their innovation performance.[5]

Advantages that accrue from diverse sources of knowledge and resources in innovation processes are considerable for their partners. Interorganizational relationships and networks are a means by which organizations can pool or exchange resources, and jointly develop new ideas and skills. They lead to various benefits with respect to knowledge diffusion, resource sharing, access to specialized assets, and interorganizational learning.

Nowadays innovation markets are developed where firms collaborate among themselves and with their customers within a network organization in the accomplishment of innovation processes. These markets are established in order to effectively transfer and use their knowledge, skills and resources in innovation processes. Activities of these processes are executed jointly by partners of the network. Learning and transferring knowledge for the benefit of all partners becomes a competitive advantage for the network.[6]

Innovation arises from complex interactions between individuals, firms-partners of the network organization and their operating environment during the implementation of innovation processes. The knowledge and learning capacities of people and companies are instrumental for innovation processes, as are their powers

[4] Ch. Dilk, R. Gleich, A. Wald, J. Motwani, State and development of innovation networks, *Management Decision* 2008, Vol. 46, No. 5, p. 691.

[5] *Ibidem*, p. 693.

[6] M. Dolińska, Kapitał intelektualny i innowacje, *Ekonomika i Organizacja Przedsiębiorstwa* 2006, No. 8 (679), pp. 41-47.

of creativity, initiative and drive, determining, to a large extent, the innovation capacity of network organization and its partners. They cooperate among themselves during the execution of innovation process activities and then they use and develop their knowledge resources. The role of knowledge transfer and development is central to the innovation process.

The growth of knowledge-intensive industries has heightened the importance of networks in R&D as well as product development and distribution. For organizations in rapidly developing fields, heterogeneity in the portfolio of collaborators allows firms to learn from a wide stock of knowledge. Organizations with broader networks are exposed to more experiences, different competences, and added opportunities. By having access to a more varied set of activities, experiences, and collaborators, companies broaden the resource and knowledge base that they can draw on.[7]

Every country should construct open innovation systems, and that not only focuses on the participated public and private sectors but also expands to relative economic structure, and various social cooperation networks that help effectively improve collective learning and knowledge innovation. The capability of production and innovation of a country can be improved by the increasing number of well skilled and educational employees.[8]

Increasingly, knowledge and innovation, the effect of the development of knowledge, now determine the economic success of the organisation in a knowledge-based economy. The value of the organisation in a knowledge-based economy depends on its ever-growing resources of knowledge, including competences of its people, and its effective application in its innovative development and in the business offer addressed to its customers.

Research and experience have shown that a knowledge-based economy is also a relational economy since the structure and quality of relationships are a major influence on both the creation and exploitation of knowledge.[9]

3. Research on cooperation of Lubelskie region firms with partners in innovation area

The objective of the questionnaire research was to examine whether Lubelskie region companies cooperate with partners and consumers during innovation process execution in the network. For this purpose, the following research hypothesis was made: Cooperation of firms with partners and consumers generates synergy effects during the execution of innovation processes within the framework of the network.

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[7] W.W. Powell, S. Grodal, Networks of innovators, [in:] J. Fagerberg, D.C. Mowery, R.R. Nelson (eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford 2006, p. 59.

[8] Ch. Chen, Causal modeling of knowledge-based economy, *Management Decision* 2008, Vol. 46, No. 3, pp. 501, 507.

[9] J. Nahapiet, L. Gratton, H.O. Rocha, Knowledge and relationships: When cooperation is the norm, *European Management Review* 2005, No. 2, p. 4.

The study was conducted on respondents from 64 companies of the Lubelskie Voivodeship in 2009. The research sample was chosen as non-probability, judgment sample of companies. The selection of the representative sample was based on the criterion of their activity, i.e. 50% of industrial processing companies and 50% percent of this number was made up by service providers.

The breakdown of the analysed companies structure by size was as follows: 25% were micro-, 34.4% – small, 28.1% – medium companies, and 12.5% were large corporations.

