

LEARNING OF INNOVATIVE COMPANIES WITHIN INNOVATION NETWORKS

Małgorzata Dolińska
Maria Curie-Skłodowska University, Poland
m.dolinska@umcs.lublin.pl

Abstract:

Contemporary companies can not learn by solely and build their innovative capabilities relying only on own knowledge resources. They ought to draw on outside and also foreign sources of knowledge and learn from partners (suppliers, consumers), and competitors during innovation processes execution within the area of the innovation networks. Innovation process links knowledge sharing, exchange, development, practical using by innovative companies and their collaborators within the framework of the innovation network during their mutual, interactive learning and improving innovative capabilities. Innovation networks enable companies to react dynamically to changeable conditions of innovation process execution, learn how efficiently to create and use knowledge in innovations, and apply them efficiently in economy. The results of companies collaboration and learning within innovation networks are synergic effects of knowledge management during innovation processes execution. This paper also presents the selected results of questionnaire research on the above theme conducted in innovative companies of the Lubelskie region (Poland) in 2009.

Keywords: innovation networks, learning, innovative company

1. KNOWLEDGE DEVELOPMENT OF INNOVATIVE COMPANIES WITHIN INNOVATION NETWORKS

Companies need to sustain innovation, learning and knowledge management. It is essential for their long-term business successes and growth of their competitiveness (Alasoini et al., 2008). Innovation is considered as the key in achieving sustainable competitive advantages and, by extension, for success of innovative firms in the market. These firms are more flexible and can respond faster to changes, create new opportunities and exploit existing ones to a greater extent than the competition (Valmohammadi 2012; Rowley, Baregheh & Sambrook 2011, Valencia, Valle & Jimenez 2010).

Now innovations determine the innovative company economic success and market value in the knowledge based economy. The value of the innovative company in this economy depends on ever-growing its inside and outside resources of knowledge, exchange and creation of knowledge with partners and/or competitors in innovation processes, and also its effective commercial application in innovative solutions, also new, more valuable offer addressed to customers. Under market turbulent conditions, the firm's innovativeness is particularly important to satisfy the evolving market needs (Santos-Rodrigues, Dorrego & Jardim 2010, p. 55).

In this paper innovation networks can be understood as an 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 (Dilk et al., 2008, p. 693) and make possible access to competitive resources of knowledge on innovation markets. In today's innovation markets, competition no longer takes place between individual competitors. Rather, it takes place between the entire knowledge value-delivery networks created by innovative cooperators and/or competitors (Dolińska, 2006, p. 44).

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, its diffusion, and also improvement at all times. It is a process of knowledge management and mutual learning of collaborators within the innovation network. With accomplishment of innovation processes within the innovation network, knowledge resources of its participants, also innovation companies are multiplied as the result of their interorganizational learning (Dolińska, 2010, pp.14-15).

Companies have increasingly shifted from innovation initiatives that are centered on internal resources of knowledge to those are centered on external networks - said another way, a shift from firm-centric innovation to network-centric innovation (Nambisan & Sawhney, 2011, p. 40). Firms which not supplement their internal resources with complementary external resources of knowledge show a lower capability for implementing innovations. The use of external knowledge has been proven to be one of the key factors in ensuring innovation, learning, business competitiveness and long-term growth (Quintane et al., 2011; Anussornnitisarn et al., 2010; Mei & Nie, 2008).

Knowledge management (KM) is concerned with obtaining and communicating ideas and information that underlie innovation competencies, and includes idea generation, absorptive capacity and networking. KM covers the management of explicit and implicit knowledge held by the organization as well as the processes of gathering and using information (Adams, Bessant & Phelps, 2006, p. 28). Knowledge absorption, an organization's ability to identify, acquire and utilize external knowledge, can be critical to a firm's successful operation.

KM of the innovative company during innovation process execution within the innovation network focuses on the following areas:

- knowledge absorbing, sharing, exploiting, transfer, development and its practical application in activities of innovation process,
- survey, creation, maintain, and secure knowledge resources of the company,
- shaping knowledge based relations (ties) with participants of innovation processes within the network,
- conducting marketing research, market analysis in the area of micro- macroenvironment,
- promoting knowledge creation and its using with partners in innovations,
- determining the knowledge required to execute innovation process activities, organizing it, making the requisite knowledge available, and distributing it to the relevant users,

- organizing access to external also foreign knowledge resources, other innovative competencies, results of R&D,
- modifying and restructure the company performance and organizational structure to use and develop knowledge in innovations efficiently,
- increasing the value-added knowledge content in new technologies, innovative products, services and processes.

