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INTELLECTUAL CAPITAL DEVELOPMENT OF INNOVATIVE COMPANIES IN OPEN AND NETWORKED INNOVATION

Summary: Aims of this paper are: (1) to characterize open and networked innovation idea for an innovative company, (2) to present knowledge management (KM) and synergic effects of intellectual capital (IC) development of the innovative company in open and networked innovations. Open and networked innovation links KM activities of innovative firms that collaborate and compete among themselves during execution of innovation processes within networks. Interorganizational KM and learning by the innovative company with partners (suppliers and consumers of knowledge, innovations) in open and networked innovations influence on synergic effects of its IC development. The paper also presents the results of questionnaire research on synergic effects of IC development by innovative companies in open and networked innovation.

Keywords: open and networked innovation, knowledge management, synergic effects, intellectual capital, development, innovative company.

Introduction

Intangible assets as intellectual capital (IC), internal and external knowledge resources, open and networked innovations are essential elements to value creation of innovative companies and their effective development in a knowledge-based economy.

The term open innovation describes innovation process, in which firms interact extensively with their environment, leading to a significant amount of external knowledge exploration and exploitation [Lichtenthaler, 2011, p. 76]. Open and networked innovation idea is a result of utilization the open innovation idea

by companies and their collaborators during their interorganizational KM and learning in innovation processes within the framework of networks, and also collective diffusion of innovations in innovation markets.

Now innovations are knowledge products of open innovation processes accomplished by innovative firms and their collaborators (partners and/or competitors, and also consumers) within innovation networks. The networks are bundles of innovation processes which are executed by their collaborators that can efficiently innovate by sharing complementary knowledge resources and innovative competencies. Innovations become processes of interorganizational KM and learning processes among innovative companies and other participants of innovation networks [Dolińska, 2010; 2015].

In this paper the innovation network 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].

Over the past decades open innovation, cooperation and networks have come to the fore in innovation research [Chesbrough, Vanhaverbeke and West, 2006; Chesbrough, 2012, Henttonen, Pussinen and Koivumaki, 2012; Dolińska, 2015]. This article is built on the recent tendency of companies to 'open up' their innovation processes and execution of them in the framework of external (domestic and/or foreign) innovation networks.

IC is the kind of movement from having knowledge and skills to using them [Chang and Hsieh, 2011, p. 4]. The IC components corresponds to knowledge assets which can be tangible or intangible as well codified or tacit in nature. IC of the innovative company can be considered as innovative competencies and capacities [Schiuma and Lerro, 2010, p. 42]. It is developed by contemporary companies during mutual KM and learning with outside collaborators (suppliers and consumers of knowledge) and/or competitors during accomplishment of open and networked innovations (as open innovation processes executed within networks).

The links between innovations and IC in the innovative company were studied from different point of view: (1) the influence of IC (or chosen dimensions, or elements of IC) on innovations, (2) innovations as results of knowledge and IC management [Marqués, Simón and Carañana, 2006; Dolińska, 2010; Santos-Rodrigues, Dorrego and Jardon, 2010; González-Leureiro and Dorrego, 2010; Lee, Swink and Pandejpong, 2011; Meyer, 2011]. The study in this paper addresses a gap in the literature by investigating how participation of the innovative company in open and networked innovations are able to have an impact on synergic effects of its IC development.

The main purpose of this paper is to present the influence of interorganizational KM and learning by the innovative company with collaborators and/or competitors in open and networked innovations on creating synergic effects of the company IC development and also each of IC dimensions (human capital – HC, organizational capital – OC, relational capital – RC).

This paper presents the idea of open and networked innovation and its using in innovative company development. It characterizes closed and open innovation models and the role of networks in each of them. It analyses interorganizational KM process in open and networked innovation. The paper presents the new, holistic approach to creating additional value of the innovative company IC. It determines synergic effects of IC (and their dimensions HC, OH, RC) development by the innovative company in open and networked innovations. This paper also characterizes the influence of interconnections among components of HC, OC, RC and also ties each of these dimensions with innovative environment of the innovative company on synergic effects of its IC development in open and networked innovations. It presents results of questionnaire research on chosen synergic effects of IC development by innovative companies of the Lubelskie Voivodship in open and networked innovation area. This research was conducted in 2009.

