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IDENTIFYING NETWORK SYSTEMS IN POLAND – SELECTED ISSUES

Summary

The main aim of this article is attempt of defining and short characteristic of network systems in Poland. Contemporary mechanisms of social and economic development of space which determinants are technological progress, evolution of informative society and economy`s globalization make new operation`s conditions for territorial units. Spatial concentration follows related with benefits of creative cities and their peripheral areas but on the other hand connected with expansion of exchange`s innovating networks in world-wide. These connections usually are based on knowledge, information and new technologies.

1. Introduction

The world is currently in a state where all countries and regions not only exert influence on each other but also are dependent on each other. Mutual impact and correlations between countries and regions have obviously been present for a long time, since domestic and international problems have been merging for a long time. A characteristic feature of the present state is, however, an extreme intensification of these phenomena. As a consequence, the awareness of their existence and the conviction that they should be accounted for in a practical activity have increased [Domański *Zasady* 2000, p. 168].

One of the visible new processes occurring in the recent years in socio-economic systems of countries (also Poland) is the development of network structures and relations. It is assumed that a strong and extensive network of internal and external relations of spatial entities is one of three most important factors conditioning their international competitiveness (along with technological and social infrastructure and efficient strategic management). What is particularly significant is the behaviour of network structures in the economy – considered one of the most dynamic and visible processes in the world now. In European countries, creating and supporting such relations between companies in a region or a city is an instrument of supporting the regional development of these settlement units. Cooperation networks have been developing in the so-called business environment – enterprises

development support and economic information networks organised by the European Commission are considered examples of this type of networks.

2. Network approach in modern spatial development

Networks are a basic material with which new organisations are or will be constructed [see more Tuomi 1999]. They can develop and spread along arteries and back streets of the global economy by invoking information power provided by a new network paradigm [Castells 2008, p. 173]. The necessity to create a new paradigm of spatial development is a result of profound structural transformations and the accompanying new tendencies of the social and economic development of space, among which the following are the most visible and commonly acknowledged [Pietrzyk 1995, p. 13]:

- *Globalisation*, expressed in a progressing mutual dependence and integration of national economies on a global scale;
- *Acceleration of the scientific and technological progress* by accepting the superiority of factors such as knowledge, research and innovations;
- *Increasing role of the environment*, which is an important component of the enterprise reality and not an external element;
- *Crucial role of network relations*, which is a result of the informational revolution, decentralising tendencies and seeking synergic effects;
- *Dynamic development of services of a higher order* as a result of metropolisation.

It is worth emphasising that the basis of competitiveness in the structures of the global system is no longer the traditional allocation effectiveness but the currently decisive adaptation effectiveness, whose premise and indicator are diverse – in between the market and hierarchy – forms of coordinating the actions, which are generally called networks. Examples of such network relations are among others: joint ventures, financial engineering, public-private partnership, industrial districts, research consortia, franchising, etc. Networks have their own logic and are composed of two elements: nodes and connections between them [Jałowicki 2002, p. 40]. In an enormous network the size of the nodes decreases, while the number and quality of the connections rapidly increases. If extending this view onto the economy as a system, not only mutual influences, but also networks which connect cities with regions, and enterprises, institutions and human individuals with the latter may be observed. There are plenty of such networks. Each socio-economic activity in the geographical space may be conceived as a network. This network will be different in the case of an industrial enterprise, agricultural farm, state institution, hospital or higher education institution. Due to

specialisation and cooperation the participants of economic processes occurring in the geographical space may conduct complex undertakings which they would not be able to execute individually.

In the original meaning a network was a group of enterprises connected with each other through various commercial relations in order to meet a specific market demand. From the historical point of view, it may be stated that the concept arose from a traditional Japanese industry management which, as a consequence of demonopolisation actions imposed on Japan, acquired a form of loosely connected groups of enterprises which were not related by localisation but by a common production objective. Among various types of relations between the economic actors, regional networks are characteristic, which among others organise the economic system spatially and on an individual scale with external considerations taken into account [Komorowski 1995, p. 167].