Advantages that accrue from diverse sources of information, knowledge and other resources in innovation processes are considerable for their partners. Successful companies realize that investing in knowledge is essential to their ability to create high value products and services (Chang & Hsieh 2011, p. 3), and build strong position on innovative markets. Market demand and consumer expectations also influence on innovative development of companies and their participation in innovation process execution. One potential source of knowledge is customers, and, accordingly, customer orientation is considered an essential attribute for innovation development (Forsman 2009, p. 504) of companies.

Small and medium-sized enterprises need to sustain innovation, learning and development, because it is essential for their long-term business successes and growth. Due to their limited size and resources, they often have to seek relevant and emerging knowledge from outside (Garengo & Bernardi, 2007) and begin to collaborate with partners during innovation process execution within the network.

External knowledge of the innovative company derives from its partners and competitors within the innovation network, and is generated in the area of their micro- and macroenvironment. Knowledge acquiring, exchange, integration, protection, using, and development is considered as integral part of the innovative company learning during innovation process activities execution within the network.

External knowledge is considered an integral part of organizational learning, innovation and development. The aims of external knowledge are to minimize process variations, to improve the performance levels and to subsequently sustain continuous improvement (Anussornitarn et al., 2010, p. 96) and innovation.

Network organization is constructed in order to effectively transfer and develop knowledge, skills among companies which are its partners. Learning and transferring knowledge in innovation processes become a competitive advantage for all partners of the network organization. Networks provide efficient access to current knowledge, diverse capabilities, technologies, new markets and more opportunity for learning, and less risk of inter-network rivalry.

By having access to a more varied set of activities, experiences, and collaborators, companies broaden the knowledge and other resources base that they can draw on and these possibilities enable them to develop faster. Networks promote social interactions, generating trust that is conducive to knowledge transfer and early adoption of innovations.

Increasingly, innovations have come to be based on the interactions, knowledge based relationships amongst their participants, knowledge, and information flow and interactive learning 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 centers, development agencies, industry or science and technology parks), finance institutions (innovation financial support: venture capital, funds, and loans), regional or local authorities, innovation transfer institutions, and also informal cooperation based on personal relationships i.e. associations of innovators, clubs of entrepreneurs. These entities collaborate and compete among themselves during innovation processes execution. Flexibility allows the network 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.

2. MUTUAL LEARNING OF INNOVATIVE COMPANIES WITH COLLABORATORS WITHIN INNOVATION NETWORK

Today's companies are faced with dynamic and turbulent environment that requires flexible and fast responses to growing competition on markets and changing consumers' needs, and expectations. Many of them have responded by taking part in innovation process execution in decentralized, team-

based, and distributed, constantly changing structures as innovation networks (also clusters, science-technology parks). Development, transfer and application of current knowledge in innovation processes depends on the company's capacities of cooperation and mutual, interactive learning with participants of networks.

Innovation processes comprises KM and learning activities within the network where knowledge based relationships (ties) are created and improved between suppliers and consumers of knowledge. Interorganizational learning amongst them creates synergic effects during knowledge and innovations development and diffusion within the framework of the network (Dolińska, 2012a, pp. 153, 155). Learning of the innovative company with its partners, competitors is a result of formal and informal communication and knowledge, skills exchange, innovation diffusion among them, and also their mutual knowledge integration and development. Cooperative and competitive relationships amongst participants of innovation networks stimulate their interactive learning, creativity, entrepreneurship, and lead to knowledge, innovation, and innovative capacity development of companies.

Knowledge based relationships amongst collaborators within networks are means by which organizations can pool or exchange knowledge resources, and jointly develop new ideas and skills. These relationships lead to various benefits with respect to knowledge resource sharing, access to specialized assets, mutual learning, diffusion and commercialization of knowledge and/or innovations (Dolińska, 2012c).

M. Pahor, M. Škerlavaj, V. Dimowski (2008, p. 1986) introduced the concept of a learning network. Learning networks can be classified as internal and external. The latter are seen as extended enterprise model and comprise the relationships that the firm has with its customers, suppliers, and other stakeholders. The former is interorganizational-learning network, which shapes a set of internal relationships among individual members of the firm and other constituencies such as product/service divisions and geographical units. Learning innovation network is built by external relationships of the innovative company with participants of innovation processes, which are executed within the area of innovation network.

Relationships of innovative companies with partners in networks are based on development and transfer knowledge, which is used in innovation processes. Good partner relationships are at the heart of the company success in the network and its innovative offer on the market. Intangible assets such as relationships with partners and supply channels are defined as relational market-based capital of a company which can provide sustainable competitive advantage and added value for a company, and its partners, particularly in innovation area (Dolińska, 2012b, p. 26).

