

## **Integrating The IC Concept Into Strategies For The Development Of Regional Network Systems.**

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### **ABSTRACT**

**B**usiness practice confirms the need of developing basic organisational features that would result in creating a unique corporate image. The material character of technical, organisational and economic resources is a feature that may be easily copied by competitors. Among the distinguished features, only human capital may thus decide on the individual character of a company.

The human capital and structural capital constitute the primary assets of every organisation and more and more every territory: on urban, local, regional, national and global levels. Restructuring technique, technology, organisation of production and work (means of production, subjects of work, power factors and economic factors) necessitates great knowledge, competence and skills, as well as the right organisational culture and philosophy. These factors constitute the basic elements of human capital. Mutual dependency of these factors results in the need of proper management of planning, organisation and motivation as well as of controlling human capital.

**Key Words:** *Systems and networks, Knowledge management, NETWORKING, human capital, intellectual capital, innovation networks, Development network*

## INTRODUCTION

It has become more and more common to claim that the concept of innovations embraces everything that is connected with creation and application of new knowledge in order to win competitive advantage. In this respect innovations concern as well, apart from technology, economy, society and culture. A traditional approach applied by organizational and management sciences is not enough to explain and manage the development of enterprises as well as that of cities, regions and countries.

Simultaneously, according to a new approach to innovativeness, creation of innovations depends on a complex/system approach. The word complex is vital since this approach should embrace the complexity of innovative networks as well as complexity of relations of cooperation and the whole network environment together with social context. Most frequently the innovative network environment is defined by means of the following elements (Cooke, 1998): producers/creators of knowledge; administrative environment; enterprises.

In recent years, a phenomenon of particular importance is the approach to network pro-innovation structures from the urban and regional point of view. This approach can be justified by the following factors: possibility to locate single elements of the network (geographical proximity); direct contacts between actors are possible and they can be created; synergy exists through common action for a precise community and territory and most frequently, common psychological and cultural patterns.

Innovations (innovativeness) do not constitute a technical process. Transforming knowledge into a new product or process requires social sphere to be engaged. Dynamic dimension of the innovation process may be based on a view of an innovation network as a system possessing ability to self-create/self-renew innovations. P. Stähle defines the following factors of system/innovation network dynamics (Stähle, Grönroos 2000).

System possesses features that make it distinct from the environment, it possesses ability to endow identity and to justify the existence. It may also possess a system of common values. Furthermore, the identity of actors (elements) of the system is defined through relations with the environment. The system of common values is created through internal relations (between actors) and through relations with the environment. It can be named Identity based on self definition. Innovations system possesses an ability of self-subsistence by processing information concerning its state, changes taking place in the system, goals and rules of action and cooperation. In consequence, a constant communication and flow of information are necessary among elements of the system (actors). Content of this information concerns the identity of the system. Other factors that determine the identity of a system are autonomy of participants (elements, actors) of a network and a belief, awareness of being a part of network.

What makes a network work is a mutual relation between actors who have same rights to access and participate in the network. The whole system must be perceived by every actor. Simultaneously, every actor is partially responsible for the whole. The nature of networking can be understood as a differentiated system of relations (particularly personal ones) inside the network. Tolerance and trust are other foundations of information flow and information return.

## THE HUMAN CAPITAL AND THE INTELLECTUAL CAPITAL

The concept of human capital may be considered as capital itself. According to a dictionary definition, capital is every value that brings added value. There is no clear definition of human capital in the literature. Some experts dealing with the problem of corporate capital stress the role of tangible and financial assets, devoting less attention to human capital. A number of authors identify human capital with the knowledge and skills of managers only. The definition is often limited to social factors describing human capital.

Recently, human capital is most frequently defined as knowledge and skills acquired in the process of learning and professional training as well as health and vitality (...) that cannot be the subject of market turnover and cannot change its owner as it is an individual feature of this owner. In relation to business activity, human capital may be described as a combination of the following factors: human features: intelligence, energy, positive attitude, reliability and involvement, ability of a person to learn: receptivity, imagination, creativity and sound reason, motivating employees to share information and knowledge: team spirit and objective-orientation.

