Modern Features of the Spatial Economics Network Development

Natalya Vladimirovna Ivanova

Financial University under the Government of the Russian Federation

Abstract: The article deals with the modern features of spatial economics network development. The main approaches to the definition of the network economics and the trends of its development in the future are analyzed. The principles of modern Russia economics network organization are stated to meet the issues of regional development.

Key words: Network · Network structure features · Economic space · Network efficiency · Regional development

INTRODUCTION

The notion of "network" has ancient origins and transdisciplinary nature of its application: this is a fishing tool and a power supply for the central elements of a common system and a self-development factor.

The etymology of the word "network" is of the Slavic origin. It has the same root as the ancient German. “seid” (“rope”, “loop”), Latvian “seitis” (“tie”, “rope”), Latvian “siet” (“to knit”), ancient German “syáti” (“binds”), a snare (with ë/i mutation). The word “Network” literally means "connected" [1].

In a broad sense the definition of the word “network” as a phenomenon of inter-organizational cooperation, considered as the whole spectrum of coordination mechanisms among its members: from informal communication to inter-organizational information and planning systems (alliances), complex integration structures (joint ventures and franchising).

Currently, the network form of organization plays a key role in the development of national and regional economies.

Information development and "new" economy is directly related to the functioning of network structures at different levels of governance, including the linking meso-level that defines unconditional relevance and significance of modern features study and the network development of spatial economics.

Main Part: A number of researchers believe that the beginning of the network economics started from telegraph invention [2].

Although, it is more logical to associate the emergence of network structures with a much earlier period of development, that is evidenced by the history of the world wars and geographical discoveries, the rapid development of industry and financial pyramid schemes of the past.

Modern researchers are developing practically identical network economics and the development of the Internet (World Wide Web).

However, this statement is not entirely correct due to the fact that the Internet is probably an accompanying element of economic development.

In some cases, it a contributing and in some cases a degrading factor as for economic so as for social development.

In this regard, it is appropriate to use the network principle of the spatial organization of economics in terms of a dualistic approach:

- The formation of network organizational and economic structures on the link principle of economic process key elements (producers, enterprises and industries) to implement specific target guidelines as network organizer (ideologist, founder, manager, etc.) and the entire network structure as a whole (mining, agriculture, etc.).


Table 1: Network Readiness Index 2013 [3]

<table>
<thead>
<tr>
<th>Economy</th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>Finland</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Singapore</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sweden</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Norway</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Switzerland</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Denmark</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>United States</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Taiwan (China)</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Russia</td>
<td>56</td>
<td>54</td>
</tr>
</tbody>
</table>

The system, Internet and Internet technologies may be used in this case as accessory elements, but they are not absolutely compulsory elements of economic process. At that it is necessary to take into account the factor of social, humanistic and synergic trend of this organizational form.

- Network organization of certain activities (economic, social, etc.) aimed at the use of Internet resources as a major factor of company development (social networks, online shopping, e-services, etc.).

However, an offensive development, branching and sometimes an aggressive pressure of the Internet on people and different segments of the population indicate the increase of an organizer and owner influence on the network structure within a global scale and, accordingly, it’s a vivid example of such a development for possible types of such organizational system.

In this case the factor of time, financial and energy costs shall be considered which is absorbed by this system and the different degrees of such costs return which directly influence on the psycho-emotional and physical health, manifest in a number of negative aspects: in the changes of mood among active population, in the reduction of its social and economic efficiency, etc.

These facts form such a known from biological science food chain as "prey-predator" of networks, the balance problems of which are rather relevant. [4] It's amazing, but it is acknowledged now that the balance conditions are as diverse as the problems of the L. Walras classical approach: the problem of balanced prices, classical oligopoly problem, the problem of portfolio optimization and even the migration problem, which in its original wordings does not have a network definition, but actually it has the features of a network structure.

Besides, there is also a problem of acknowledged traffic network balance associated with the management of traffic on city roads, as well as the environment and ambient air condition and even Internet traffic. Along with the transport network, the spatial balance price also has a basic structure of the network (the nodes, corresponding area places, etc.).