The majority (92.2%) of the companies sold their products on regional market, 78.1% – on Polish market, and 45.3% – on foreign market. Among the analysed companies were manufacturers of well known brands not only on the regional and Polish market but also on the foreign markets (mainly in the European Union).

University graduates constituted the biggest part of the staff in the companies under analysis, and their number was bound to rise in the years to come. Employees in 98.4% of the companies combined their work with graduate studies, M.Sc. studies, courses in engineering and undergraduate studies. Employees of firms constantly developed their competences and results of the research showed that the following dependence – the bigger the firm, the smaller the number of employees with higher education. Company staff continued to develop their professional qualifications by attending various training courses. On average, each employee attends 10 hours of training per year.

The breakdown of employees by their age indicates that the personnel of the companies was open to change (in 65.6% of the companies the average age did not exceed 40), and, at the same time, had the required level of professional experience to ensure effective activity in the field of innovation.

Employees from 48.4% of the companies took part in conferences, scientific seminars last year and then they built relationships with personnel of universities, research or scientific institutes. These relationships were based on knowledge exchange and application of it in innovation.

The majority of innovative solutions implemented in companies resulted from in-house development projects. This clearly indicated that there was considerable potential in partnership cooperation in the area of innovation, which has not as yet been utilised.

Most (73.4%) firms put into practice product innovations, in turn 65.6% – applied innovative technology, 59.4% – innovations in management, and 46.7% – new business processes. In quantitative terms, innovative solutions on a regional scale were dominant (made up 68.1% of all innovations), followed by innovative solutions on a national scale (23.4%). During the analysed three-year period the companies in question implemented as few as 8.5% of innovative solutions on an international scale. On average, each analysed company implemented 10 (10.33) innovations during the analysed period.

Such data indicate that companies increased their activities to ensure a more competitive nature of their innovations on the national and international arena. This new stance could be attributed to Poland's membership in the European Union.

The study focused on the evaluation of cooperation between the companies and their partners in innovation processes, both home and abroad, including companies in the same line of business, operating in other areas, R&D entities, innovation transfer institutions, scientific-technological parks, clusters, regional bodies of authority, local authorities (including those abroad), and other business entities.

The research results showed that the majority (95.3%) of companies cooperated with partners at home, and fewer (43.8%) firms – both home and abroad. Most firms cooperated during innovation process execution with firms in the same line of business at home, however, 34.4% – with firms abroad. Fewer (40.6%) firms cooperated with firms different line of business at home and 15.6% – abroad, and only 20.3% of firms cooperated with home universities, and fewer (17.2%) – with R&D entities at home, and very few (1.6%) – abroad.

The companies demonstrated little activity in cooperating with the representatives of regional and/or local authorities, because only 17.2% of them made it at home, and 1.6% – abroad. Very few (4.7%) companies cooperated with innovation transfer institutions at home and only 1.6% – abroad, and few (6.3%) firms cooperated with domestic scientific-technological parks, and 7.8% – with clusters.

Partnership schemes were maintained by most companies on the domestic market (with 603 partners) and fewer – on the foreign market (with 89 partners). One analysed company cooperated on average with 10 partners both home and abroad.

23.4% of analysed companies cooperated with firms from one country, 9.4% – with firms from 2 countries, and 9.4% – from 3 different countries, and only 1.6% – with firms from more than 10 countries. The most firms cooperated with foreign firms in the same line of business in the following countries: 23.4% – in Germany, and 15.6% – in Italy and also Hungary, fewer firms (1.6-7.8%) – with firms in USA, Spain, Ukraine, Holland, Sweden, Great Britain, Japan, the Czech Republic, France, Austria, Slovenia, Switzerland, Lithuania, Israel. Fewer companies (1.6--4.7%) cooperated with firms in different line of business in the following countries: China, Germany, France, Slovakia, Italy, Belgium, Turkey, Switzerland, Australia, USA, Sweden, Slovenia. Moreover research companies collaborated with abroad innovation transfer institutions in Germany, Canada and Italy, and also with R&D entities in France and with region authorities in Hungary.

