

Generation of Macroregional Network Innovation- and Educational Cluster in the North Caucasian Federal District

Dagestan State University of National Economy
M.Kh. Abidov, S.E. Savzikhanova, L.A. Borisova

This article validates the generation practicality of the network innovation- and educational cluster, which would combine leading universities of the macroregion, research- and infrastructure entities and the business community. The main difference between the proposed model of the cluster generation and the existing ones is that originally the initiative of cluster establishment comes from entrepreneurs, who are interested in investments in the development of innovation- and educational activity of the macro-region, and the North Caucasian Federal District (NCD) in particular. This article also proposes patterns of networking cooperation of the cluster participants, in order to optimize expenses in the course of cluster creation and operation.

Key words: innovation- and educational cluster, synergy effect, network cluster, cluster policy, networking cooperation, infrastructure of innovation activity.

Currently, the creation of integrated interactive network educational space is one of the major tasks of education system modernization. This can be implemented if comprehensive information- and communication system with broad and in some degree unique functional capabilities is in place. New technologies create the potential for sustainable development of cluster formations in the research- and educational system of higher education. This process generates missing links of the market infrastructure, including distributed virtual research- and educational structures.

At present, numerous policy papers indicate the importance of development of territorial clusters in various forms.

Catering to the needs of the post-industrial paradigm of global development, economic systems change. The cluster policy of leading economically developed countries also changes. It is reflected in the transformation of approaches to the cluster concept. Interactive cooperation forms of innovation parties, network cooperation forms of cluster participants begin to play a more significant role. This helps to

overcome territorial and country restraints, and achieve a higher synergy effect in cluster cooperation.

Approaches to the definition of clusters have significantly altered. While in the XX-th century territorial vicinity of its participants, which defined the essence of the cluster, played an important role, in the present interpretation common ideas, goals and their joint achievement with the application of resource-, informational- and financial potential of cluster participants is the key element of the cluster cooperation. In this regard, the authors define the network cluster as a group of independent commercial and (or) non-commercial entities, which are united at the resource level in the technological network to implement a common idea. This technological network provides for the achievement of synergy effect sufficient to produce competitive products or services in the course of innovation-oriented activity as part of the integrated space [1].

From this definition one can see that cluster participants preserve their independence and combine resources as part

REFERENCES

1. Ob utverzhdenii Kontseptsii dolgosrochnogo sotsialno-economicheskogo razvitiya Rossiyskoy Federatsii na period do 2020 goda (On Approval of the Concept for Long-Term Socio-Economic Development of the Russian Federation until 2020) [Electronic resource]: Russian Federation Government Decree of 17 November 2008 No. 1662-p. – URL: <http://www.ifap.ru/ofdocs/rus/rus006.pdf>, free. – Tit. from the screen (usage date: 04.09.2016).
2. Naumkin N.I. Metodicheskaya sistema formirovaniya u studentov tekhnicheskikh vuzov sposobnostey k innovatsionnoy inzhenernoy deyatel'nosti (Methodological System for Preparation of the Students of Technical Universities for the Innovative Engineering Activities) / N.I. Naumkin. – Saransk: Mordovian State University, 2008. – 172 p.
3. Varnavskikh E.A. Tvorcheskaya inzhenernaya aktivnost spetsialista i realizatsiya metodik ee formirovaniya u studenta v tekhnicheskoy vuzovskoy sredy (Creative Engineering Activity of a Specialist and Realization of the Methods for Its Formation for Students of Technical HEIs) [Electronic resource] // Pedagog. – 1999. Iss. 7. – URL: http://www.altspu.ru/journal/pedagog/pedagog_7/a07.html, free. – Tit. from the screen (usage date: 15.09.2016).
4. Lozovskiy V.N. Fundamentalizatsiya vysshego tekhnicheskogo obrazovaniya: tseli, idei, praktika (Fundamentalization of Higher Technical Education. Goals. Ideas. Practice) / V.N. Lozovskiy, S.V. Lozovskiy, V.E. Shukshunov. – SPb: Lan, 2006. – 128 p.
5. Naumkin N.I. Osobennosti podgotovki studentov natsionalnykh issledovatel'skikh universitetov k innovatsionnoy inzhenernoy deyatel'nosti (Special Aspects of Training the Students of National Research Universities for Innovative Engineering Activities) / N.I. Naumkin [et.al] // Integratsiya obrazovaniya (Integration of Education). – 2013. – Iss. 4. – pp. 4-13.
6. Krylova N.B. Kulturologiya obrazovaniya (Culturology of Education) / N.B. Krylova. – Moscow: Vysshaya Shkola, 2000. – 184 p.
7. Karmin A.S. Kulturologiya (Culturology) / A.S. Karmin. – SPb: Lan, 2003. – 928 p.
8. Chuchalin A.I. Kachestvo inzhenernogo obrazovaniya (Quality of Engineering Education) / A.I. Chuchalin. – Tomsk: Tomsk Polytechnic University Publishing House, 2011. – 124 p.
9. National Research Tomsk Polytechnic University [Electronic resource] : [official website]. – Tomsk, 2002-2017. – URL: <https://tpu.ru>, free. – Tit. from the screen (usage date: 10.10.2013).
10. Moscow State Technical University [Electronic resource]: [official website]. – Moscow, 1997-2016. – URL: <http://www.bmstu.ru>, free. – Tit. from the screen (usage date: 12.12.2016).



