

## NETWORKING IN KNOWLEDGE ECONOMY (PART II)

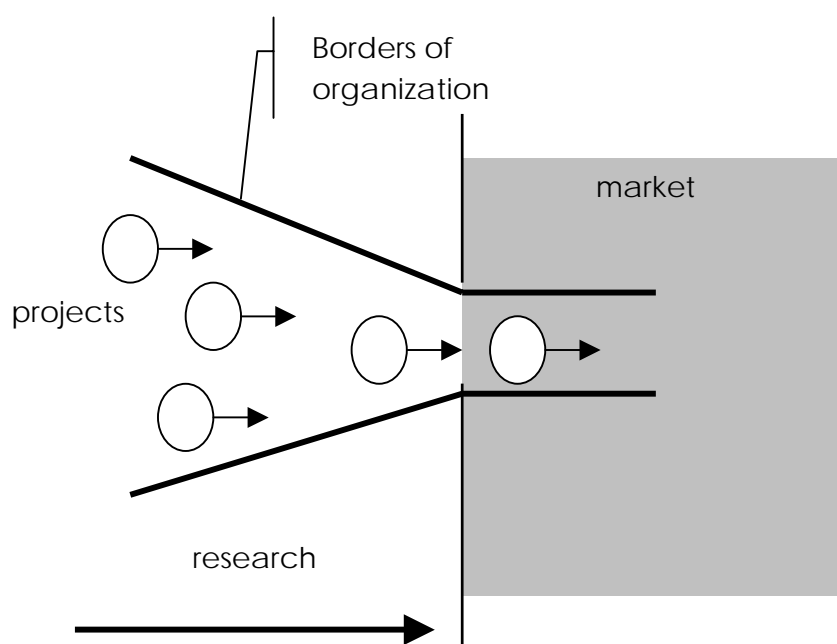
Associate Professor PhD Piotr Pachura, Czestochowa University of Technology, e-mail:  
piotrpachura@o2.pl

*ABSTRACT: Networking and network process are one of the most inspiring theory in socio-economic science during last years – when knowledge and information are most important. An economy based on knowledge is one directly based on production, distribution and the use of knowledge and information. The notion of a knowledge-based economy should be understood first and foremost, as the definition of a modern stage of economic development, where knowledge is understood as the ability to act and play a decisive role in stimulating social and economic development.*

*Keywords: networks, knowledge economy, innovations, regional development*

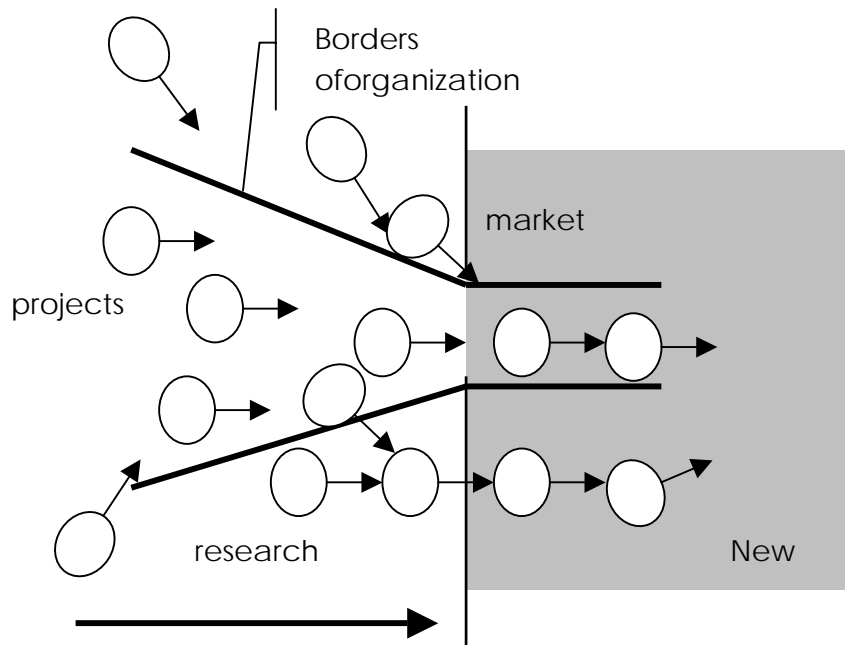
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Important phenomenon associated with the change of innovative strategies of enterprises is the approach to the inspired concept of “open innovation”<sup>1</sup>. Innovative strategies of enterprises up to now have been most frequently based on research on new products or services carried out by the enterprises themselves in their own R&D centres (fig. 1). However, the concept presented in fig. 2 defines a new model of creating and commercializing innovations based on a free flowing transfer of knowledge and innovation through the organizational borders of an enterprise. This model is most often based on network structures of interaction.