1. The role of open and networked innovations in development of innovative companies

Open innovation is an emerging innovation management model comprised of two dimensions: (i) unbound open innovation, which is the practice of establishing relationships with external organizations or individuals with the purpose of accessing their technical and scientific competences for improving internal innovation performance and (ii) outbound open innovation, which is the practice of establishing relationships with external organizations with the purpose of commercially exploiting technological knowledge [Chiaroni, Chiesa and Frattini, 2010, p. 222]. Two important characteristics of the open innovation theory are that it gives considerable attention to the purposive outbound flows of intellectual property and underlines the need to motivate the creation of relevant knowledge outside the company [Henttonen, Pussinen and Koivumaki, 2012, p. 136]. Inbound open innovation is an outside-in process and involves opening up the innovation process to knowledge exploration. Here, external knowledge exploration refers to the acquisition of knowledge from external sources. In contrast, outbound open innovation is an inside-out process and include opening up the innovation

process to knowledge exploitation. External knowledge exploitation relates to the commercialization of technological knowledge [Lichtenthaler, 2011, p. 76].

Companies have increasingly shifted from innovation initiatives that are centered on internal resources of knowledge (closed innovation) to those are centered on external networks – said another way, a shift from firm-centric innovation to network-centric innovation [Nambisan and Sawhney, 2011, p. 40]. As a consequence, the ‘ideal’ model of processes for innovation have experienced a linear evolution from a traditionally closed system towards more or less exclusively open and strategically networked systems of complementary resources [Harryson, Dudkowski and Stern, 2008, p. 745]. Open and networked innovation is becoming increasingly important for organizations as they attempt to rapidly changing environment by joint acquiring, creating, integrating and using interdependent and complex bundles of knowledge within innovation networks (inside and outside of its collaborators, also innovative companies).

In the closed innovation model, internal R&D activities feed the company’s production pipeline and products are produced and brought to market by the company itself. Open innovators employ a systematic strategy for motivating the creation of external knowledge. They also use purposive outward knowledge flows to reach new markets and maximize returns on internal innovation. Empirical evidence clearly shows that firms implementing open innovations require the establishment of extensive networks of interorganizational relationships with a number of external actors, in particular universities and R&D institutions, suppliers and users of knowledge and/or innovations and other actors of innovative environment [Chiaroni, Chiesa and Frattini, 2010, p. 225; Henttonen, Pussinen and Koivumaki, 2012, pp. 136,137]. Table 1 presents characteristics of closed and open innovation models, and also the role of networks in the relevant model.

Table 1. Characteristics of closed and open innovation models and the role of networks in the relevant of them

Innovation model	Characteristics of using the relevant model by the innovative company	The role of networks in using the relevant model by the innovative company
1	2	3
Closed innovation	<ul style="list-style-type: none"> • only internal R&D activity of the company, • commercialization of results of own R&D, • development of internal knowledge and its application in own innovations, • entering innovation market by the company itself, • improvement of abilities of own innovators, • execution of innovation process activities inside the company 	<ul style="list-style-type: none"> • sometimes collaboration of employees of internal R&D and/or production, and/or marketing units within inside networks

Table 1 cont.

1	2	3
Open innovation	<ul style="list-style-type: none"> • motivating creation and contribution of external knowledge in innovations, • inbound and outbound flows of intellectual property, • learning absorption of external knowledge, • access to competitive resources of external knowledge, innovative skills and competences, • integration and application of own and external knowledge, technology, innovative competencies, • conducting market research with external partners, • using external technology and/or innovative solutions in own innovations, • collective execution of innovation process activities with outside partners, • entering innovation market with external collaborators 	<ul style="list-style-type: none"> • creation of external knowledge and innovations with collaborators within networks, • interorganizational cooperation during collective execution of innovation processes within joint internal and external networks, • interorganizational KM and learning, mutual innovative capabilities development during accomplishment of innovation processes within innovation networks, • creation of synergic effect of IC development during cooperation with partners and/or competitors within innovation networks, • development and using of mutual, shared knowledge resources with partners in networked innovation processes, • entering innovation markets and diffusion of innovations with partners from innovation networks

Source: Based on: [Chesbrough, Vanhaverbeke and West, 2006; Chiaroni, Chiesa and Frattini, 2010; Lichtenthaler, 2011; Henttonen, Pussinen and Koivumaki, 2012, Dolińska 2015].