It is now established that, formally, even supernets in which decision-makers (whether manufacturers, retailers or consumers at demand markets) compete with each other, but must cooperate (at various levels) between different levels of process. There are problems of network supply balance.

The same is true for complex financial networks with intermediaries [5]. Furthermore, even within supernets a social network was integrated with the supply chain and financial network structures.

Therefore, it becomes more and more evident that seemingly disparate balances in a range of disciplines may be similarly formulated and studied as a problem of network balance [6].

This identification allows:

- Visualize graphically network structures making the base of a system;
- Have benefits from existing concepts, analysis methods and calculations;
- Get an idea of a common network structure formation procedure and its behavior in the synthesis of complex systems that are at the basis of our economies and societies.

A network principle is the principle of any independent centers, connected by various nodes.

The company now may not have in its internal structure all the types of activities (from scientific development to implementation), but it can enter into long-term contracts on the basis of strategic alliances or reallocation of resources.

Despite the exponential growth of research in social and organizational networks, there the network theory is not clear still.

In recent years there was an increased interest in research of network theory basis in different areas of social and economic sciences, such as economics, spatial economics, economic geography, organization theory, sociology and so on.

Scientists Borgatti, S.P. and Haglin, D.S. in their work on the network theory [7] proposed a specific concepts of network theory. Two types of selection (behavior, attitudes, decisions) and success
Table 2: Network mechanisms by model and research tradition

<table>
<thead>
<tr>
<th>Social outcomes</th>
<th>Model</th>
<th>Success</th>
<th>Choice</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Flow (ties as pipes)</td>
<td>Capitalization</td>
<td>Contagion</td>
</tr>
<tr>
<td></td>
<td>Coordination (ties as bonds)</td>
<td>Cooperation</td>
<td>Convergence</td>
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(performance awards) results, as well as two network models: the "flow" and "reconciliation" are revealed by these concepts.

While the "flow" model is the movement of material assets or intangible assets (e.g. information) via connecting path between network agents the "reconciliation" model demonstrates the leveling of interests and the coordination of individual and collective actions in relation to other the network subjects (e.g. power, the differentiation of labor, co-production, etc.).

Using cross-tabulation two models with two types of results provide the framework for four different functions: the value of "capitalization" assumes network achievement explanation based on the "flow", such as innovations or profits, which explain the network features influence on its economic results.

The second function is "cooperation" which includes obligatory explanations of success where management resource, innovation or other performance (presentation) comprehension is achieved via the strategy of alliance, operating units and the exclusion of third parties.

The function of chain reaction or "domino effect" and convergence (see the "flow" and "reconciliation") are based on model selection, realized that the adoption of an innovation or the choice of equal opportunities on the basis of direct contacts between subjects or on the basis of similarities between people and organizations that appeared as the result of the network convergence (from the Latin. converge-closing in).

In the context of innovations, capitalization and cooperation the key factor is the function of interest and motivation.

As an economic result, innovations may be explained through the flows of information, or by the creation of coordinated collective innovations.

The typical network characteristics can be expressed in the terms of position (e.g. primacy), group membership, a role (e.g. structural equivalence) or dyadic flows between the pairs of participants (e.g. transfer of knowledge between two companies).

From the viewpoint of network evolution it is necessary to consider the mechanisms and conditions that affect the appearance of certain relations and network forms over time, which will be increasingly important for the understanding of the relationship between the form of "network organization" and socio-economic outcomes in a particular space [8].

When you consider an economic area as a combination of physical basis and a development environment as the criteria of region typology the following factors may be distinguished [9]:

- Economic and geographical position of the region in a national economic space;
- The level of region involvement in the global economic space;
- Characteristics of interactions between regional economic subjects.

In geo-economic space, several researchers have identified two main models of the spatial organization of the territories- integrated (centralized) and network one.

The first model was implemented in the era of industrialization and associated with dominance in the regional economy of major mass industries.

In the network regions the socio-economic development in this case is not concentrated, but distributed.

The economic power of the region in this case is defined not by production volumes but by mobilization resource of the whole network, its overall influence on global exchanges. Local networks are characterized by flexible specialization, innovation ability instead of strict specialization in the form of single-industry peculiar for hierarchically organized central regions.