M.Kh. Abidov



S.E. Savzikhanova



L.A. Borisova

of the specific technological network to achieve a common goal. A special focus is made on the availability of synergy effect. Moreover, it is stated that this effect would be sufficient to produce competitive products or services. Significantly, the authors do not consider geographic proximity as one of the major motivating factors of cluster generation, although the scientific literature has made a primary focus on this. It is considered, that currently it is not a major factor, but more importantly, cluster participants perform their activities as part of common information- and communication space, which ensures networking cooperation at the cutting-edge level. The factor of innovation orientation is also an important distinguishing feature of the cluster, because clusters are generated where breakthrough advancement in science, technology with further entry into new market niches is expected or performed.

The distinctive feature of the innovation networking cluster is that all participants, that are located in different regions or countries, and united via telecommunication systems, are engaged in the implementation of the common innovation project at various stages of its life cycle. It means that within one cluster, all participants of the innovation process unite and cooperate with each other from the birth of an innovative idea to its commercialization and market entry. At that, territorial concentration does not play a key role.

The majority of existing innovation clusters in Russia are primarily generated on the geographic principle. In order to convene all participants in the same area within one region, the Federal government spends enormous financial resources on the cluster infrastructure. At the same time, advanced economies depart from the above principle and focus all their efforts on the ultimate goal, optimizing costs on the development of innovative projects through the use of innovative organizations resources from various regions and even countries. This significantly increases the competitiveness of innovation projects, reduces transaction

costs and makes it possible to involve best specialists from different countries in this project.

To create and develop the innovation- and educational cluster (IEC), one needs economic strength, high level of human capital, and also a certain degree of infrastructure development of innovation activity. Infrastructure development of innovative activity is declared as one of the main priorities of Russia's innovation system. [2]. Since the beginning of the 1990-ies, the Russian Federation has created more than 1,000 infrastructure objects of innovation activity, including 5 special economic zones of technical innovation, 10 nanocentres, 13 prototyping centers, 16 certification centers and testing laboratories, 29 centers of information- and consulting infrastructure, more than 50 engineering centers, which combine 28 regional engineering centers, 20 engineering centers as part of leading technical universities, 9 engineering centers of pilot innovative regional clusters, etc and others, 114 technology transfer centers, 160 industrial parks, 200 business incubators, 300 centers for collective use. Russia established infrastructure objects of innovation to ensure the development of science. It includes the Advanced Research Foundation, the Federal Agency for Scientific Organizations, the Russian Found for Research, 2 national research centers and 14 science cities. The system of development institutions is in place, and covers Rosnano Corporation, Skolkovo Innovation Centre, the Russian Venture Company (RVC), the "Web-innovations" Foundation and others. The organization of more than 200 regional clusters has been initiated, including 26 pilot innovative regional clusters, supported by the Federal budget and 35 technology platforms, which also belong to the innovation infrastructure [3].