Diverse forms of open innovation networks are possible, for example: national, regional innovation systems, technology and science parks, clusters, formal cooperation of companies with other firms (suppliers, consumers of knowledge and/or innovations, funds for innovations, services in the area of innovation development, commercialization and diffusion), also with research and development (R&D) institutions, high schools, regional and/or local authorities, innovation transfer institutions, and also informal cooperation based on personal relationships i.e. associations of innovators, clubs of entrepreneurs.

Creating knowledge based interactions and relationships (often repeated interactions) by the innovative firms with collaborators within innovation networks enable cooperation during their mutual KM and learning in open innovation processes [Dolińska, 2010; 2014].

Knowledge assets of the innovation network and their participants – innovative firms are created, utilized and developed by them as the result of joint KM and building among them knowledge based relationships which lead up to collective, interorganizational KM and learning during networked innovation processes accomplishment. The role of knowledge based relationships between

partners within innovation network is central to their mutual knowledge creation, transfer and effective using in innovation processes [Vanhaverbeke, van de Vrande and Chesbrough, 2008; Lichtenthaler, 2011; Dolińska, 2015].

2. KM and IC development of the innovative company in open and networked innovations

Contemporary firms and their employees cooperate among themselves during execution of open and networked innovations and then they share, use and develop their complementary knowledge and also IC resources. The goal of entering external innovation networks and cooperating with partners in open innovation by innovative company is to get access to internally not available knowledge, new technology and learn from partners how develop innovative capabilities, abilities and implement innovations inside and on the market efficiently.

Innovation arises from complex interactions and relationships between individuals, firms-partners of the network organization and their markets during the implementation of innovation processes. With accomplishment of innovation processes within the innovation network, knowledge resources of its participants are multiplied [Dolińska 2010, pp. 8,15].

The issues concerning the balance between suitable knowledge, its impact on performance, and when and with whom to seek external knowledge are important for sustainability of companies innovative development. The use of external knowledge has been proven to be one of the key factors in ensuring innovation, learning, business competitiveness, long-term growth (Anussornnitisarn et al., 2010; Quintane et al., 2011) and the innovative company IC development.

Implementing open and networked innovation requires the use of KM system able to support the exploration (acquiring, creation, development), maintaining, transfer and exploitation (sharing, practical application) of knowledge within the firm and with its external environment. Knowledge assets of the innovation network and their participants are created, utilized and developed by them as the result of joint KM and building among them knowledge based relationships which lead up to interorganizational learning during open innovation processes accomplishment.

In today's innovation markets, competition no longer takes place between individual competitors. Rather, it takes place between the entire value-delivery knowledge networks created by innovative competitors [Dolińska, 2006, p. 44]. These networks enable companies to react dynamically to changeable conditions of interorganizational innovation processes execution, and learn how efficiently managing knowledge in open innovations.

External knowledge of the innovative company derives from its collaborators within the innovation network, and is generated in its micro- and macroenvironment. Retention of this knowledge refers to its maintaining outside a firm's organizational boundaries over time using interorganizational relationships with partners as an extension of the internal knowledge resources [Dolińska, 2010; 2015].

Innovation is a way of creating knowledge and IC value in the firm, but its development in open and networked innovation enable to add additional competitive value to IC of the firm.

This paper uses the three interrelated dimensions to operationalize the IC construct of the innovative company, that is HC, OC and RC. HC comprises all knowledge assets (tacit and explicit) placed in individual employees, their competence, skills, experience, intellectual abilities, education, or life and business attitudes. It characterizes their knowledge and its practical using in the company. This area of HC considers not only all knowledge and skill acquired by employees, but also their knowledge based relationships with other employees for the creation of teams to work and learn within the company [Galunic and Anderson, 2000, p. 3; Guthrie 2001, p. 36] and additionally with partners in open and networked innovations in the knowledge-based economy. HC of the innovative company considers also knowledge, abilities, collective learning of employees from partner-firms in open and networked innovations.

