



Analysis of actual models of cooperation in regional innovation system
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Abstract

The paper deals with actual models of collaboration in the regional innovation system. It is vital to note that there is no single model (example) for networking in the regional innovative system, but most of the existing models are based on Triple Helix Model. This model of innovation can be explained by a set of interactions between academia, government and industry. In the paper the common type of cooperation in the network structure and main characteristics are also described. The paper reviews how each model operates in innovation-driven economy. According to this paper, it is important for participants of regional innovation system to be a part of one of the presented models.

Keywords: Models of cooperation, innovative system, cluster, collaboration, actor, regional economy;

1. Introduction

In recent decades, networking is an object of the increased attention on the part of the scientific and business communities. This is due to the growing dynamics and uncertainty of the external environment, as well as changes in interfirm relations in the context of increasing specialization and understanding of the importance of cooperation for achieving enhanced results.

To see how the network collaboration takes place and between which actors it most often occurs, it is necessary to turn to the basic models of establishing networks. The basis for these interactions in innovative structures is the triple helix model.

2. Discussion

Triple Helix Model entered economic life in the mid-1990s through the collaboration of sociologists Henry Herzkowitz (Stanford University) and Loet Leydesdorff (University of Amsterdam), who presented the network partnership of the three sectors as a hybrid social construct. The main participants of innovation development are authority, business and science. Authority unites all levels and branches; science is the generator and distributor of knowledge; business is the realization of accumulated potential. Science is divided into fundamental and applied, the first one is represented by universities, and the second one is represented by research institutes and knowledge-based industries if they have an adequate a research base and trained personnel. According to scientists, this design has a high adaptability to changes in the external environment [4]. The effectiveness of network interaction in the model is characterized by the area of intersection of interests of three groups of actors. The cohesion of the elements of the

triple helix leads to innovative synergistic effects. Its formation occurs in stages. A similar triple helix model for evaluating the interaction of actors was proposed by Zaraichenko I.A., who considers the areas of intersection of interests between the systemically important elements in the innovation network.

Smorodinskaya N.V. in her scientific work presents a triple helix in several variations. In the course of the collaboration, three groups of actors are internally modified, starting to bring together and take over the inherent functions. Then they form stable pairwise ties (three double helices) creating joint institutes (for example, a science park, where companies acquire developments/innovations created at universities with the financial support of the authorities). Finally, three players reach a co-evolution mode: they mutually overlap their functions, partially replacing each other, and transform into network organizations. For example, universities, in addition to educational and research activities, take on the entrepreneurial function of commercializing scientific ideas (creating start-ups, small innovative enterprises). Companies partially act as universities (they create their own research centers and staff retraining centers). In addition, the State partly acts like a venture fund (supporting start-ups at the expense of concessional funding for universities) or a business manager (supporting partnerships between universities and companies). At the same time, universities and companies partially replace the State in creating an innovation infrastructure [3].

The triple helix model as a network model has deprived society of the illusion that knowledge production is the exclusive prerogative of universities, the creation of economic benefits is a business profile, and control over economic growth is an exclusive function of the state. In the literature, it is characterized as a universal model of collaboration that exists in the 21st century [2].

The authors of the triple helix model consider that it illustrates the functioning of both the modern economy and modern society. They assume that the formation of spirals in the system, which increase its dynamism, may involve the interaction of a much larger number of structural elements than three elements of the triple helix model [5]. In accordance with this, attempts are being made in science to expand the number of links in a spiral, with the inclusion of additional components. However, the concept of quadruple, fifth, and N-th spirals seems unconvincing. As Leydesdorf notes, each element of the model requires a clear functional specification, and the addition of redundant elements reduces its usefulness [1].

Cluster network model. Along with universities and scientific organizations, business and government, intermediary organizations are included in the cluster network model, which functionally cannot be attributed to any of the three links of the spiral. In cluster literature, such organizations are often referred to as collaborative support institutions [3]. They perform coordinating functions, create platforms for dialogue and generally work to strengthen the system of communications in the cluster network, facilitating partnership rapprochement between participants, helping them achieve the shared vision and their coordinated project promotion activities.

In different approaches, this includes specialized agencies, management associations, professional centers, support institutions, etc. If the model presented by N. Smorodinskaya is taken as an example, we have the following.

The cluster network model is distinguished from a cluster as a form of association by the fact that the functional interconnection of the model links is not subordinate to their territorial proximity.

The potential of the presented model is connected neither with the spatial concentration of enterprises, nor with the individual competitive advantages of the participating firms, nor with

their belonging to the innovation orientation. All that matters is the achieved synergy effect resulting from the network collaboration, which affects:

- reduction of the uncertainty level;
- reduction of all types of costs;
- collective innovation;
- formation of internal subsystems (clusters).

Reduction of the uncertainty level is achieved through the exchange of participants' experience and knowledge gained in the course of independent activities, as well as through consulting assistance from organizations-intermediaries and local authorities.

Reduction of all types of costs occurs during the implementation of joint production projects, when residents of the model complementarily combine their resources and competencies to achieve the maximum possible effect from the collaboration.

Collective innovations are born out of the high specific concentration of educational, research, scientific organizations, as well as business representatives, in symbiosis with whom knowledge generators will bring their products to the market.

The formation of internal subsystems is the result of a variety of activities that participants implement. In order to center efforts and to increase economic efficiency, they are combined according to the profile specialization of each participant and then act on a given vector.

Lack of synergy means that this agglomeration is not originally a cluster network (devoid of triple helix properties), or has flaws in the communication model (lack of openness, coordination mechanisms, willingness to cooperate with competitors), or has not reached that stage of maturity in the development of network interactions on which this effect can manifest itself [5].

Network structure model. The following model is not tied to any form of association of actors of the regional innovation system. The group of network participants and detailed directions of networks in the network structure distinguish this model.

The author of the model, R.A. Abramov, identifies the following main elements:

- participants of the regional innovation network structure, research and development and educational institutions in the region;
- subjects of the production and economic complex that are consumers of innovations and potential recipients of investment resources;
- representatives of the innovation infrastructure (techno parks, technopoles, business incubators);
- bodies engaged in the financing of investment and innovation activities (supporting organizations);
- government agencies and authorities responsible for coordinating the interaction of all the above mentioned elements.

3. Conclusion

From the position of the network approach, the model of the regional network structure should function due to the interaction between the elements of the system, during which purposeful activities are carried out to implement innovative processes. However, the absence of a unifying factor between the participants of the model affects the potential of network interaction inside; in such models, the frequency of contacts is very low, and this leads to a weak collaborative effect, which contributes to the favorable development and functioning of network structures.

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