P. Bianchi and N. Bellini, in turn, describe a network as “an interactive group of companies based on external work division and not being subject to hierarchical management” [Bianchi, Bellini 1991, p. 489]. M. Teubal et al. state that “networks become a more decisive and dynamic link between innovation (and an innovative company), on the one hand, and the market than a static »intermediary« management system opposed to the market in a sense” [Teubal, Yinnon, Zuscovitch 1995, p. 389]. Yet other writers believe that networks are a new form of economic systems organisation which conform to the Kondratiev fifth wave [see more Piore, Sabel 1984]. Hence, the increase of the role of network horizontal connections is observable, that is the convergence of economic, institutional, technological and social relations on the local, regional, national and also international scale, e.g. network relations within the European Union. They form a framework of common activity. The elements of the network change slowly and, usually equipped with permanent devices, they subordinate fast-changing flows. It is important, however, that a forum for cooperation, networks of relations and an efficient mechanism of their operation are established. Such a situation facilitates creating new jobs, income increase, spatial order and human and social capital increase.

The structure of the majority of the network types is asymmetric. What may be distinguished in them is the so-called network core [Domański *Miasto* 2000, p. 62], normally formed by large economic entities (or possibly corporations), which play a significant role in shaping the operation of the whole network. Apart from the core, which has a specific spatial localisation, there is also the environment, which is composed of smaller entities cooperating

closely with the entities which constitute the network, and to a large extent dependent on them. This phenomenon results in networks developing on various spatial scales, i.e. local or regional, national or supranational. The level of the scale depends on the type and size of the activity; it needs to be emphasised, however, that through an accelerated innovation diffusion process – in an interactive form – networks may expand. Such a phenomenon leads to a spatial diversity of products and services [Domański 2002, p. 194], and what follows – to a diversity of work sharing.

It is also worth emphasising that joining a network is voluntary, it involves certain obligations but it also provides numerous possibilities to the participants, e.g. exchange of knowledge. It enables organisations to access additional resources which are complementary to their own and which are not available for individual participants. Moreover, a network provides many entities which have their own knowledge bases and which focus on one common issue with the opportunity to cooperate.

Thus, the new network paradigm involves the creation of a quite different economic force, since “in network methods of resource allocation, transactions are made neither by means of selected exchange acts nor by means of administrative powers of attorney, but by means of networks of individual people or institutions included in the actions on the conditions of mutuality, privilege, and mutual support. Complementarity and adaptation are cornerstones of effective production networks” [Murdoch 1995, p. 741]. In relation with the above, attention is drawn to the fact that a tendency of a significant increase of network relations which are, on the one hand, relatively “weak” relations, fairly loosely defined in comparison with traditional rules of market exchange, and on the other hand, relatively stable relations, based on mutual confidence and functioning in longer periods, with rarer changes of participants compared with money markets, is observable [Grzeszczak 1999, p. 53].

The quoted opinions on the modern economy permit drawing the conclusion that paradigms of socio-economic space development and resulting new economic implications are currently undergoing significant changes. The traditional paradigm of socio-economic space development (also called Cartesian, Newtonian or Baconian as its major assumptions were specified by Cartesius, Newton and Bacon) is being replaced with a new paradigm described as holistic, ecological or systemic, but none of these adjectives fully reflects its nature. The thinking based on the new paradigm is based on five criteria [paper by Cempela]:

- 1) Turn from the notion of the Part to the notion of the Whole – Thinking according to the traditional paradigm assumed that in the case of any complex system the dynamics of the

whole may be comprehended based on the features of the individual components of the whole. In the modern paradigm the part-whole relations are reversed. The features of the components may be understood only based on the dynamics of the whole. Thus, the components cease to exist. What is called a part is simply a component of the inseparable network of relations.

2) The turn from the notion of a Structure to the notion of a Process – The traditional paradigm assumed the existence of primitive structures and powers and mechanisms which make them interact, due to which processes occur. According to the modern paradigm, each structure is understood as a manifestation of a process hidden therein. The network of relations is dynamic in nature.