**Fig. No. 1. The Closed Innovation Model**

<sup>1</sup> Davenport T., Leibold M., Voelpl S., *Strategic Management in the Innovation Economy*, Publicis, 2006



**Fig. No. 2. The Open Innovation Model**

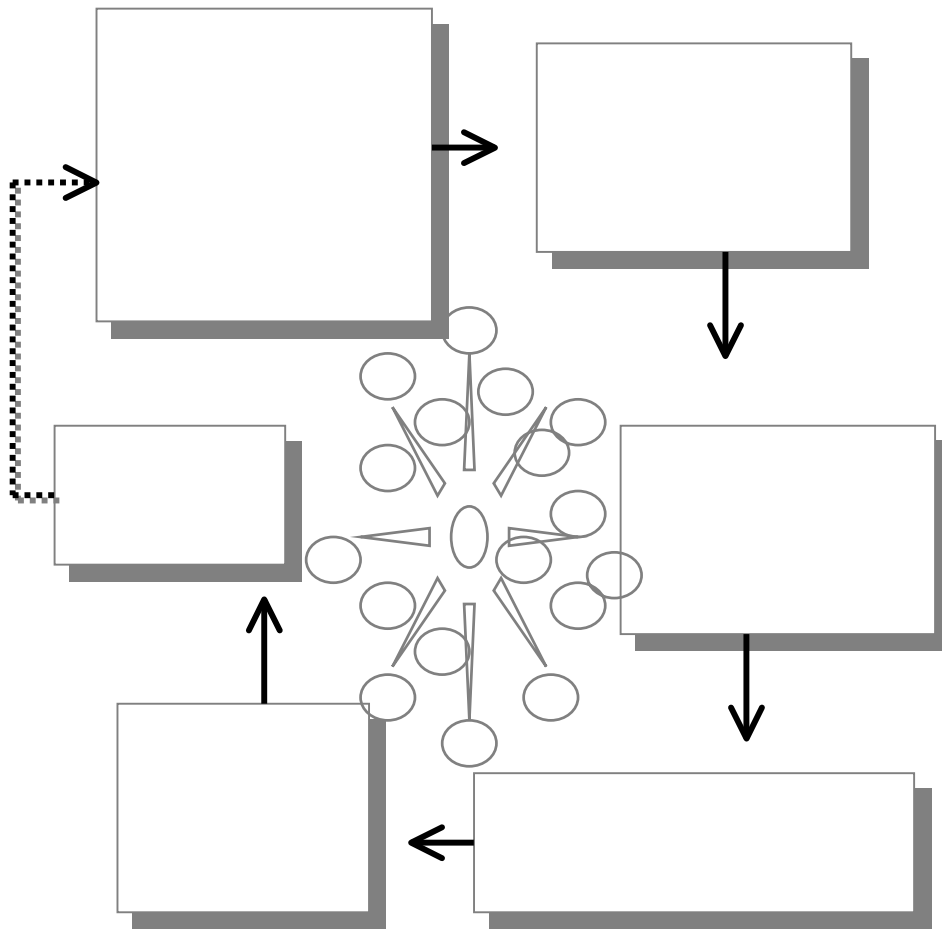
If we also assume that the *networking* itself is sufficient for the creation of the process of *continuous innovations*, but the quality of cooperation in the network (*quality of interactions*) then the category of social capital appears as a factor which stimulates the quality and effectiveness of the innovation<sup>2</sup>

In the last few years, particular significance has been attached to the approach to pro-innovative network structures from the point of view of a region on the basis of the process of creating clusters<sup>3</sup>. Such an approach can be justified by the following: the possibility of locating certain elements of the network (geographical proximity); direct contacts between the players is possible and can be created; synergy exists in the community of activity on behalf of the specified community and territory, as well as most frequently common psychological and cultural patterns.