The existence of numerous factors characterising human capital is confirmed by the cycle of human capital development and by the fact that knowledge management has been accepted as the basis of human capital management. According to J. Naisbitt and P. Aburdene, the traditional understanding of strategic resources concerned mostly material assets, that is traditional production factors, whereas the contemporary definition of these resources stresses the importance of three elements: information, knowledge and creativity (Naisbitt, Aburdene 1985).

In present economic reality, knowledge constitutes one of the most important factors determining competitiveness of economic organizations and in spatial context like urban and regional competitiveness. The above statement finds its application not only in case of various categories of economic entities but also on the level of regional and national economies. Condition for economy based on knowledge require precise strategies to be implemented by local authorities. Those strategies have to take into account a particular role of intellectual resources while winning competitive advantage on a market. Top priority of knowledge in modern economy was noted among others by P. Drucker who at the same time determines traditional means of production as being of secondary importance. Knowledge is understood as utility and means to achieve social and economic results. It is a basic asset applied to introduce innovations systematically (Drucker, 1999). L. Edvinsson, one of pioneers of the intellectual capital concept, stresses that in a situation of economy of knowledge, value of countries, regions, organizations and individual units is directly connected with their knowledge and intellectual capital (Edvinsson, Bounfour 2004).

A concept of intellectual capital that goes back to the beginnings of the 90's of the 20th century became an interesting notion to investigate for practitioners and researchers from various scientific disciplines. Different conceptual approaches accepted by the scientific milieu and a constant development of theories in this field have not resulted so far in creation of a standard and widely accepted definition of the intellectual capital. Multitude of definitions and conceptual approaches may result from a broad and interdisciplinary character of the intellectual capital as well as from different approaches presented by researchers working in economic and social fields.

The second half of the 20th century constitutes the beginning of a new stage of development of social and economic relations. The shift concerns abandoning production of material goods and concentrating on production, organization, transfer and exchange of knowledge (Delanty 2001). The

mentioned shift caused conceptualization and perception of modern phenomena as the knowledge society (Giddens 1991). The authorship of this notion is attributed to Daniel Bell, the author of *The Coming of Post-Industrial Society: A Venture in Social Forecasting* issued in 1973 (Bell, 1973). In his work, Bell points at decline of knowledge as well as society of practical knowledge (technical, professional) and the beginning of theoretical knowledge domination. This includes development of technologies based on advanced research and theoretical works “a new intellectual technology”. Simultaneously, it is recognized that the beginning of the “knowledge society” era, is accompanied by growth of importance of education, particularly on higher education level.

The intellectual capital became a subject of investigations for economists, sociologists, specialists in management and accounting. According to literature studies presenting different scientific approaches it may be concluded that the main source of intellectual capital is knowledge understood as a factor of primary importance for any organization’s value. While attempting to define the notion of the intellectual capital for the needs of the present paper it can be assumed that its main source is knowledge understood as a factor of primary importance for economic value. Understanding knowledge as a source of value was confirmed by Wriston who claims that “the new source of value is not material, it is information, knowledge used for creating value” (Wriston, 1992). The literature on the subject most commonly defines the intellectual capital as “knowledge that can be transformed into value or profit” (Edvinsson, Sullivan 1996). The intellectual capital approached at an enterprise level is understood as “intellectual subject which has been formalized, seized and used to create assets of high value ” (Edvinsson, Sullivan 1996).

According to a present stream of evolution of intellectual capital theory certain attempts have been made to transfer and apply this concept on national, regional and urban systems. The above approach fits into innovative policy foundations which aims at constructing economy of knowledge. Intellectual assets localized in regions become determinant for their future development. They also constitute a certain base for creation of regional and urban innovations systems and winning competitive advantage. Edvinsson in his discussion over one of the first complex works concerning intellectual capital in regional and urban context (Bounfour A., Edvinsson L., eds., “Intellectual Capital for Communities, Nations, Regions and Cities”) points out that intellectual capital considered in this sense can be seen as capacities to achieve regional and urban competitive advantage in the future in the following contexts: human, infrastructural and in relations between single units. According to the author, intellectual capital of a region is a capacity to generate constant wealth for its dwellers in the future . Bontis on the other hand, while conducting research on measuring the intellectual capital of countries, defined it as hidden values of units, enterprises, institutions, communities and regions that constitute a present as well as potential sources of wealth creation (Bontis, 2004).