OC is the institutionalized knowledge and codified experience residing within and utilized through databases, patents, manuals, structures, systems, trademarks and processes. About organizational intangible assets, the attention has been paid on other kind of infrastructure related to innovation strategy, innovative and learning culture, entrepreneurial attitudes, image, flexible organizational structure. RC is defined as the knowledge embedded within, available through, and utilized by relationships among individuals and their networks of interrelationships, planning and execution of innovation processes within the framework of innovation networks. RC concept derives from the initial notion of customer capital, which was amplified to consider the knowledge obtained through all kind of relationships with competitors, suppliers, consumers, associations, government or other organizations that interact [Youndt, Subramaniam and Snell, 2004, p. 454; Nahapiet, Gratton and Rocha, 2005; Dolińska, 2014], collaborate and/or compete in the innovative environment. RC also encourages collaboration both within and across organizations and is the base of building knowledge-based relationships by innovative companies with collaborators (suppliers and consumers of knowledge) during open innovation processes accomplishment within the framework of innovation networks.

Interorganizational KM and learning by the innovative company with external collaborators during cooperation also competition in open and networked innovations affect synergic effects of the company IC development (see Table 2). Interrelationships among dimensions HC, OC and RC influence on IC growth of the innovative company value and they are taken into consideration during determination of synergic effects of its IC development in open and networked innovations.

Components of IC are determined for the current and future periods and they enable to create market value of the innovative company IC dynamically. Mutual development, exchange of knowledge and using it in open and networked innovations with partners enable to build higher value of the company IC that is crucial for building its competitive position on the innovation market.

3. Results of questionnaire research on synergic effects of IC development by innovative companies in open and networked innovations

The questionnaire research was conducted on respondents from 64 innovative companies of the Lubelskie Voivodeship in 2009 [Dolińska, 2009]. The research sample was chosen as nonprobability, judgment sample of companies.

Table 2. Synergic effects of IC development by the innovative company in open and networked innovations

Synergic effects of development			
of human capital	of organizational capital	of relational capital	of IC (human and organizational and relational capital)
1	2	3	4
<ul style="list-style-type: none"> Improving innovative competencies, abilities of the company and its staff within innovation networks. Personnel cooperation and/or competition with partners and/or competitors during KM in open and networked innovation 	<ul style="list-style-type: none"> Transformation external tacit into explicit knowledge; development and using it with partners in innovations. Elaborating and executing innovative strategy with outside partners. Launching innovations in the firm with outside collaborators 	<ul style="list-style-type: none"> Organization of cooperation with partners (suppliers, consumers of knowledge) in open and networked innovation. Entering new domestic, foreign markets of innovations. E-business, s-commerce with partners in the area of KM and development of innovation 	<ul style="list-style-type: none"> Mutual KM and learning with outside partners. Creating collective knowledge and innovations; their diffusion with partners within the innovation networks. Acquiring knowledge from macro-and microenvironment, and also from external experts and specialists

Table 2. cont.

1	2	3	4
<ul style="list-style-type: none"> • Collective learning and KM with collaborators within the innovation network. • Improving ability for knowledge exchange and share, and using it efficiency with outside collaborators in innovation process 	<ul style="list-style-type: none"> • Building and practical using external and internal knowledge bases and information system in innovation process. • Increasing innovative capacities during innovation process accomplishment within the networks. • Integration and using external, internal sources of knowledge on innovations, innovators and innovation markets. • Conducting R&D with partners from outside the firm. • Shaping image of the innovative company as participant of innovation networks 	<ul style="list-style-type: none"> • Consumer/partner relationship management, also using CRM system in open and networked innovation. • Growth of competitiveness of the company and its offer on the innovation market. • Increase of the company share in innovation market. • Conducting market research and analysis on innovations with outside partners. • Creating partnership between suppliers and consumers of knowledge in open and networked innovation 	<ul style="list-style-type: none"> • Access to complementary knowledge and other resources which are used by collaborators of the firm in open and networked innovations. • Growth of IC value of the innovative company and its market value. • Upgrading knowledge based relationships with partners in the framework of innovation network. • Building with partners and using shared knowledge bases in the area of innovation networks