As indicated in the Strategy of Innovative Development of the Russian Federation until the year 2020, achieving self-sufficiency has been a fundamental challenges of infrastructure development of recent innovation efforts, and this issue still remains

unsolved. From 2007 to 2014, the Federal and regional budgets allocated 684.4 billion roubles on infrastructure innovation. It included 92.1 billion roubles to support small- and medium business programmes, 281.1 billion roubles for the capitalization of development institutions, 67.7 billion roubles for the generation of innovation infrastructure in the Russia, 243.5 billion roubles for state guarantees and guarantee funds [4].

In the course of these efforts, a "chronic disease" of public-private projects has been revealed, when significant government spending was not supported by planned extrabudgetary funding, and the increase in costs was not accompanied by proper increase in revenues from innovative infrastructure projects and their contribution increase in Russia's economy. One might as well say that the issue of reaching the innovation infrastructure self-sufficiency has not been resolved.

In our opinion, the issue is not only that Russian clusters are created by the front-office decision, but also in the development priorities of clusters. Oftentimes, clusters align themselves with prestigious industries and interests of major companies, that is why it limits development prospects of these clusters and impairs their efficiency. Not in every instance are the interests of small and medium-sized businesses taken into account. It is clear from the structure of cluster governing bodies, which are often managed by either State government agencies or State-owned companies. Thus, it does not create a sustainable platform for internal cooperation and development.

It is very important to establish the efficient management system within clusters focused on the interests of cross-sectional participants, on harmonization of programmes and development strategies of cluster participants.

The authors propose to establish the networking innovation- and educational cluster, which would unite leading universities of the macroregion, research-, infrastructure organizations and innovative entrepreneurship.

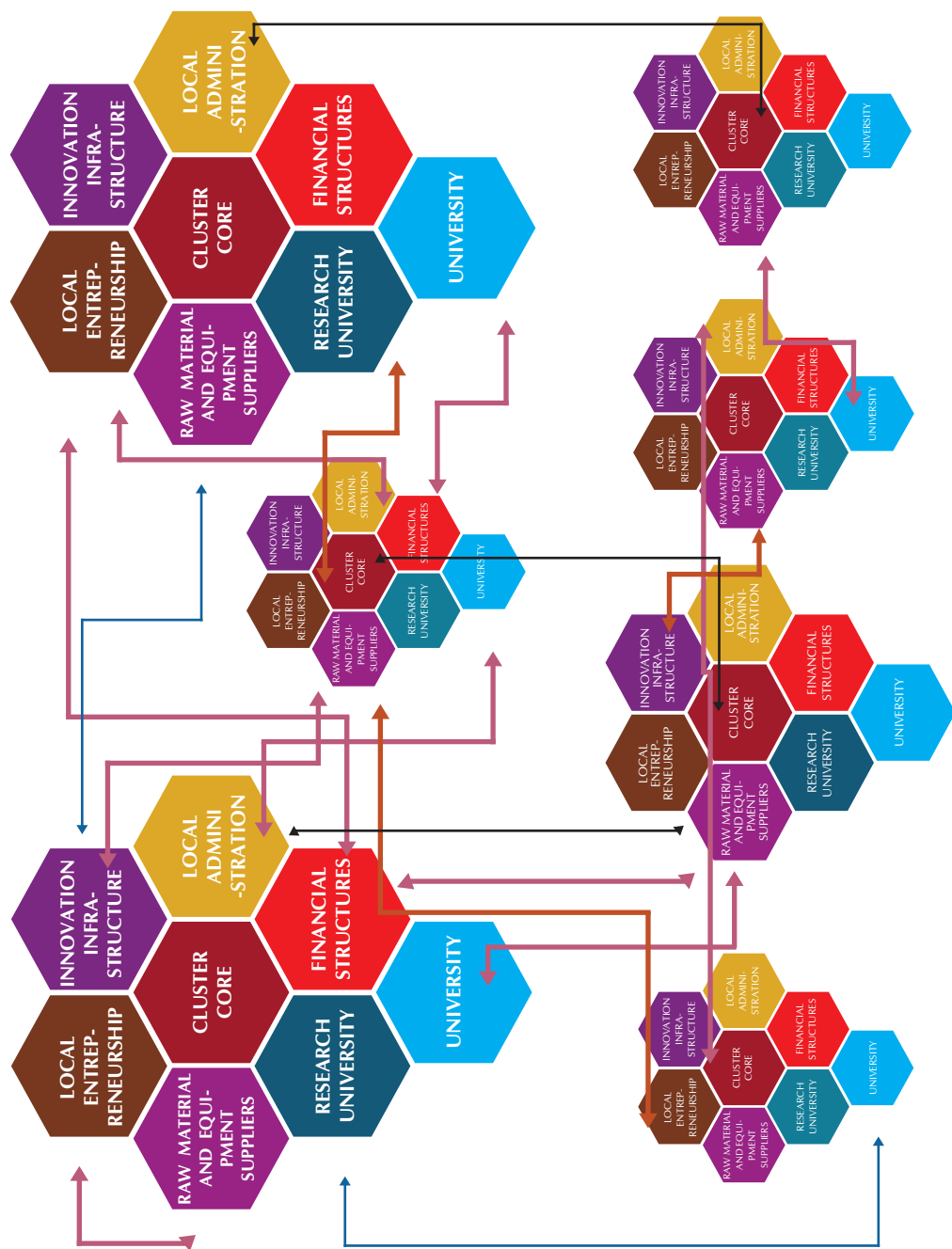
Advanced countries achieve their high level of innovation namely through the active integration of higher education- and research organizations in business processes of regions. The direct dialogue between regional authorities, research- and business community is required. Cluster development with network technologies has been recognized as the most efficient form of this cooperation throughout the world. In this regard, the establishment of the networking inter-regional North Caucasian Federal District innovation- and educational cluster seems pertinent.