However, from the point of view of innovative strategies of enterprises it is possible to speak of a *network strategy*, understood as a sequence of strategic choices (fig. 5) associated with entering the network (or its creation) for the realization of autonomous economic aims. The stages of the process of *networking* includes the construction of network structures that involves a selection of the network participants, while subsequently the implementation or in other words, initiating the functioning of the network which most frequently takes place on the basis of agreements, contracts etc. (e.g. with relation to alliances or clusters, networks of course exist without the formation of formal agreements). Further stages are associated with the use of mechanisms, tools serving the management of the network and the adaptation of the functioning of the network to the conditions and changes in the network environment.

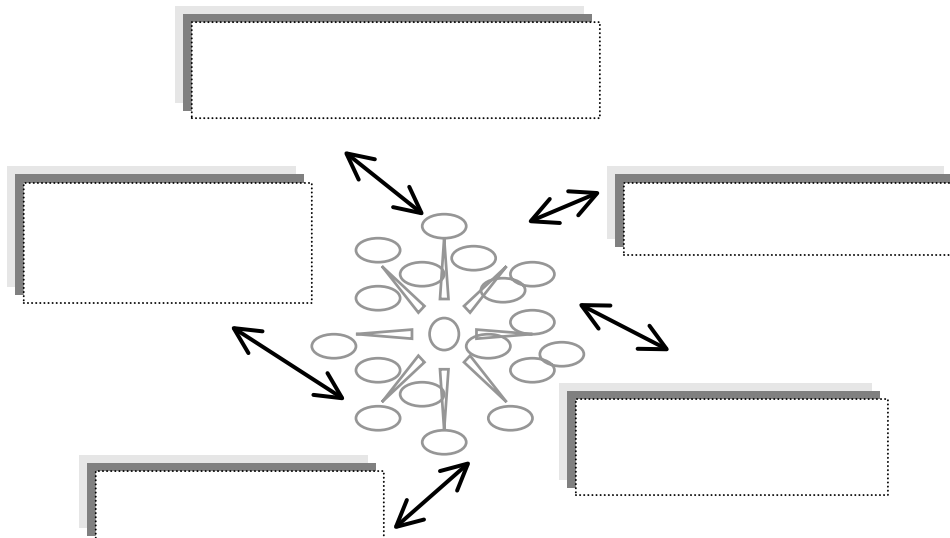
<sup>2</sup> Nowicka Skowron M., Pachura P., Nitkiewicz T., Kozak M. *Regional Intellectual Capital: Disentangling a New Concept* [in] *Intellectual Capital Management in Regional Pro-Innovative Networks*, [ed.] Stachowicz J., Exit Warszawa, 2006; [in] *Intellectual Capital Management in Regional Pro-Innovative Networks*, [ed.] Stachowicz J., Exit Warszawa, 2006

<sup>3</sup> Particularly evident in the strategic development of voivodships and regional innovation strategies (RIS)



**Fig. No. 3. Process of networking**

Innovation (innovativeness) is not (or is not only) a technical process of transforming knowledge into a new product or a process that requires the involvement of a social sphere. The dynamic dimension of the process of innovation can involve viewing the innovative network as a system which has the ability of self creation/auto-creation/ innovation on the basis of key elements/ dimensions (fig. 4).