One from a few objectives of the study was to examine whether cooperation of innovative companies with partners and consumers in open and networked innovations influences on development of IC of the analysed companies. The results of this research have made possible to determine synergic effects of IC development by innovative companies in open and networked innovations.

The breakdown of the analyzed companies structure by size was as follows: 25% were micro-, 34,4% – small, 28,1% – medium companies, and 12,5% were large corporations. 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 during last three years.

Employees from 48,4% of the companies took part in conferences and/or scientific seminars last year and then they exchanged new knowledge on innovations and built knowledge based relationships with personnel of universities, R&D or other scientific institutes. These relationships enable the innovative company to create synergic effects of its HC development.

The study focused on cooperation in open and networked innovations that was developed by the companies with their home and/or abroad partners, including companies in the same line of business, – operating in other areas, R&D entities, universities, innovation transfer institutions, scientific-technological parks and clusters.

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 (62,5%) firms cooperated during networked 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. 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.

The above data confirms that the most companies developed open innovation cooperation with partners within innovation networks of the domestic market and fewer – foreign markets. Few companies collaborated with the contemporary innovation networks as clusters and scientific-technological parts. The analyzed cooperation of the innovative company with partners and/or competitors influences on its interorganizational KM and IC development in open and networked innovation.

Most (65,6%) of examined companies maintained long-term relationships with individual consumers, more (92,2%) – knowledge based relationships with institutional consumers, and 78,2% – with collaborators in the area (of development and/or application, and/or distribution, and/or commerce) of innovations.

Some innovation-related marketing activities were carried out by the innovative companies with outside partners and consumers, and created synergic effects of their RC development. The majority (68,1%) of the analyzed companies collaborated with outside firms in conducting marketing research on innovations, and 40,6% of them – diffusion of innovations, but only 20,3% of these companies used CRM systems during cooperation with consumers in open innovations. Consumers were source of external knowledge on innovations in 60,9% of the analysed companies. Collaboration with consumers in 57,8% of firms increased efficiency – and in 43,8% of them influenced on cost cut – of development of their new products.

Most (56,3%) companies carried out R&D activities, and 37,5% of them – carried out it on their own, only 28,1% – collaborated with other entities in this field, and fewer (10,9%) – carried out this activity on their own and also with specialist firms outside. The analyzed companies carried out their R&D activities largely on their own. Cooperation with outside partners in this field enable innovative companies to develop interorganizational KM and learning in the area of innovations and create additional value of their IC (and also its dimensions: HC, OC and RC).

Respondents determined possibilities of knowledge system development (including absorption of external knowledge) on innovations in their firms. Connection this system with external knowledge influences on synergic effects of the innovative company OC development. Development of knowledge for innovation purposes was carried out by the majority (65,6%) of companies on their own and 34,4% of the companies carried out the same in association with external partners in the framework of the innovation networks. The majority of companies possessed and developed actual knowledge bases of their institutional clients (82,8% of firms) and individual clients (65,6%), competitors (57,8% of firms) and fewer companies (32,8%) on other (except clients) collaborators within innovation networks.

Respondents determined the following effects of the innovative company collaboration with partners/competitors in open and networked innovations:

- 95,3% of firms obtained access to external knowledge and/or innovation solutions,
- 85,9% of them – increased their innovative capabilities,
- 68,1% – strengthened their image of the innovative company,
- 68,1% – strengthened their competitive position on the innovation market,
- 65,6% – increased efficiency of innovation development and put into practice,
- 59,4% – applied new technology,
- 45,2% – faster entered innovations on new markets, and/or more efficiently,
- 37,5 % – increased efficiency of innovation promotion and sale.