Social capital of innovation networks plays a key role in expediting the innovation process. It is an intangible factor that accelerates innovation by stimulating interactive learning, knowledge sharing and transfer in innovation networks. How does social capital influence innovation? Trust – the most important element of social capital – not only provides a basis for the creation of networks but also consolidates the networks by encouraging transparency among networks members, thus facilitating knowledge sharing and exchange. Trust, supplemented with good learning ability of members in a network, enhances the innovativeness and competitiveness effect of the network (Yokakul & Zawdie, 2010, p. 22). Innovations arise from complex interactions and relationships between individuals, firms-partners of the network and innovative environment during the implementation of innovation processes. The base of building these relationships is shaping mutual trust between collaborators of innovation processes.

Every country should construct open innovation systems, that expand to relative economic structure, and various social cooperation networks that help effectively improve collective learning, knowledge and innovation development. The capability of production and innovation of a country can be improved by the increasing number of well skilled and educational employees (Chen 2008, pp. 501, 507) and also their interactions and relationships inside and outside the companies during execution of innovation processes within innovation networks.

Innovations occurs more effectively where there is exchange of knowledge between systems (for example, between regions or between science and industry) (Ritter & Gemünden, 2003). At an institutional level, national systems of innovation play an important role in the diffusion of knowledge and innovations in terms of the way in which relationships with knowledge suppliers, customers and

intermediaries such as professional and trade associations are important factors affecting innovation performance and productivity (Pittaway et al. 2004, p.137).

Regional innovation networks are best characterized by collaboration among academia, government, and industry for purposes of fostering and accelerating innovation. The focus and purpose of these networks is to drive economic development through increased commercialized innovation, derived from internal or external R&D, financial resources, and other support programs (Schoonmaker & Carayannis, 2010, pp. 48-50).

Clusters are defined as geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete and also cooperate (Porter, Ketels & Delago, 2008). Proximity facilitates an increased number of interactions between related firms, largely as a function of high spatial concentration, which in turn enhances the coordination and control of firm activities within the supply chain and facilitates frequent and repeated inter-firm knowledge, information sharing and collaboration (Zhao, Zhou & Huesig, 2010, pp. 4, 8).

The science-technology park is a group of firms that generate, develop and utilize new technology to apply them in the economy (also in new products on markets). It stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, laboratories, companies and markets; it facilitates the creation and growth of innovation-based companies through incubators and spin-off processes, and provides other value-added services together with high quality space and facilities. Professional associations, trade associations and publicly funded bodies specifically aimed at promoting innovation (such as technology transfer centers) have positive impact on the development of inter-organizational networks and innovation (Hanna & Walsh 2002; Janne 2002).

The goals that companies realize by learning within innovation networks include:

- collaboration and mutual learning with partners (also consumers) and/or competitors during innovation process activities execution,
- flexible access to new technologies, innovative solutions and also current knowledge form inside and outside the networks,
- KM with partners and/or competitors,
- improving innovative competences, capabilities,
- risk share with partners during innovation process accomplishment and innovation diffusion,
- shaping innovative culture,
- intensifying contact with clients, partners to speed innovative products to market, and enter new markets,
- creating long-term knowledge based relations with knowledge and/or innovations suppliers and clients,
- pooling complementary innovative skills,
- safeguarding property rights, the network members (partner-firms) from outside competition on the innovation market,
- reducing R&D time and costs,
- increasing efficiency of innovation process accomplishment and innovation dispersing,
- flexible access to many sources of innovation financing and flexible using of them during innovation development and application.

Networks are critical not only for accessing knowledge to create in-house innovations, or for the diffusion of technological solutions, but they are equally important for learning about innovative work practices that other organizations have developed or adopted. They influence this in a number of ways. First, by enhancing access to knowledge – promoting awareness and early adoption of innovations – and, secondly, by promoting social interaction, generating trust and reciprocity that is conducive to knowledge transfer (Pittaway et al. 2004, pp. 145, 148, 150).

KM and learning capacities of people and innovative companies are instrumental for innovation processes, as are their powers of creativity, initiative and drive, determining the innovative capabilities of the network and its collaborators.

3. COLLABORATION AND LEARNING OF COMPANIES WITH PARTNERS WITHIN INNOVATION NETWORKS (CHOSEN RESULTS OF QUESTIONNAIRE RESEARCH)

The study was conducted on respondents from 64 innovative companies of the Lubelskie Voivodeship (Poland) in 2009 (Dolińska, 2009). The questionnaire respondents were managers of firms with the necessary knowledge and perspective to answer the relevant questions.

The objective of the questionnaire research was to examine:
With what partners the analyzed companies cooperated and learnt mutually during innovation process execution within the framework of innovation networks.

For survey this purpose, the following research hypothesis was made:
Collaboration of companies with partners (also clients) within the framework of innovation networks enable them mutual learning and innovative development.

The most (73,4%) of the analyzed firms put into practice product innovations during the last three years (before 2009), in turn 65,6% firms applied innovative technology, 59,4% firms – innovations in management, and 46,7% firms – 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 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 three year period.