Authors of another research project concerning investigation of the intellectual capital of one of Polish regions propose to define intellectual capital as “region’s ability to a qualitatively new approach towards joining capacities that the region already possesses in order to create new values . All the definitions proposed let us understand the intellectual capital of a region as common knowledge of single regional entities. This knowledge constitutes a base for realization of specific strategies and taking effective measures in order to assure constant socio-economic development. The above ability and effectiveness in use of common resources of knowledge is determined by collective actions that aim at preservation of the effect of intellectual synergy. In order to transform individual knowledge of single actors of the socio-economic sphere into a common value, it is crucial to engage specific stimuli i.e. social capital as a factor favoring knowledge processes.

A modern paradigm becomes the fact that IC defines organization's competitiveness, also in global conditions. However, IC is not a static phenomenon and its level is changing, thus competitive capacities of the organization change as well. IC should be perceived through a dynamic systems based on system approach.

## SYSTEMS AND NETWORKS

*Knowledge management*, flow of information are immanent characteristics of the system. It is based on proper instruments of knowledge transfer and information streams. In this respect, the system is open to external information coming from the environment. The system exists in a way in *streams of information* as well as in a state of permanent uncertainty (Prigogine, Stengers 1984). This results in a change in the way of thinking, leading to giving up routine approaches. *Entropy phenomenon* connected with excess of information and its lack of order constitute factors stimulating creation of the "new", as well as synthesis of knowledge which leads to innovativeness. Innovations system on the one hand creates entropy of information and knowledge and on the other hand limits it, tries to order and direct it to apply and use for the implementation of goals. In consequence, one deals with a phase (condition) of entropy of knowledge and in the second phase with its ordering (crystallization). As a result, there must be acceptance for information excess among actors as well as tolerance concerning mistakes and uncertainty (Prigogine, Stengers 1984). Innovations system functions unceasingly between chaos (lack of order) and order (*crystallization*). Knowledge concerning decision making in relation to the situation in the environment is crucial. Environmental analysis and knowledge about processes taking place outside network are key elements in decision-making concerning goals and strategies that the system aims at. Identification of chances and risks enables an effective implementation of goals.

Urban or region competitiveness as understood through the concept of network cooperation as well as the importance of social capital can be evaluated by means of indicators describing the following areas: competitiveness, attractiveness, networking (Sotarauta 1999). In those approach, the following examples factors may be analyzed: *Human capital*, defined by: number of students, number of students of technical institutes, number of graduates of higher education institutions, percent of professionally active persons, *Innovativeness*, defined by: expenses on R&D, number of patents, number of employees of R&D institutions, *Concentration*, defined by: population density, employment structure, employment in the business services sector, *Infrastructure*, defined by: density of communication network, quality of natural environment, prices of energy, water etc., telecommunication network, *Economy*, defined by: size and structure of industry, value of exports, participation of industries of high technologies, *Institutions*, defined by: higher education institutions, higher education technical institutes, institutes and research centers, etc, *Quality of life and environment*, defined by: pollution, healthcare services, costs of living (media, housing, etc.) and social environment (mutual relations between people, social values, culture, etc.), *Pro-development networks*, defined by: the existence of clusters and enterprise groups, networks of cooperation, platforms, etc., *Competition in creativeness*, defined by: potential to create new knowledge, activeness of public regional and local institutions, common initiatives, implementation of supra-local projects and openness to dialogue and cooperation, etc.

The above-enumerated factors constitute only examples of possible indicators, or, in some cases, guidelines that may serve to create indicators which can be helpful in presentation

(evaluation) of Cities or Region competitiveness. Competitiveness based on *social capital and innovation networks*.