The presented data proved that the majority of the companies were external knowledge and/or partner-oriented. Their activities were directed towards creating long-term knowledge based relations with their collaborators, and also more effective development of their IC in open and networked innovations.

The results of the study indicated that entrepreneurs were interested in boosting cooperation of their companies with partners/competitors in open and networked innovations. They were well aware of the impact of open and networked innovations on synergic effects of IC development in innovative companies.

Conclusions

Cooperative and competitive knowledge based relationships, interorganizational KM and learning of the innovative company with other participants of open and networked innovations build additional value of its IC. This paper characterizes the influence of using joint knowledge and innovative skills, competencies, and mutual development of them by companies with partners/competitors in open and networked innovations on creating synergic effects of their IC (and its dimensions: HC, OC, RC) development in open and networked innovations. Future research might solve problem – how to measure IC value of the innovative company as the participant of open and networked innovations. Metrics of IC components in the innovative company ought to be determined for the current and future periods, because then they enable to build IC value and also market value of the company dynamically.

References

- Anussornnitisarn P., Sanpanich S., Phusavat K., Kess P., Muhos M. (2010), *Sustaining Organizational Innovation and Learning through External Knowledge*, "International Journal of Innovation and Learning", Vol. 7, No. 1, pp. 85-99.
- Chang W.S., Hsieh J.J. (2011), *Intellectual Capital and Value Creation – Is Innovation Capital a Missing Link?* "International Journal of Business and Management", Vol. 6, No. 2, pp. 3-12.
- Chesbrough H. (2012), *GE's Ecomagination Challenge: An Experiment in Open Innovation*, "Berkeley-Haas Case Series. University of California", Vol. 54, No. 3, pp. 140-147.
- Chesbrough H., Vanhaverbeke W., West J., eds. (2006), *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford, UK.
- Chiaroni D., Chiesa V., Frattini F. (2010), *Unravelling the Process from Closed to Open Innovation: Evidence from Mature, Asset-Intensive Industries*, "Research & Development Management", Vol. 40, No. 3, pp. 222-245.
- Dilk Ch., Gleich R., Wald A., Motwani J. (2008), *State and Development of Innovation Networks*, "Management Decision", Vol. 46, No. 5, pp. 691-701.
- Dolińska M. (2009), *Sprawozdanie merytoryczne. Projekt badawczy własny nr 1 H02D 060 30. Marketingowe i organizacyjne uwarunkowania zarządzania wiedzą w procesie innowacji wdrażanych w przedsiębiorstwie*, MNiSW, Warszawa.
- Dolińska M. (2010), *Innowacje w gospodarce opartej na wiedzy*, PWE, Warszawa.
- Dolińska M. (2014), *Open Innovation* [in:] A. Jaki, B. Mikula (eds.), *Knowledge – Economy – Society. Managing Organizations: Concepts and Their Applications*, Cracow University of Economics, Cracow, pp. 221-228.