**Fig. No. 4. Strategic network elements of an innovative nature**

The system possesses features of distinction from the external environment and possesses the ability to provide an identity and justification of existence. It can also possess a common system of values. Furthermore, the identity of the players (elements) of the system is defined by the relations with reference to the external environment. The system of common values is created by external relations (between players) and relations with the external environment. The innovative system has the ability of “self maintenance” through the processing of information about its condition, changes emerging in the system, aims and principles of activity and cooperation. Constant communication and the flow of information must exist between the elements of the system (players), whose content is the identity of the system. Furthermore, the identity of the system is decided by the autonomy of particular participants (elements, players) of the network, as well as the conviction, consciousness of belonging to the network in question<sup>4</sup>

The engine of the network is the mutual relations between the players, who avail of their participation in the network in an equal manner. The whole system must be seen by each player and simultaneously each one becomes partly responsible for the whole. The essence of networking can be understood as a varied system of relations (particularly from the view of personnel) within the framework of the network. Trust and tolerance also exist as the foundations of the flow of information and feedback.

Management of knowledge, the flow of information is the imminent feature of a system that is based on the appropriate tools for the transfer of knowledge and information flows. In this sense, the system is open to external information that flows in from the environment of the system. This system exists as “information flows” and is in a state of permanent uncertainty<sup>5</sup> which causes a change in the way of thinking and breaks up routines. The phenomenon of entropy is associated with the surplus of information and their disorder constitutes a factor that stimulates the formation of a new” synthesis of knowledge which leads to innovativeness. The innovative system on one hand, creates an entropy of information and knowledge on the other hand, restricts and strives towards ordering and directing their use in the realization of these goals. We are therefore faced with the phase (state) of the entropy of knowledge and its ordering (crystallization) in the second phase. In the network, there must be acceptance of the surplus of information and tolerance to the mistakes and uncertainty among the players.

It is worth mentioning that the process of knowledge management in innovative strategies can be based on the classic cognitive concept that is based on the analysis and processing of information relating to in an objective manner the existing external world concepts of organized knowledge, *autopoiesis*, or in other words, dynamic knowledge created within the framework of the organization itself<sup>6</sup>. The theory of *autopoiesis* in terms of an organization is to a certain extent associated with the theory of the emergence of systems and in this case in the system which possesses the properties of emergence the knowledge of *autopoiesis* can be known as the expression of the emergence of the system<sup>7</sup>. An innovative system constantly functions between chaos (disorder) and order (crystallization). The knowledge relating to taking decisions is important with relation to the external environment. Analysis of the environment and knowledge of the processes occurring outside the network is of significant meaning in taking decisions on the aims and strategies realized by the system. Recognising the opportunities and threats facilitates the efficient realization of aims. Taking the conditioning of the global knowledge economy into consideration, it is possible to distinguish the strategic determinants of development as regards network structures of interaction. A set of factors stimulating networking in a spatial dimension has been illustrated in

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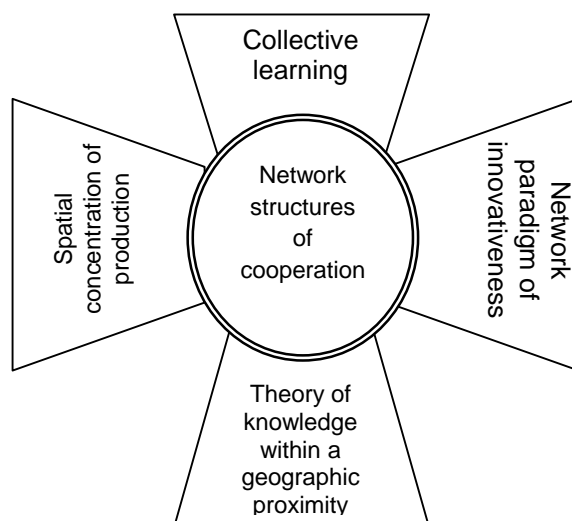
<sup>4</sup> Pachura P., Kozak M., *Kapitał społeczny w regionalnych sieciach innowacyjnych* [in] *Badania Operacyjne i Systemowe* [ed.] Stachowicz J., Straszak A., Walukiewicz S., Exit Warszawa, 2006

<sup>5</sup> Prigogine, I., Stengers, I. . *Order out of Chaos: A Mans Dialogue with Nature*. New York, Bantam, 1984

<sup>6</sup> Stachowicz J. *Modele procesów rozwoju współczesnego przedsiębiorstwa: geneza, praktyczna użyteczność*, Zeszyty Naukowe PŚ Organizacja i Zarządzanie, z. 37 Gliwice, 2006;

<sup>7</sup> Pachura P. *System Thinking and Global Challenges*, ISI Pierrard, HEC du Luxemburg, Virton, 2006

fig. 1. It should be treated as a platform or its own type of “fertile soil”, on which the concept of networking grew that is understood as the formation of various forms of interaction from the centres of technology transfer, to clusters, and finally regional systems of innovation.