3) The turn from the notion of Objective science to the notion of Epistemological science – The traditional paradigm assumed the objectivity of scientific descriptions, thus independent of the observer and of the cognition process. The modern paradigm assumes that epistemology, that is the comprehension of the knowledge formation process, ought to be directly incorporated into the description of the examined natural phenomena. Thus far, however, there is no consent as to the proper nature of epistemology, but a common conviction is appearing that epistemology must be an integral part of every scientific theory.

4) The turn from the notion of a Building to the notion of a Network as a metaphor of knowledge – The metaphor of knowledge as a building consisting of fundamental and absolute truths, principles, construction bricks, etc. had been dominant in the science and philosophy of the West for thousands of years. In the periods of the paradigm change it was believed that the foundations of knowledge were collapsing. According to the modern paradigm the metaphor of a building is replaced with a metaphor of a network. We perceive the reality as a network of correlations occurring between the observed phenomena. There are neither absolute hierarchies nor absolute foundations present in such a network.

5) The turn from the notion of Truth to the notion of an Approximate Description – The Cartesian paradigm was based on the conviction that scientific knowledge is able to give us absolute and final certainty. In the context of the modern paradigm it is believed that all notions, theories and discoveries are limited and approximate. Science will never ensure comprehensive and final understanding of the reality [Popper 1995, p. 274].

Another feature of the network paradigm is its flexibility. The order in the network paradigm displays the ability to reconfigure all components of processes and spatial structures, a crucial property in the society for which constant changes and organisational

volatility are typical. A radical change of rules without the threat that the network organisation would be destroyed has become possible as the material basis of the organisation may become redesigned and reformed [see more Tuomi 1999] as a result of the operation of horizontal relations.

Based on the above observations, it may be stated that the network economy functions according to different rules than the traditional hierarchical economic system [Domański 2002, pp. 194-198]. If the competitive price is the crucial mechanism coordinating the market and the organisational rules are the mechanism of hierarchy, the characteristics of the network is confidence and cooperation. Networks are not a simple continuation of market contracts between autonomic enterprises, nor are they a renewal of bureaucratic administrative relations. Partner cooperation, loyalty and confidence between the new and co-autonomous entities and large corporations have a greater significance. They exert influence on the dynamics of the market and, as a consequence, on the regional development. They may accelerate it or slow it down. The market competition leads to the volatility of economic relations. The relations are established, they develop and disappear. The major consequence of the development of networks, particularly in the capital form, is the fact that they cause certain inertia of the market and slow down market adaptation to the changing competitive conditions. Hence, network structures are usually more effective than other structures, especially when the markets are uneasy and technologies undergo fast changes. Networks are particularly useful in the situations which require fast and accurate flow of the information which is crucial for commercial or social reasons. They play a key role both for small and medium, but also for an increasingly greater number of large enterprises.

The spatial scope of networks is naturally very diverse. There are dense networks and networks dispersed on larger areas: local, regional, national, subnational, global networks. Additionally networks with or without territorial cores, networks being a combination of agglomeration and dispersion, symmetrical networks, where the participants are companies of similar sizes, and asymmetrical networks composed of small and large companies may be distinguished. Network concepts spread also to geopolitics. Their implementation gives a new meaning to borders, countries and constitutions. According to J.G. Lambooy “there is no global village, there is a world in the form of Perroux networks which create their own hierarchies and markets which go beyond the rules provided for in constitutions” [Lambooy 1991, p. 21].

Unfortunately, establishing networks has also a negative side. The so-called cores are formed in networks – poles, the connections between which are tunnel-like. The consequence of the connections for the regional development is polarisation processes. Networks may contribute to both facilitating and developing systemic solutions and to decomposing, degenerating, and even destroying the system, which is argued above all by evocative examples indicated by R. Putnam [Putnam 2000].