- Dolińska M. (2015), *Knowledge Based Development of Innovative Companies within the Framework of Innovation Networks*, "Innovation: Management, Policy & Practice", Vol. 17, No. 3, pp. 323-340.
- González-Leureiro M., Dorrego P.F. (2010), *Intellectual Capital on Regional Innovation: Systems toward the Momentum of Growth Rates of Business Performance*, "International Journal of Transitions and Innovation Systems", Vol. 1. No. 1, pp. 82-99.
- Galunic C.D., Anderson F. (2000), *From Security To Mobility: Generalized Investments in Human Capital and Agent Commitment*, "Organization Science", Vol. 11, No. 1, pp. 1-20.
- Guthrie J. (2001), *The Management, Measurement and the Reporting of Intellectual Capital*, "Journal of Intellectual Capital", Vol. 2, No. 1, pp. 27-41.
- Harryson S.J., Dudkowski R., Stern A. (2008), *Transformation Networks in Innovation Alliances – The Development of Volvo C70*, "Journal of Management Studies", Vol. 45, No. 4, pp. 745-773.
- Henttonen K., Pussinen P., Koivumaki T. (2012), *Managerial Perspective on Open Source Collaboration and Networked Innovation*, "Journal of Technology, Management & Innovation", Vol. 7, Iss. 3, pp. 135-147.
- Lee J.Y., Swink M., Pandejpong T. (2011), *The Roles of Worker Expertise, Information Sharing Quality, and Psychological Safety in Manufacturing Process Innovation: An Intellectual Capital Perspective*, "Production and Operations Management", Vol. 20, No. 4, pp. 556-570.
- Lichtenthaler U. (2011), *Open Innovation: Past Research, Current Debates, and Future Directions*, "Journal of Management Perspectives" February, Vol. 25, No. 2, pp. 75-93.
- Marqués D.P., Simón F.J.G., Carañana C.D. (2006), *The Effect of Innovation on Intellectual Capital: An Empirical Evaluation in the Biotechnology and Telecommunications Industries*, "International Journal of Innovation Management", Vol. 10, No. 1, pp. 89-112.
- Meyer J.P. (2011), *Effects of Exploration on the Relationships between Intellectual Capital and the Retained Technical value of Innovation*, "International Journal of Innovation Management", Vol. 15, No. 2, pp. 249-277.
- Nahapiet J., Gratton L., Rocha H. (2005), *Knowledge and Relationships: When Cooperation is the Norm*, "European Management Review", No. 2, pp. 3-14.
- Nambisan S., Sawhney M. (2011), *Orchestrator Processes in Network-Centric Innovation: Evidence from the Field*, "Academy of Management Perspectives" August, pp. 40-57.
- Quintane E., Casselman R.M., Reiche B.S., Nylund P.A. (2011), *Innovation as a Knowledge-Based Outcome*, "Journal of Knowledge Management", Vol. 15, No. 6, pp. 928-947.
- Santos-Rodrigues H., Dorrego P.F., Jardim C.F. (2010), *The Influence of Human Capital on the Innovations of Firms*, "International Business Economics Research Journal", Vol. 9, No. 9, pp. 53-63.
- Schiuma G., Lerro A. (2010), *Knowledge-Based Dynamics of Regional Development: The Intellectual Capital Innovation Capacity Model*, "International Journal of Knowledge-Based Development", Vol. 1, No. 1/2, pp. 39-52.

Vanhaverbeke W., Vrande V. van de, Chesbrough H. (2008), *Understanding the Advantages of Open Innovation Practices in Corporate Venturing in Terms of Real Options*, "Creativity and Innovation Management", Vol. 17(4), pp. 251-258.

Youndt M.A., Subramaniam M., Snell S.A. (2004), *Intellectual Capital Profiles: An Examination of Investments and Returns*, "Journal of Management Studies", 2004, No. 41, pp. 335-362.

ROZWÓJ KAPITAŁU INTELEKTUALNEGO PRZEDSIĘBIORSTW INNOWACYJNYCH W OTWARTEJ I SIECIOWEJ INNOWACJI

Streszczenie: Celami artykułu są: (1) scharakteryzowanie dla przedsiębiorstwa innowacyjnego koncepcji otwartej oraz sieciowej innowacji, (2) przedstawienie zarządzania wiedzą (ZW) oraz efektów synergicznych rozwoju kapitału intelektualnego (KI) przedsiębiorstwa innowacyjnego w otwartych i sieciowych innowacjach. Otwarta oraz sieciowa innowacja łączy czynności ZW innowacyjnych firm, które współpracą oraz konkurują ze sobą w trakcie realizacji procesów innowacji w obszarze sieci. Międzyorganizacyjne ZW oraz uczenie się innowacyjnego przedsiębiorstwa z partnerami (dostawcami i klientami wiedzy) w otwartych i sieciowych innowacjach wpływa na efekty synergiczne rozwoju jego KI. Artykuł przedstawia również wyniki badań ankietowych na temat efektów synergicznych rozwoju KI przedsiębiorstwa innowacyjnego w otwartej i sieciowej innowacji.

Słowa kluczowe: otwarta i sieciowa innowacja, zarządzanie wiedzą, efekty synergiczne, kapitał intelektualny, rozwój, przedsiębiorstwo innowacyjne.