Simultaneously, the existence of urban innovation networks, as well as other cooperation networks, (production, clusters of various type) create a urban knowledge system (Smedlund, Pöyhönen 2005). In this approach it is taken for granted that an enterprise may participate in many local networks and that thanks to such participation innovations appear in natural and constant manner. These factors have decisive influence on the success of any cities or region as well as on capitalizing its potential (Smedlund 2006).

Local production systems, defined in literature as *clusters*, constitute basis for creation of research methodologies concerning urban / regional intellectual capital. Discussion on the intellectual capital of territories by means of clusters is based on a commonly stressed importance and role of those regional sectoral network systems in shaping competitive advantage of any location. Clusters are perceived as a key element generating and sustaining a high level of competitiveness of enterprises functioning in them in a situation of progressing globalization. In literature on the subject it is stressed that the concept of clusters constitutes a new way of thinking about creating competitiveness of national economy as well as regional economies. Porter incorporated clusters into a widely practiced model of diamond of competitiveness embracing main determinants of a national competitive advantage. The author of the cluster concept defines them as

*"geographical clusters of mutually connected enterprises, specialized suppliers, units providing services, enterprises working in similar sectors and institutions cooperating with them (universities, normalization units and sectoral associations) in specific domains, competing against each other but also cooperating (Porter 2001)."*

In consequence, many researchers discuss the problem of regional intellectual capital from the perspective of clusters. One of particularly interesting pioneer approaches is a proposition of A. Smedlund and A. Pöyhönen who analyze the intellectual capital at the very level of clusters.

They present a system approach based on theory from different scientific sources in order to picture processes of creation of the intellectual capital in clusters framework grouping small local enterprises. This procedure enables to define a regional system of knowledge based on three kinds of networks namely production, development and innovative networks. Further, the authors present another approach and model of evaluation of intellectual capital based similarly on the concept of clusters. An enterprise functioning as an element of network of *value in cluster framework* profits from numerous advantages such as lower transaction costs, wider possibilities to learn new practices. Finally, it may gain valuable market information from its partners. The main benefit of being a member of a regional economic network though, is a possibility to generate innovations through cooperation with other partners. Local production system provides with constant possibilities to improve products, production methods and processes.

This is possible thanks to creation of conditions favoring joining of different assets and knowledge. In the center of processes of creation of innovations one should place the ability to create and transfer new knowledge as well as to use the existing knowledge inside the network. According to A. Smedlund and A. Pöyhönen, in order to maximize the potential of value creation by regional or urban clusters of small enterprises, those enterprises should simultaneously create new knowledge as well as transfer and implement knowledge they already possess (Smedlund, Pöyhönen

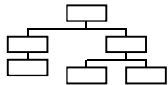
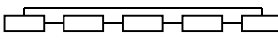
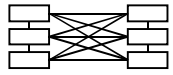
2006). The approach presented by the authors lets understand in a fuller way the processes of creation of regional knowledge and dynamics of creation of intellectual capital in a framework of complex cooperation of many different regional actors.

Authors justly claim that works concerning intellectual capital are in large part dominated by three basic research streams. First of them treats the *IC* in categories of immaterial assets. Second perceives *IC* as dynamic capacities to create immaterial assets. Finally third one takes into account social relations as a framework in which knowledge processes take place. Authors understand *IC* as an organization's capacity to create, transfer and implement knowledge, which seems to be in compliance with the fact of treating innovations as a key factor in winning competitive advantage.

Each of the above-presented conceptual approaches treats knowledge in a different manner. Intellectual capital understood in categories of static immaterial assets embraces knowledge possessed by an organization and is most frequently classified into three categories: *human, structural and customers or relational capital*. *IC* understood as dynamic capacities to create immaterial assets, on the other hand, treats knowledge as constant and emerging process, in which a central role is played by a capacity to reinforce, develop and change the level of immaterial assets. Finally the last approach to the concept of intellectual capital is connected with implementation of *social capital in its structure*. In this case, knowledge is perceived as an asset shared in the context of social relations. A joining factor and a bridge for knowledge processes in case of social relations is social capital.