Nonetheless, the network economy creates new possibilities on the largest scale thus far. It is worth emphasising here that what best facilitates enterprise and innovation, that is the basic features of spatial entities which enable to achieve the structural competition ability, is an institutional system which is characterised by the following properties [Hausner 2001, pp. 5-6]:

- organisational multitude and diversity called after Amin and Thrift the “institutional density”,
- presence of coordination networks, which ensure cooperation between numerous and functionally different organisations,
- rules and practices which protect competition.

To sum up, the network paradigm is not evolving in the direction of closing in the form of a system but of opening in the form of a multi-edge network [Castells 2008, p. 83]. It is overwhelming and imposing in its materiality, but at the same time plastic and open in its historical development. Its major features are versatility, complexity and flexibility.

3. Trends and problems of Polish spatial planning

Most of the planning activities in Poland are performed at the local and regional level by local governmental institutions. Spatial Planning Acts were introduced in 1961, 1984, 1994 and 2003. The basic regulatory instrument for spatial planning is the Spatial Planning and Spatial Management Act of 27 March 2003, which: defines the scope and procedures related to appropriation of land for specific uses and the principles for its sustainable development; and regulates the means of resolving conflicts of interests that might arise between citizens, self-governed communities and the state.

Although spatial planning is in principle a legal requirement and a prerogative of local governments (communities and voivodships-regions), most Polish local governments do not have proper planning systems. The 2003 Spatial Planning Act requires that communities prepare a study on the commune’s future physical development. Most municipalities have such plans, and 20% of the Polish territory is covered by the plans. In 2003, the Parliament

abrogated all Poland's local development plans, but did not make the design of new plans for urban land use compulsory [see more *National Development Plan for the Years 2007-2013*]. Some municipalities lack the capacity (both financial and in terms of human resources) to make such a plan. When development plans are absent, exemptions for specific projects are possible through an administrative procedure, which involves some degree of arbitrariness.

Even when planning is well organised at the municipal level, it is weak, because of a narrow focus and lack of long-term vision. Physical development plans are not well connected with strategic plans and the planning focuses on administrative borders of communities rather than on functional areas. The communities do not cooperate enough in the planning process and have no incentive to do so, with the result that decisions on the use of space are sub-optimal. The upper levels of government (region, central) are unable to enforce the implementation of strategic decisions. Regions (voivodships) have responsibility for planning systems, because they prepare the regional spatial development plans. However, these plans are not binding on municipalities and tend to remain quite general and superficial. In particular, the communities have many ways to avoid unwanted programmes and projects, e.g. by prolonging procedures for preparing local plans, undertaking lengthy social and judicial processes, etc. There is no comprehensive spatial planning that encompasses physical and socio-economic developments at the regional scale, even though regions are encouraged to do this. The planning documents prepared at the different administrative levels are also often not coherent.

Insufficient spatial planning creates problems for infrastructure development, particularly for transport and housing. Although municipal spatial planning is in principle a legal requirement, many local governments do not have proper planning systems. Only 20% of the territory has spatial plans and these focus on municipalities' administrative borders rather than on functional areas and rarely involve cooperation among municipalities. Upper levels of government (region, central government) are unable to enforce the implementation of strategic decisions [Vanhove 1999, pp. 57-63]. As a result, planning does not enough play the role of coordinating and giving spatial articulation to policies. The lack of adequate functional spatial planning has adverse consequences for both urban and rural areas. In large cities, it hinders the development of integrated transport systems and contributes to a rapid increase in the use of cars to the detriment of public transport, thereby increasing congestion and pollution. It has also slowed the development of housing, and Poland now faces a shortage of some 1 million dwellings, particularly for social housing, which again reduces

labour mobility and reinforces growing urban sprawl. Poor spatial planning also adversely affects rural areas. With the increased price of land since EU accession, rural communities tend to speculate on land rather than develop a strategic long-term vision on its best use.

Spatial planning needs to be linked to initiatives targeting enterprises and job creation. Urban space in Poland has suffered from the construction in the 1960s and 1970s of gigantic complexes of block housing, usually forming a ring around Polish towns and cities. Today, such complexes represent sub-standard housing with high costs of exploitation and rapid depreciation. In some Polish cities such high-rise constructions are inhabited by 30-40% of residents, often low-income groups. As mentioned earlier, rehabilitation of these post-industrial (post-military) areas is crucial for both social and competitiveness reasons but will probably take decades. Management of town centres, where the housing stock is old and often run-down presents another challenge.