**Fig. No. 5. Determinants of development of network structures of cooperation**

The fast tempo of changes emerging in the competitive environment of enterprises and at the same time the key role of innovation in gaining economic benefits is the characteristic feature of the period of the knowledge economy. That is why, it is suggested that instead of the term the knowledge economy, the term the *learning economy* should be used, as it fully reflects the changes occurring. The fast tempo of change means that specialized knowledge is becoming a resource that has a shorter life cycle and from this the ability of learning and adapting to new conditions to a large extent determine the results of individual units, enterprises, regions and countries<sup>8</sup>. *The organizational aspect of learning as a critical factor in generating innovations constitutes the basis for creating interaction ties and is currently first and foremost at the level of network interactions within the framework of the concept of clusters.* Therefore, the use of the term the learning economy is justified in the context of interpreting the phenomenon of networking in a spatial dimension. Enterprises strive to achieve interaction even with their competitors at the cost of losing part of their market share, but in order to achieve the strategic aim of gaining valuable knowledge from other units. The *geographical proximity* is seen to be significant here, as well as the external effects of networking in the form of *knowledge spillovers*, which stimulate the process of clustering.

The significant meaning of geographical proximity determining the realization of the processes of knowledge in the region is the common element of the models of regional development thought up with the aim of constructing regions based on knowledge. According to Cooke, the potential resulting from geographical proximity is materialized through the exploration and use of knowledge while taking account of the open channels of knowledge which are important for these processes. These channels offer a wide range of possibilities for expanding the potential of knowledge as it can lead to “information leaks” resulting from the geographical proximity<sup>9</sup>. Research observations referring to the role of knowledge in the development of the spatial arrangement mainly take account of the *knowledge spillovers* and the creation of regional

<sup>8</sup> Lundvall B.A., Borrás S., “*The globalising learning economy: implications for innovation policy*”, Report based on contributions from seven projects under the TSER programme, Commission of the European Union, December 1997, page 31.

<sup>9</sup> Cooke P., „*Bliskość, wiedza i powstawanie innowacji*” (Proximity, knowledge and creation of information), Studia Regionalne i Lokalne (Regional and Local study), Nr 2 (24)/2006, page 24.

innovative centres in which the spatial proximity to the creation and sharing of knowledge is crucial.

Both in the case of clusters and other types of regional innovative centres the ability of innovative location and the process of the network itself emerging are based on the phenomenon of the *localized knowledge spillovers* and availing of the benefits of the functioning source of valued knowledge in the defined spatial proximity by the units themselves. The knowledge spillover occurs in the situation where knowledge that is created by a given unit leads to the creation of knowledge or innovation by other units. In this concept, the assumption that the creation of new knowledge brings positive external effects is key. These effects take place as knowledge is not an exclusive product and is difficult to exercise total personal control on it<sup>10</sup>. Francik defines these effects as the “uncontrolled process of the penetration of knowledge and its products, as well as various types of skills”<sup>11</sup>. The author further underlines the essential role of these types of effects with relation to the systems of innovation and underlines that the essential role should be attributed to the flow of knowledge on the basis of informal contacts between the participants of the regional systems, as the efficient transfer of knowledge is difficult to code and first and foremost takes place through inter-personal relations. The deepening specialization of a region is becoming the source of endogenic development based on the internal intellectual potential of growth<sup>12</sup>.

The information flows resulting from geographical proximity are acknowledged to be one of the most important factors in the creation and development of clusters, particularly those concentrating the innovative enterprises<sup>13</sup>. The main aspect in the statement underlining the large significance of information flows in the region with relation to the process of networking is the fact that the transfer of new information takes place in a way which is more effective between units that are located close together. The essence of spatial proximity in the successful realization of information flows results from the basic properties of knowledge associated with the activities of innovative firms, mainly their complex nature and detailed nature of *tacit knowledge*<sup>14</sup>.