In the proposed model of the multi-core networking innovation- and educational cluster (fig. 1), each "bunch" symbolizes the innovation system of the region, which includes leading universities, companies and organizations, regional governments, financial institutions, development institutions, venture capital funds and elements of innovation infrastructure. The above entities, implementing online cooperation within its regional segments, have an additional opportunity to establish efficient networking cooperation at the interregional level. This allows to accumulate resources in most important areas of regional economy and to involve most competitive professionals and experts to perform innovation projects, and significantly reduce all transaction costs of cluster participants.

This model of macro-regional networking innovation- and educational cluster proposes to generate a unified information- and communication environment for all macro-regional innovation participants. In fig. 2, this environment is arbitrarily highlighter in blue. It means that each macro-regional innovation cluster is included in the proposed system, and its members have an opportunity to cooperate both regionally and interregionally. This would give the impetus to previously generated projects and expedite the creation of new ones.

The information- and communication system of macro-regional networking Innovation- and Education Cluster creates integrated information- and communication

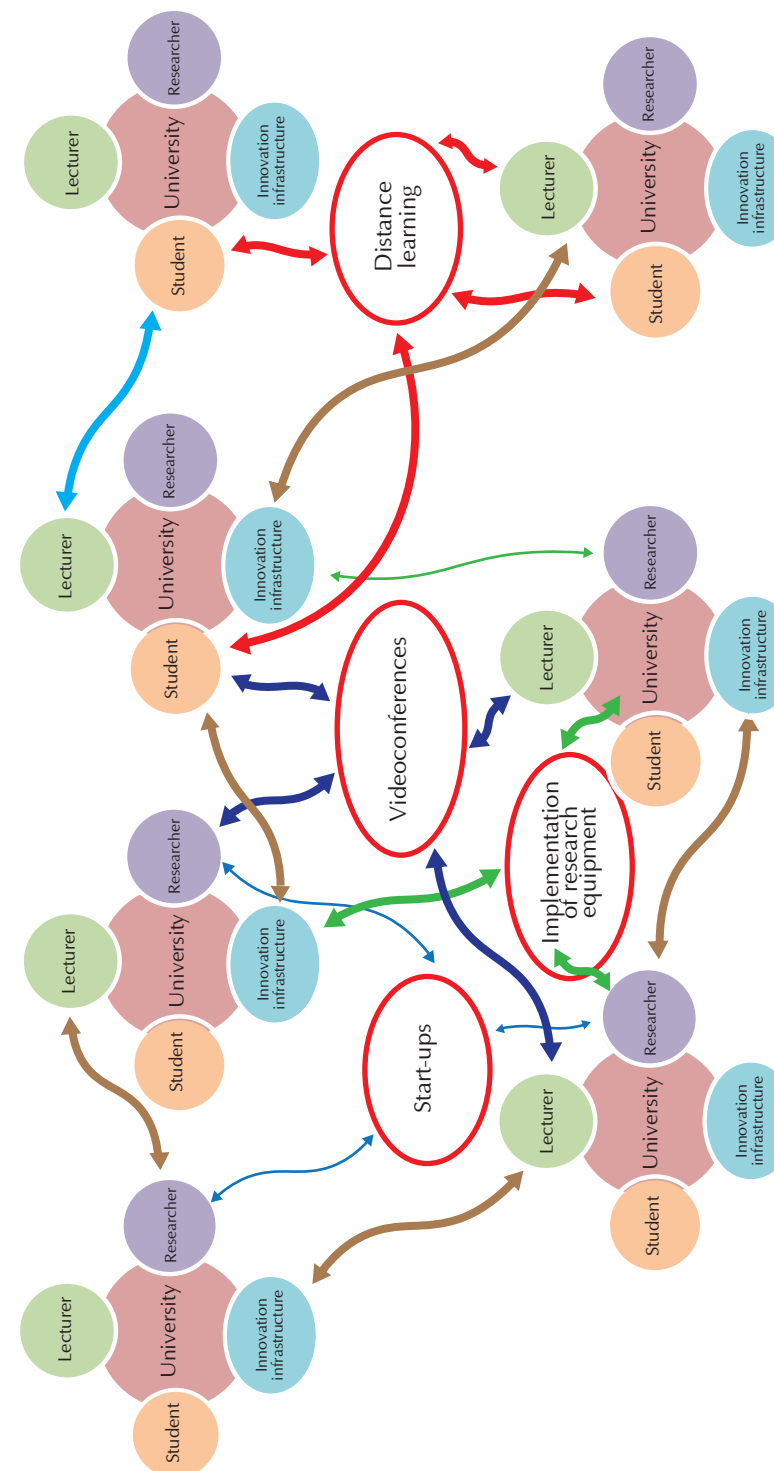
Fig. 1. Model of regional networking multi-core innovation- and educational cluster of the North Caucasian Federal District



space of the networking cooperation of the entire operation of this cluster. To intensify their efforts under the information- and education cluster, both management

and staff of these organizations must be involved in the network environment of the cluster. To achieve this, participants must have a corporate network environment

Fig. 2. Cooperaton diagram of macro-regional universities in education and research under networking innovation- and educational cluster of the North Caucasian Federal District



for all employees to be able to work on the networking basis. Most importantly, this internal network environment must be adapted to the cluster network environment.