Considerations on intellectual capital through the notion of clusters based to a high extent on organizational and *social networks* require use of dynamic approach towards the concept of *IC*. Such approach should take into account knowledge processes based on relations found inside a cluster.

In this concept, inside a cluster of small enterprises one can find three kinds of networks: *production, development and innovation*. The above networks are characterized by different structure and functions that they perform in relation to *IC*. Those functions are identified with basic processes concerning knowledge, i.e. its creation, transfer and application. In a production network, flows between participants are connected with manufacturing of a product and thus embrace mainly physical products and cash flows. Inside this kind of network the sales process takes place. All information transferred inside a network concern production, for example stocks. Such network may be dominated by one participant occupying a central position in it while other partners included in the exchange process may not even know each other. Thus the structure of this network possesses a *hierarchic character*. To ensure its effectiveness, production network requires application of clear and coherent rules and regulations. That is why important information circulating inside a network should take a codified form to ensure that it reaches all units. It is sufficient that information circulates in one direction from up to down since any discussion or new thought may lead to modifications, which are not desired in this kind of network and may constitute an obstacle for its effectiveness.

Characteristic features of three kinds of networks of a regional knowledge system by Smedlund A., Pöyhönen A			
	Production network	Development network	Innovation network
Graphic model			
Structure	Vertical	Horizontal	Diagonal
Function performed in relation to IC	Knowledge implementation	Knowledge transfer	Knowledge creation
Flows between participant of the network	Material (products, payments) Immaterial (information concerning production)	Immaterial (transferable specific information concerning enterprise, know-how)	Material (innovative products, payments) Immaterial (research knowledge, experimental knowledge, know-how)

Źródło: Smedlund A., Pöyhönen A., „*Intellectual Capital Creation in Regions: A Knowledge System Approach*”, [w] Bounfour A., Edvinsson L., red., „*Intellectual Capital for Communities, Nations, Regions, and Cities*”, Elsevier Butterworth-Heinemann, Oxford 2005, pp. 23

Development network is characterized by *horizontal structure* and can be applied to join enterprises in a regional clusters framework, also in case when they do not cooperate in productive functions. Participants of such network can be competitors who agree to share certain information that constitutes a source of individual profit for them. Flows in a development network possess by nature an immaterial character. It can be for example information concerning production methods or know-how knowledge. Enterprises through learning best practices from others can achieve higher levels of effectiveness.

From the perspective of regional or urban activities, a network orientated for development may boost results of its participants in acquiring high-risk capital. The most important feature of this type of networks is undoubtedly orientation towards sharing knowledge. A constant development of network is based above all on silent knowledge, bi-directional flow of knowledge and mutually dependent relations of all participants. Relations that one deals with in the network possess a reciprocal character and at their base one will rather find trust instead of formal agreements. In a development network there is no dominant unit, however a coordinating entity supporting the process of knowledge sharing may be established.

Taking into account realization of knowledge processes, the most advanced network in this field is innovation network, in framework of which new knowledge is created as well as new solutions needed to deal with specific problems are found. These solutions are worked out consciously and in cooperation with other members of the network. Flows in such network concern the process of innovation, for example product patterns or research knowledge of experimental character. Structure of relations in an innovation network is diagonal which means that its participants are recruited from different sectors and production chains. In this type of network various public and private institutions may cooperate with enterprises. Innovation network has to master the process of knowledge creation, which should be new to all participants of the network.



Leader's function is taken by the most competent unit for coordinating assets and knowledge, which means that leadership is not established according to specific hierarchy.

According to the characteristics presented above, each of the three networks found inside a cluster performs specific functions and implements its strategic goals by engaging various categories of knowledge. The strategic goal of a *regional or urban production network* can be for example creation of a possibly most effective flow of intermediate products. Development network may aim at formulation and implementation of common marketing policy identified with the sub-region in which the cluster functions. On the other hand, the main goal of innovation network may be carrying out of research-development works on new technologies for a specific sector. Results of such research which are new methods and production processes should then find application in commercial activities of participants of the cluster.