The currently binding model of innovation forces the observation of the process of creating knowledge in the dimension of a system or in other words, a network. The new theory of economic growth forces cooperation in the area of realising the processes of knowledge, which has led to the binding *network paradigm of innovativeness*. In traditional economic models which explain the theory of economic growth, knowledge and technology remained as external factors. A significant change in this interpretation occurred thanks to the acknowledgement of technology as a key and endogenic factor of growth, the effect of which the *Total Factor Productivity – (TFP)* was introduced, thanks to which the impact of innovation on the growth of productivity was reflected. This theory which was worked out by Solowa – a laureate of the Nobel Prize underlined the meaning of technology in the function of production, which in turn commenced research on knowledge as a factor driving the growth of the economy. As opposed to the neoclassic theories of growth, knowledge is becoming recognised as an endogenic factor of growth within the framework of the new theory of economic growth (*new growth theory*)<sup>15</sup>.

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<sup>10</sup> Greunz L., “*Intra- and Inter-regional Knowledge Spillovers: Evidence from European Regions*”, European Planning Studies, Vol. 13, No. 3/2005, page 451.

<sup>11</sup> Francik A., „*Sterowanie procesami innowacyjnymi w organizacji*”(Controlling the processes of innovation in an organisation), Wydawnictwo AE, Kraków 2003, page 93.

<sup>12</sup> Francik A., as above, page 93.

<sup>13</sup> Breschi S., Malerba F., “*Clusters, Networks, and Innovation: Research Results and New Directions*”, Oxford University Press, Oxford 2007, page 2.

<sup>14</sup> Breschi S., Malerba F., as above, page 2.

<sup>15</sup> More on the topic of the new growth theory and the model interpreting the role of knowledge in economic development in various ways can be found in the following publications: Lipsey R., “*Sources of Continued Long-run Economic Dynamism in the 21st Century*”, “*The Future of the Global Economy. Towards a Long Boom?*”, OECD, Paris, 1999; Abramowitz M., “*Thinking about Growth*”, Cambridge University Press, Cambridge, 1989; Nelson R., Winter S., “*An Evolutionary Theory of Economic Exchange*”, Harvard University Press, Cambridge, 1982; Arrow K.,

The process of creating knowledge understood as the process of innovation is an interactive process which incorporates the interactions between organizations specialized in the creation of knowledge, enterprises, financial institutions, consumers and suppliers. As a result of the binding model, innovativeness is becoming regional and domestic systems of innovation are concentrating cooperating units together – as participants of the process of innovation. That is also why the process of creating knowledge can be defined as the interactive process which is of an organic nature. The modern growth of resources in terms of knowledge is taking on the features of a non-linear process.

Issues relating to the recreation of knowledge and the process of transferring knowledge conditioning its use in the economy, while also recognising the essence and role of transferring and spreading knowledge on a regional dimension led to the increased interest in regional concepts of networks of knowledge and innovative systems responsible for the realization of the the aforementioned processes. In associated literature and strategic principles formed at the level of EU institutions, the essence of transferring technological knowledge from the sector of science and research to the economy is discussed at length. With relation to this, the meaning of close interaction between colleges and the world of science with that of business is emphasized as this favours the process of transferring technology<sup>16</sup>. Therefore, the regional possibilities in the area of R&D activities are associated with production operations within the framework of one regional system of innovation. With the aim of stimulating the processes of transferring technology various mechanisms of interaction are initiated such as technological centres, technology transfer centres and technological incubators.

The necessity of making organizational interaction results from the essence of knowledge, or in more precise terms, one of its categories- *know-how*. This comes from the industrial sector where it defines the skills and abilities that are not described with the aid of patents and licences, but technology transfer which is crucial at a given moment. This type of knowledge is usually developed and maintained within organizational limits of an individual enterprise or research team. However, together with the growth in the complexity of knowledge the trend towards development of interaction between organizations occurs. One of the most important reasons for creating the network of enterprises is actually the need to gain the possibilities of combining and sharing the elements of the complex type of knowledge known as *know-how*. Similar networks that are created are between research teams and laboratories<sup>17</sup>.