In many ways, these qualities of network regions are based on hidden knowledge and interdisciplinary exchange of information specific to production networks. The combined companies, which make the part of cooperation and interaction network, form a network cluster.

The relationship of geography and area economic development acts as a network effect moderator on knowledge and regional development, which is also explained by the factor that a spatial allocation of resources in the network allows you to share resources, technology and knowledge throughout the whole network of alliances.
Thus, it is necessary to determine network characteristics to reveal the degree of network relationships in the region.

The value of a network is determined primarily by the quality and quantity of available nodes and connections: the bigger it is, the higher the internal diversity in the network and the effectiveness of interactions.

The indicators demonstrating this characteristic include the number of enterprises in the region (the more the number of enterprises, the wider and more extensive ties are between them and the enterprises outside the region), the number of enterprises, the number of innovative enterprises.

The intensity of economic relations is determined not only by its number, but also by the provision with modern infrastructure.

Obviously, on terms of network economy it is necessary to create new economic conditions under which the activities of the regional organizations is transferred to the network environment, in particular to clusters as one of the network forms of industrial region economic space organization.

The establishing of network organizational structures for regional economic development (network infrastructure creation) is a predominantly horizontal integration method, which consists of forming a network with its nodes and connections to achieve the purposes of compliance with the needs and expectations of the space-economic transformation.

Thus, under the circumstances, there is a new paradigm of regional development, the essence of which should be considered by taking into account the general principles of network structure development as the basis for socio-economic transformation of modern society [10].

Network as a new stage in the evolution of organizational structures of spatial economics development management has several features.

The following fact may be referred to the main features: the place of network structure appearance is changing global markets, where companies must constantly work on improving the quality and the process of production to produce environmentally friendly products, consumer goods and services. As for network assemblies the evaluation of their effectiveness should be carried out at from the standpoints of an integrated approach, taking into account the multiplicity of integration forms and mechanisms, sectoral and regional specificities, a variety of interaction aspects between the participants.

The effect of a business unit entering in a business network, i.e. the transformation of it into a network partner, is characterized by the sum of the effects from the cooperation of its potential main elements.

Thus, the efficiency of the network partner functioning can be defined as the sum of the effects from cooperative work on production upgrade and individual processes, the use of partner know-how etc.; from industrial organization cooperation; from resource provision cooperation, from administrative functions performance cooperation, from function performance cooperation in the field of food products distribution, from financial resources cooperation.

This method provides a more comprehensive substantiation of network operation, allows evaluate the effectiveness of different planes of interaction that may bring additional benefits to its members [11].

At that it is possible to evaluate the effect as for a network customer partner customer so as and for a network contractor partner comparing the potential costs and benefits of network association. Thus, the efficiency of the cluster may be estimated by benefits (economic effect) calculation at four levels: for the enterprise structure-cluster members for cluster association as a whole, for a region and for a state economics.

This assessment may be based on a system of values:

- The output of a cluster production based on the annual average number of employees, the creation of additional jobs, the share of added gross value for cluster products in the gross regional product (GRP), the coefficient of localization, calculated as the ratio of the regional industry output share in GRP to the specific gravity of the same industry in domestic gross product and others.

**CONCLUSION**

In the course of the study it is determined that the network principle of the economics spatial organization should be used by taking into account the complex nature of modern network features and the functional matrix which is standard for individual elements of the network organization and forming a synergistic effect at the rational interaction of the network structural elements.

**Conclusions:** In the context of Russia accession to the World Trade Organization many sectors of the domestic economics faced the necessity of competition level
increase and the development of investment, institutional and organizational factors that will contribute to the survival of new, emerging and effective enterprises at cluster-network basis.

Alternative principles on which the models of leveling and polarized regional development in Russia are constructed, do not exclude the presence in their structure of a generic element, which acts as the recognition of network structures as a significant development factor and result. The efficiency of the network structure and network development effectiveness of spatial economics should be provided through the balanced interaction, self-organization and responsibilities of all network assembly subjects.

This in its turn leads to the need of incorporation of all features and capabilities of the of the network structure transformation and also represents the theoretical and practical significance in the development of the domestic experience in the field of spatial economics management and the selection of the most effective development trends in the context of national economic space polarized development model.

REFERENCES