Employees of the analysed firms continuously improved their innovative competencies and applied their knowledge in their innovative activities and offer addressed to clients. They learnt from participants of formal and informal innovation networks.

Employees in 98,4% of companies learnt during combining their work with graduate studies, M.Sc. studies, courses in engineering and undergraduate studies. Staff of the companies continued to develop their professional qualifications by attending various training courses on innovation and knowledge development. Employees from 59,4% of the analysed firms attended courses on financing innovations, and from 32,8% of firms – courses on innovations, from 21,9% of firms attended courses on knowledge, intellectual capital. Employees from 48,4% of the companies took part in conferences, scientific seminars last year before 2009, and then they learnt how use current knowledge in innovations and also built relationships with personnel of universities, research or scientific institutes. These relationships were based on knowledge exchange and mutual learning. They were the beginning or continuation of building informal or formal innovation networks in the future.

Performance of firms within innovation network should depend on knowledge resources of its partners and their skill in organizing knowledge management (absorption, creation, exchange and using) in innovation processes. Innovative assets of the companies are results of their internal and interorganizational learning and also internal and external (also foreign) sources of knowledge.

The analyzed companies cooperated and learnt during accomplishment innovation process activities with partners at home and abroad. The following partners (at home and abroad) of the firms were taken into consideration in carried out research: firms in the same line of business, firms different line of business, high schools (universities, polytechnics), R&D entities, regional and/or local authorities, innovation transfer institutions, science-technology parks, clusters, and also financial institutions.

The research results showed that 95,4% of the analyzed companies cooperated and learn with partners during innovation processes execution. The majority (95,4%) of companies cooperated and learn mutually with partners at home, and fewer (43,6%) firms – both home and abroad, and 4,6% – only abroad. The capacity for assimilation of external knowledge depends on the company's internal learning and how it structures its knowledge based relations with partners in innovation networks. Most (62,5%) firms cooperated and learnt during innovation process execution with firms in the same line of business at home, however 39% – with firms abroad. Fewer (46,9%) firms cooperated with firms different line of business at home and 15,6% – abroad, and 34,4% firms cooperated with only home universities, polytechnics and fewer (17,2%) – with R&D entities at home, and very few (1,6%) – abroad. Very few (4,7%) companies cooperated with innovation transfer institutions at home and only

1,6% – abroad, and few (3,1%) firms cooperated with domestic science-technology parks, and (7,8%) - with clusters (see Table 1).

Table 1: Cooperation and mutual learning of the companies with partners within innovation networks

Kind of partners (participants of innovation networks)	Percent of the analyzed companies what cooperated and learnt with different partners	
	At home	Abroad
Firms in the same line of business	62,5	39,0
Firms different line of business	46,9	15,6
R&D entities	17,2	1,6
Universities, polytechnics	34,4	-
Innovation transfer institutions	4,7	1,6
Science-technology parks	3,1	-
Clusters	7,8	-
Regional/local authority	15,6	1,6

Source: own research of the author

The results of research confirmed that the most companies cooperated and learnt with partners of the domestic innovation networks and fewer – of foreign ones.

The majority (95,4%) companies took part in innovation processes execution in the innovation networks and cooperated, developed their knowledge with a few firms the same and other line of business, R&D entities, universities, innovation transfer institutions, scientific and science-technology parks, clusters.

Respondents expected development of interorganizational learning during effective cooperation with many next partners in the future, in particular - with these forms of the innovation networks, which are now built in Poland, that is with – clusters and science-technology parks.

Companies developed knowledge and learnt how use it in innovations carrying out R&D activity. Most (56,3%) of the companies carried out R&D activity, and 37,5% – carried out it 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. Companies developed knowledge and learnt intensively during execution of innovative research projects. 43,3% of the analyzed firms executed these projects, and 23,4% of them did it independently, and 37,5% cooperated with other entities in this field, but 17,2% of firms did it both independently as well in cooperation with partners.

Clients remained the most important source of knowledge on innovative solutions for the analysed companies. They were source of innovations in 60,9% of the companies. The data presented proved that the majority of the analyzed companies were partner/client-oriented in the innovation area and their activities were directed towards shaping long-term knowledge based relations with partners/clients and mutual learning with them during innovation processes execution.

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

4. CONCLUSIONS

The results of the study indicate that entrepreneurs were interested in increasing their cooperation and interactive learning of their companies with partner firms and clients during KM in innovation processes within framework of networks. Cooperation and mutual learning of innovative companies with collaborators within the framework of innovation networks generates synergy effects in the area of their knowledge and innovative capabilities development and also effective, commercial using.

The results of the studies confirmed a growing awareness of the innovative companies on how significant were their knowledge based relationships with partners and clients during innovation process execution within innovation networks in ensuring them a competitive edge on the marketplace and in learning how build with collaborators the knowledge-based economy in the region.

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