4. Network systems in Poland

The development of mass media, information revolution, disappearance of international exchange barriers have been establishing stable foundations enabling the societies and economic structures to come closer and make connections on an unprecedented scale. The new relations in the spatial socio-economic development have been forming and shaping both by means of competition and cooperation or taking successive positions in the added value chain [Padmore, Gibson 1998]. Instability of the market, high costs of research, narrowing the life cycle of products, in short, the intensification of risk and immobilisation of the constant capital lead capital owners to the system of “common risk”. Deconcentration of large enterprises into networks of specialised companies or individual location in the network of cities and regions is a potential answer to this challenge.

The presented considerations and tendencies of shaping new systems in the socio-economic space, including network systems, are observable in the Polish reality as well.

When discussing the current network systems in Poland, attention ought to be given to three significant dimensions of the network, stating that it is at the same time [Sroka, Kwieciński 2006, p.16]:

- an internal or in some cases a suprasystemic system of relations and correlations which are social, economic, interorganisational and political in nature;
- a medium of social, interorganisational and political communication;

- a “transmission line” serving for transferring resources – including but not limited to funds, knowledge, symbolic resources, mobilisation actions, controlling opportunities, coalition support and political support [see more Sroka 2004].

On the other hand, what is extremely important in order to understand the nature of network relations established between the main subjects of spatial processes is the “rules of the game” applicable within the networks and treated as an “unwritten constitution”. The content of the standards and models of interaction included in the thus understood constitution disciplines and directs behaviours of the entities functioning within the network and makes them predictable, as well as decides on the strategic placement of the resources controlled by them and on the accepted methods of capitalising and operationalising those resources [Wilks, Wright 1989, p. 305].

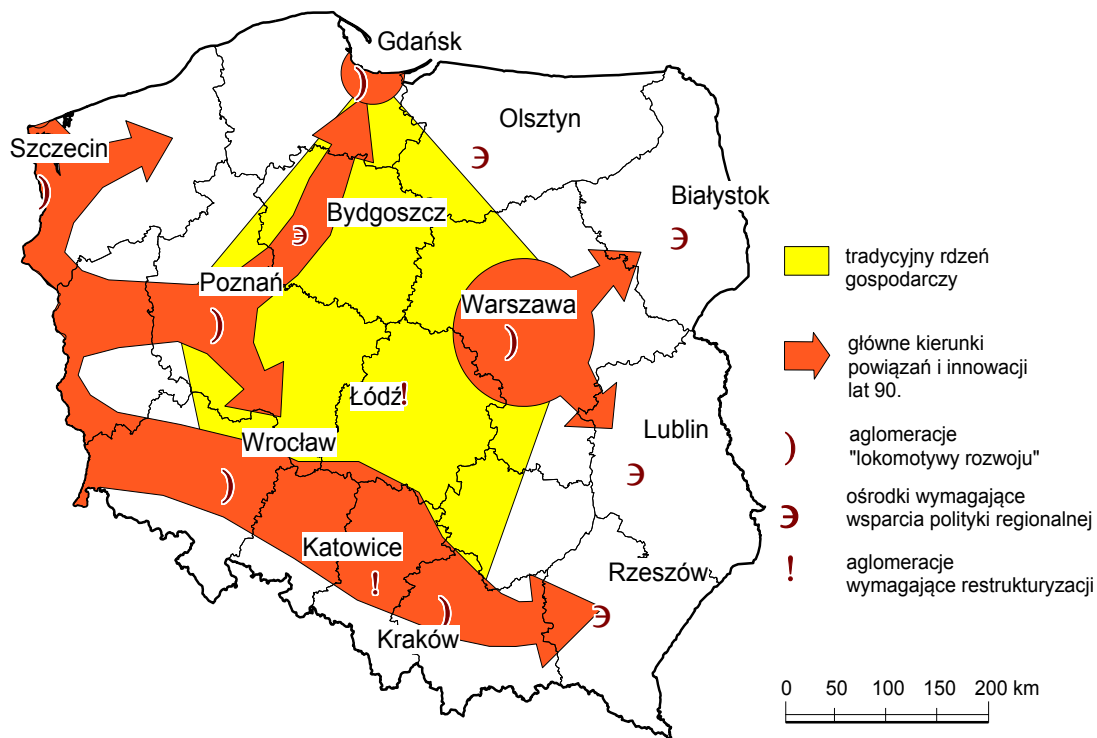
S. Wilks and M. Wright indicate eight general rules of the game which order the socio-economic relations of network societies. They include [Wilks, Wright 1989, p. 305]:

- pragmatism of actions and opinions of the engaged entities;
- strive for consensus;
- observation of rules of justice;
- actions for mutual adaptation of individual types of activity, which does not necessarily mean mutual coordination thereof;
- discretion, i.e. performing obligations concerning confidentiality of some information;
- trust, which is a condition of not only interaction within network systems, but is also a basis of the majority of other desired relations occurring in the social space, the participants of which trust each other and therefore “conclude an agreement on mutual recognition and protection” [Giddens 2002, p. 66];
- “depolitisation” of issues which are a subject of a tendering procedure, understood as the strive for a strictly substantive dialogue deprived of political threads, since this is certainly impossible within networks not only made of relations resulting from an exchange of material resources, but also those connected with relations which are based on authority. Depolitisation of the mentioned issues should be understood as resigning from brute political strategies; irrefutability of public decision centres' authority, which in the case of a clear necessity may take autonomous decisions as to the previous arrangements within the network; willingness of the engaged parties to constantly resume and continue network relations.

The above rules, which describe the economic and political relations in network systems, should be observed also by entities operating in the Polish space, where

disproportions in terms of development resulting in spatial conflicts and collisions and hampering the maintenance of spatial order in the country are still present (Fig. 1).

Fig. 1 Illustration of transformations of the spatial structure of Poland in the early years of the 21st century



[tradycyjny rdzeń gospodarczy – traditional economic core; główne kierunki powiązań i innowacji lat 90. - main directions of relations and innovations of the 1990s.; aglomeracje “lokomotywy rozwoju” - “development driving motors” agglomerations; ośrodki wymagające wsparcia polityki regionalnej – centres requiring the regional policy support; aglomeracje wymagające restrukturyzacji – agglomerations which require restructuring]

Source: G. Węclawowicz: *Przestrzeń i społeczeństwo współczesnej Polski*. PWN, Warsaw 2002, p. 154.

As is seen from the following illustration, agglomerations which are the “development driving motors” set the main directions of relations and innovations, and are the economic core of Poland. The integrated development of agglomerations which leads to establishing polycentric systems (in the present situation these are usually bipolar) improves the competitiveness of the space by shaping growth centres which are strong and attractive in terms of location, and also stimulates the development of macro-regions where they operate. Currently, five bipolar activity concentration spheres (network systems) may be distinguished in Poland [Kuciński, Kudłacz, Markowski, Ziobrowski 2002, p. 156]:

- central area I - with the bipolar Warsaw-Łódź system,
- southern area II - with the bipolar Cracow-Katowice system,

- northern area III – Baltic sphere with the dominant functional bipolar Tricity-Szczecin system and the supporting bipolar Bydgoszcz-Toruń system, with a considerable chance for establishing a system of urban space with network relations between medium and small coastal towns,
- western area IV - with the Poznań and Wrocław agglomerations,
- eastern area V - with the Lublin and Białystok agglomerations.

Features of individual network environments are identified in all these systems (Table 1), but properties of the intermediate innovative environment are dominant.