The above data confirm that the most companies had viable innovation cooperation schemes with partners on the domestic market and fewer – on foreign markets.

Most companies assessed their cooperation in the innovation area with home and abroad partners favourably. Respondents from 67.7% of companies stated that this cooperation was effective, from 29.8% – not very effective, and 2.5% – ineffective. The most effective was cooperation with firms in different line of business (18%

of assessments – effective, 6.8% of assessments – not very effective, and lack of opinions – ineffective).

Cooperation between companies and firms in the same line of business was assessed worse (13.4% of opinions – collaboration effective, 8.7% – not very effective, and 1.3% – ineffective). Only 5.6% of respondents stated that collaboration with firms with R&D entities was effective, 1.2% – not very effective, and only 0.6% – ineffective. The collaboration with universities was assessed the worst (only for 6.2% of firms this collaboration was effective, for 6.8% – not very effective, and for 0.6% – ineffective). Cooperation with scientific and technological parks, clusters, innovation transfer institutions, region and local authorities in the innovation area was assessed as not very effective.

Conclusion from this analysis is that cooperation between the companies and their partners in the area of innovation was effective and our membership in EU was conducive to development of partner relationships during innovation processes execution.

The majority (65.6%) companies took part in innovation processes execution in the network structures and fewer firms also conducted their innovation activity within other flexible structures of management, that is: team structures – 37.5% of firms, project – 26.6%, process structures – 18.8%, and matrix structures – 4.7%. The companies conducted their innovation activity within flexible organisational structures of management and the majority of them – in a network.

Respondents determined possibilities of knowledge and information system on innovation in their firms. Development of knowledge for innovation purposes was carried out by the majority (76.6%) of companies on their own and 28.1% of the companies carried out the same in association with their partners. Personnel of the companies acquired and accumulated knowledge and information on innovation. The results of the research suggest that companies required knowledge and information concerning new technologies, techniques – 68.8% of firms, legal provisions relating to innovation – 45.3%, ways to finance innovation – 45.3%, expectations of consumers – 42.2%, new products – 32.8%, rivals – 28.1%, and our state and EU innovative politics – 25% of firms. A considerably smaller number (only 3.1%) of companies were interested in acquiring information to facilitate cooperation with suppliers, intermediaries, and clients in the area of innovation.

Clients remained the most important source of innovative solutions for the analysed companies. They are source of innovations in 60.9% of the analysed companies and employees of marketing & sale department are source of innovation in 57.8% of firms.

Innovation-related marketing activities are carried out with considerable success. The majority (76.6%) of the companies conducted market analyses, marketing research on innovations. More (50.5%) companies execute marketing activities effectively. However, fewer (25%) companies have the capacity to market new products in an effective manner, 40.6% of firms collaborate with partners in the innovation area effectively, and 45.3% of firms conduct diffusion of innovation effectively.

Most (56.3%) companies carried out R&D activity, and 37.5% of them carried it out on their own, 28.1% – only collaborated with other entities in this field, and 10.9% – carried out this activity on their own and also with specialist firms outside. The companies carried out their R&D activity largely on their own.

Funds for innovation came mainly from profits generated (in 74.2% of firms) followed by bank loans (in 57.8% of firms), EU funding (6%), and lease contracts (3%). The remaining sources of financing innovation, including loans, grants from the state budget, contributions from the company's owners, shares, and venture capital, account for a smaller chunk ranging from 0.1 to 0.9%. It follows that the companies used modern methods of innovation financing very rarely.

The companies intend to increase their outlays on innovation in the years to come, including a rise in the utilisation of EU funding by 46.9% of these companies. The average increase in outlays on innovation, as declared by the companies, should amount to 16.7% . Such figures show fairly optimistic plans of these companies as regards their financial expenses on innovation in the forthcoming years.