Inside an innovation network in a local cluster one deals with flows of specific material and immaterial assets between participants of the network. Knowledge is the main asset that is transferred. The flow of assets inside the network generates innovations.

According to A. Smedlund and A. Pöyhönen research, usually three categories of networks tend to form a system. This system is named by the authors a *regional knowledge system*. From the perspective of creating intellectual capital at regional level, knowledge system constitutes an approach towards the process of generating IC according to dynamic approach treating knowledge as dynamic process. It is also compliant with the approach to the concept of IC that takes into account social relations as an important factor in implementation of knowledge processes. Regional knowledge system constitutes a source of better possibilities for creating immaterial assets, *modernization of a cities, region, country* and adapting its to changes appearing in the environment. In order to win competitive advantage, three kinds of networks should function in regions. Innovations generated in *innovation networks* are transformed into measurable economic benefits through their application on the level of *production network*. *Development network* based on social relations and processes of learning performs a proxy role in transferring innovations between other networks. Each type of network performs specific functions connected with intellectual capital. *Production network* applies and implements generated knowledge in economic reality.

*Development network's* task is to share hidden knowledge among network members. The main function of *innovation network* is to create new knowledge. *Production network* shapes core production processes on local level while knowledge applied in those processes is used to supply products to the market. In *development network*, local actors share their knowledge and provide with reinforcement of *regional or urban social capital*. On the level of these network relations, common language and trust among its participants are formed. In this way, processes of creation, transfer and application of knowledge in a specific cluster become more effective (Smedlund, Pöyhönen 2005).

*In case of existence of the above-mentioned networks in the region, innovations are transferred to all members and bring each of them measurable benefits. Circulation of innovations and new ideas between all types of networks is defined as regional knowledge system. All three kinds of mutually dependent and mutually penetrating networks are essential for existence of a knowledge system.*

Another approach towards the concept of *regional intellectual capital networks* is presented by *M. Viedma* who perceives *intellectual capital of cities* and regions in the context of industrial sectoral clusters.

This research approach is compatible with the presented before concept of regional knowledge system based on the development of clusters as a factor determining competitiveness of a given *geographical area*. Research approach accepted by *M. Viedma* seems to be particularly interesting because of the fact of evaluating the intellectual capital not only basing on generated statistical data but above all on qualitative indicators. This type of methodology of *intellectual capital evaluation on the city level* requires deeper analyses as well as finding a proper reference platform in order to execute the evaluation. In case of this approach, *micro-clusters functioning in the city area become the platform representing the development potential of the city*.

As it is in case of the majority of models of regional intellectual capital evaluation, the model presented by *M. Viedma* was created on the basis of an author's model known as *ICBS – Intellectual Capital Benchmarking System* applied in enterprises in the past. Main applications of this model embrace evaluation of immaterial assets understood in categories of core competences in the context of innovative and organizational processes occurring in enterprises. Through execution of certain modifications, the author proposes to apply the method to evaluate intellectual capital of regions and cities as well as social capital of clusters. A modified model is then called *CICBS – Cities' Intellectual Capital Benchmarking System*.

Conceptual approach and model's components are shown in the scheme in a subsequent part of the work. *The presented model of city's intellectual capital evaluation is composed of two sub-models*: a general one based on categories of the modified intellectual capital *Skandia Navigator* applied in this case in city context, a more detailed model embracing *micro-clusters* specific for a city.

According to the author, management process concerning general intellectual capital of a city is composed of five stages: vision creation, identification of core activities necessary for vision implementation, identification of core competencies necessary for implementation of core activities, identification of indicators for all core activities and competencies, categorization of indicators according to existing components of intellectual capital.

All categories mentioned by the author in the context of a general model of intellectual capital model are based on *Skandia* and are compatible with components defined earlier by *N. Bontis*. It seems that an innovatory research approach presented by the author concerns above all the second part of the benchmarking system, that is a more detailed *approach to the evaluation of city's intellectual capital in the context of industrial clusters*, which are specific in case of a given city.