Table 1. Types of network environments according to J. C. Perrin

Endogenous innovative environment or technological area	Exogenous innovative environment or Technopoles	Intermediate innovative environment
Is based on the already regionally or locally existing defined groups of small and medium enterprises; they have a long tradition of interaction and learning creative competition from each other based at times on cooperative innovative practices; examples of such an outward innovation are environments in southern Germany (e.g. Baden-Württemberg) and in southern Italy (e.g. Tuscany and Emilia-Romagna).	Is established where companies, normally large ones, divide their production structures and place their R&D activities in functionally specialised areas, where they themselves or the supporting network policy expects synergy from co-location; innovative environments of this type occur in France, in Sophia Antipolis, in Toulouse and in Japan, e.g. in Tsukuba City.	Between the two types of networks, an environment which develops near the already existing metropolises or inside them is established from the combination of the endo- and exogenous types.

Source: Own work based on: J.C. Perrin: *Dynamika przemysłowa a rozwój lokalny. Bilans w kategoriach środowisk*. In: L. Wojtasiewicz (ed.), *Studia Regionalne* 1, Poznań 1995, p. 29.

It needs to be emphasised after J.C. Perrin [*Enterprises innovatrices et développement territorial* 2004, pp. 367-379] that an effective development policy of every Polish region should facilitate cooperation between individual elements of an innovative system, as it

results in faster popularisation of knowledge, and thus stimulates innovation, whose positive influence on establishing new relations in the spatial socio-economic development is invaluable [Brown 1968]. It is also worth noticing that a condition of the effectiveness of every network is its publicity. Networks ought to be easy to identify, well-known and open, regardless of whether they are formal or informal. The logic of networks rejects rigidity, closed structures, universal schemes, central authorities and established values. It offers, in turn, pluralism, diversity, ambiguity, incompleteness, randomness and multitude. These features contribute to the progressing dominance of the immaterial sphere over the material world. They also cause that the technologies which broaden, enhance, improve and develop all types of new immaterial relations, i.e. among others horizontal relations in the form of economic networks, are the most valuable ones.

5. Conclusions

Summing up, it's necessarily to stress that essential changes in regions' general situation occurred in the second half of the 20th century. The regions underwent long evolution from spatial units, which had only auxiliary and administrative character to full subjectiveness. This caused appearance of new unit in social and economic processes. These changes' reasons are indubitably different. They included first of all acceleration and intensification of exertion of development' s process and keeping company of this process progressing globalization of worldly economy and also social phenomena like for example: development of territorial self-governments. That's why the increase of phenomena connecting with decentralization follows; it means the role of state authorities in creation of regional development's processes is limited (the meaning of intraregional policy increases). Progressing economization of space and processes occurring in it has got important influence for regions' situation. It causes in large range transformations of individual areas – they often run in spontaneous and unexpected way. The transformations are not only connected with changes of regions' positions in economic processes appearing in economy's scale of country or world but also their internal structure. Another important feature of these processes is disparity of level of their appearance in several regions. It causes disproportions' accumulation in development's level of individual parts of state or world. As this fact is clear in comparison's situation of weak developed countries and high developed ones, in space of individual states it isn't advantageous phenomenon and not always explained in rational way.

The internalization of cumulative potential in the networks takes place in the learning region (which is high developed area), by the possibility of complementary usage of resources

in existing and developing cooperation. However we should remember that creating of the nets in a region is a selective process, it happens at different intensity in different places in regional space. Areas with suitable capital (also human resources with the highest qualifications) and knowledge become leaders in this process. The nets' knots are situated in these areas (these are mostly big urban centers of modern structure). New regional structure created in these conditions is what we call 'new quality', however at the same time it is not continuous. This means that apart from the areas in regional space where the social and economic activity is being accumulated, there are areas which do not belong to the network and do not benefit from the synergy effect. This seems to be a natural occurrence, but the exclusion of a single area is not permanent. According to the changeable net's logic, where the changes happen rapidly the areas which appear not to be very attractive nowadays can become desirable elements of the network in the future, e.g. for their unique nature, localization value or other yet not known reason. More important is for the region as a whole to be able to create the fundamentals for the net by its innovational nature or unique potential and to use benefits of the net in the future.

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