The ability of creating innovation should be understood in accordance with the dynamic and interactive model of the process of innovation. *Innovation is understood here as a process of a network and systemic nature, in which innovations are the result of numerous and complex interactions between units, organizations and the environment.* Innovation is the process of learning, which means that it is the result of accumulating specific knowledge and information that is useful for the activities of enterprises. The process of innovation uses internal and external sources, which makes it an interactive process<sup>18</sup>. The systemic approach to innovation means the impact of the widely understood external institutional players on the innovative activities of enterprises. The systemic notion of the process of innovation underlines the essence of transfer and diffusion with regard to categories of knowledge and skills. Flows of knowledge take place within the framework of channels and networks situated in a socio-cultural environment that has an impact

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“*The Economic Implications of Learning by Doing*”, Review of Economic Studies, 29/1962; Romer P., “*Endogenous Technological Change*”, Journal of Political Economy, No. 5/1990.

<sup>16</sup> Goldberg I., „*Polska a gospodarka oparta na wiedzy. W kierunku zwiększania konkurencyjności Polski w Unii Europejskiej*”, Bank Światowy(Poland and the economy based on knowledge. In the direction of increasing the competitiveness of Poland in the EU< World Bank) Waszyngton 2004, page 14.

<sup>17</sup> “*Knowledge Management in the Learning Society*”, as above, page 15.

<sup>18</sup> Stawasz E., „*Determinanty działalności innowacyjnej*”, w: ”*Innowacje i transfer technologii. Słownik pojęć*”(Innovation and technology transfer. Dictionary of concepts), PARP, Warszawa 2005, pages 39-40.

on the innovative abilities of the regional players. Innovation is seen as a dynamic process in which knowledge is accumulated through the processes of learning and interaction<sup>19</sup>.

*The innovative ability of a region – understood in the categories of a systemic organ is determined as the ability of networking and collective learning.* The systemic approach to innovation provided the beginning of the concept of creating new mechanisms of regional development. The central point of the innovative management of a region became the issue of cooperation and interactive processes of creating, diffusion and applying the knowledge by the regional players. The establishment of the systemic approach is mainly reflected in the domestic models and regional systems of innovation, concepts of learning regions, innovative clusters, or the local innovative environment. The basis of the shaped concepts of regional development is that of the *network paradigm of innovativeness*. The creation of regional networks of interaction facilitates the mutual learning of the participants of the process of innovation and strengthens the flexibility of mutual activity. A particular role is also played by the social aspects of the innovative processes, which often take their course in accordance with unwritten principles and cultural traditions and explain the processes of networking.

Most concepts that are written into the systemic approach to innovativeness in a spatial dimension are based on regional network interaction that incorporates units representing the sphere of business, institutional environment and units of the scientific and research sphere. The development of regions based on knowledge and innovativeness constitutes a layer of related models of learning regions, local innovative environment, clusters, or finally regional systems of innovation. The converging assumptions of these concepts are particularly related in the policies of regional development realized by EU member countries. The problematics of creating a competitive advantage on the basis of the pro-innovative networks of interaction became the subject of consideration for many modern theories of regional development. Innovativeness and knowledge of a region were acknowledged by many theories of regional development as the most important factors of a regional economy. They indicate how to build the competitiveness of a region on the basis of the endogenic potential of growth. The modern binding models of regional development emphasize the mobilization of internal potential of the growth of location, which is to be the source of a competitive advantage of spatial arrangements. The assumptions of related concepts are widely initiated in the case of learning regions, innovative clusters, innovative environments, entrepreneurial environments, or domestic and regional systems of innovation. The models of regional development based on endogenic and knowledge-derived growth potential illustrate the abilities of a region in the sphere of realizing the processes of innovation guaranteeing self-renewal in a globalized and fast changing economic environment.

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<sup>19</sup> *“Oslo Manual. Guidelines for Collecting and Interpreting Innovation Data”*, OECD and Eurostat, third edition, Paris 2005, page 33.



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