The goal of intellectual capital model specific for a given city (*CSICM – Cities' Specific Intellectual Capital Model*) is intellectual capital measurement and management of every *micro-cluster* which is particular for a given industry branch in the city.

The author claims that in order to apply the described model, it is necessary in the first stage to define proper micro-clusters in a given city. In a situation when clusters have already been defined, it is possible to apply to each of them a system of intellectual capital benchmarking. *M. Viedma* interprets factors which are of crucial importance for the existence of a cluster and which can be investigated in the following manner: vision: a future vision picturing the cluster according to City authorities' ideas, demand in a given sector: classification of various demand segments for

products of a given cluster, results: classification according to various demand segments, goods and services: functions and attributes of products evaluated according to each demand segment, processes: operational and innovative value chains analyzed in order to identify core activities and competencies, core competencies: competencies constituting a base for core activities in value chains framework, professional core competencies: identification and evaluation of each value chain and type of demand as well as definition of specialists who generate and perfect company's core competencies.

Modern economy recognized by *P. Drucker* as *postcapitalist* requires new approach to development challenges, where a “*single act of innovation*” is not enough. That is why in present times, the core of modern economy is characterized by network structure. One of characteristics of network dependencies being created is most frequently their spontaneous and chaotic character. In consequence, an important role is attributed to the environment of *the administrative / governance* environment as a “*catalyst*” and participant of network cooperation.

If innovativeness is: a constant process of flow and creation of knowledge, then certain factors defining effective functioning of *network structure* are of crucial importance. If we also take for granted that networking on its own is insufficient to create a process of *continuous innovations*, but requires also *quality of interactions*. The category of *IC and social capital* appears to be a stimulating factor for quality and effectiveness and explain system thinking approach and analyzing.

## CONCLUSIONS

The concept of intellectual capital in regional and urban system context is also frequently associated with investing in knowledge, in other words called non-material investments. On the one hand such approach may be considered as fully justified since to achieve a high value of intellectual capital it is necessary to engage certain expenditures which in turn generate specific intellectual assets. Investments in knowledge coming from public and private sources determine future development and growth of the intellectual capital of a region. The above category of investments is defined as expenditures aiming at reinforcing the existing knowledge, acquiring new knowledge and favoring the circulation of knowledge. The result of investments in knowledge is generation or diffusion of knowledge. According to the approach presented above, expenditures on education, research and development, trainings, innovations and software are perceived as main categories of investments in knowledge (Khan, 2005). This approach, among others, goes together with the approach accepted by the OECD in reports published on the economy of knowledge of different countries. The enumerated above categories of investments are often identified with development of an economy based on knowledge.

On the other hand however, identifying knowledge-absorbing investments with the level or sometimes even value of the intellectual capital seems to be, to say the least, superficial. It lacks deeper analysis of processes of creation and use of knowledge resources in creating value. Despite the existence of an obvious correlation between investments in research and development as well as in education and the level of innovativeness, on this basis it is hard to conclude clear-cut about regional or national creativeness. An important element that has to be completed seems to be the effectiveness in use of investments made to create economic value.

It has to be stressed that the future of scientific thought as well as that of tools for practical application in the process of urban and regional development is more and more frequently

associated with concepts of knowledge creation, management and benchmarking of intellectual capital. The concept of IC could be regarded as a sign of system thinking and “a holistic vision”. The notion of IC constitutes a certain form of “complement” to the previously presented vision of the economic reality.

Social capital, the structure of which is interdisciplinary, creates a system concentrating elements and relations of various nature: psychological, economic, sociological, historical, cultural. Simultaneously, among most dynamically developing scientific concepts one may quote management and creation of knowledge, as well as networking and pro-innovative systems in development process, specially for local and regional levels.

The present paper is definitely not aiming at a complex and full presentation of the described point. It rather expresses authors interests in searching for a way to explain urban and regional development challenges.

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