Most companies possessed and developed database of their partners (82.8% of firms) and clients (65.6%); 93.8% of the companies assessed customer/partner satisfaction, 59.4% of them – customer value, and 50% of them – customer loyalty.

For 90.6% of the companies the base of relationships shaping with partners/clients was assessment of their satisfaction, and for 56.3% of them – was the collaboration with partners/clients during innovation processes execution. For the majority of these companies customer satisfaction, assessment of customer value, cooperation with partners in the area of innovation are key factors that help shape viable relations with partners and customers.

The priorities of the innovation activity indicated by the companies include entering new foreign markets (in 65.5% of firms) followed by partnership cooperation in the innovation area on the domestic market (in 51.6% of firms). It is the intention of the companies to intensify their expansion onto foreign markets and cooperation with partners in innovation processes in the years to come.

The results of the study confirmed the correctness of the working hypothesis proposed.

The data presented proved that the majority of the companies were client/partner-oriented and their activities were directed towards shaping long-term relations with their clients and partners during innovation process execution in the network.

The results of the study indicated that entrepreneurs were interested in boosting participation of their companies in innovation processes with a view to increasing their cooperation with partner firms and clients during execution of them. The respondents were well aware of the effects of innovation on the strengthening of their competitive market positions and on their competitive business offers.

4. Conclusions

Innovation processes entail knowledge sharing and development, learning of associated companies which cooperate with one another in the network in exploiting their resources. This paper attempts to analyse relationships between companies, and their partners and consumers in innovation processes which are executed in the network. The results of the studies confirmed innovative development of the analysed companies in the last years and a growing awareness of their employees on how significant innovations and relationships with partners and clients during innovation process execution in the network were in ensuring organizations a competitive edge on the marketplace and in building a knowledge-based economy in our country.

Companies form a competitively superior value-delivery network on the innovation market when they partner effectively with other organizations and clients in the innovation area.

References

Chen Ch., Causal modeling of knowledge-based economy, *Management Decision* 2008, Vol. 46, No. 3, pp. 501-514.

Dilk Ch., Gleich R., Wald A., Motwani J., State and development of innovation networks, *Management Decision* 2008, Vol. 46, No. 5, pp. 691-701.

Dolińska M., Innowacje w przedsiębiorstwie, na rynku, w regionie, *Ekonomika i Organizacja Przedsiębiorstwa* 2004, No. 9 (656), pp. 18-25.

Dolińska M., Kapitał intelektualny i innowacje, *Ekonomika i Organizacja Przedsiębiorstwa* 2006, No. 8 (679), pp. 41-47.

Lazonick W., The innovative firm, [in:] J. Fagerberg, D.C. Mowery, R.R. Nelson (eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford 2006, pp. 29-55.

Nahapiet J., Gratton L., Rocha H.O., Knowledge and relationships: When cooperation is the norm, *European Management Review* 2005, No. 2, pp. 3-14.

Pomykalski A., *Zarządzanie innowacjami*, Wydawnictwo Naukowe PWN, Warszawa 2001.

Powell W.W., Grodal S., Networks of innovators, [in:] J. Fagerberg, D.C. Mowery, R.R. Nelson (eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford 2006, pp. 56-70.

WPŁYW SIECI NA ROZWÓJ INNOWACYJNY PRZEDSIĘBIORSTW W REGIONIE LUBELSKIM

Streszczenie: Dla przedsiębiorstwa innowacja jest kluczem do kształtowania przewagi konkurencyjnej na rynku oraz dodatkowej wartości dla klientów. Rozwój rynku innowacji i wdrażanie polityki innowacyjnej UE w naszym kraju powinny sprzyjać aktywizacji współpracy przedsiębiorstw z partnerami w procesach innowacji w nadchodzących latach. Celem tego opracowania jest ocena wyników badania ankietowego na temat znaczenia współpracy przedsiębiorstwa z partnerami i klientami w trakcie realizacji procesów innowacji w sieci. Badanie to zostało wykonane w przedsiębiorstwach regionu lubelskiego w 2009 r.