The application of the proposed pattern of networking cooperation of micro-regional universities is also possible under previously generated educational clusters. In particular, "North Caucasus" Scientific and Educational Medical Cluster of the North Caucasian Federal District, which was created pursuant to the order of the Russian Federation Ministry of Health № 844 as of 26.11.2015 "On arrangement of work on generation of scientific and educational medical cluster" [5], would operate more efficiently if its members used networking information system of the innovation- and educational cluster. Networking cooperation can provide the following advantages for the cluster:

- shared library of information resources;
- distance learning of students;
- organization of online lectures of professors at several universities simultaneously;
- implementation of modules, which could help students choose professors in particular courses of study in one of the universities of educational cluster;
- possible involvement of therapeutic- and clinical centers in the educational process (e.g., live video feed of complex operations);
- possible selection of clinical sites for medical resident's practice.

This is an incomplete list of benefits that the scientific- and educational medical cluster of the North Caucasian Federal District would gain, if it were involved in the proposed model of networking innovation- and educational cluster. All the above- mentioned competitive advantages of networking cooperation of regional universities within the cluster are applicable not only to health cluster, but also to all universities of the North Caucasian Federal District.

Networking innovation- and educational cluster of the North Caucasian Federal District creates favorable conditions for education

modernization of the macro-region based on implementation of networking educational programmes, e-learning, distance learning technologies and remote operation.

The network approach to the development of the North Caucasian Federal District universities is currently a topical issue and it requires careful consideration. Participants of the interregional innovation- and educational cluster of the North Caucasian Federal District cooperate by the distributed virtual networking organization, which combines traditional and electronic forms.

The competitive development of universities of the North Caucasian Federal District is possible if the system of open education is in place. It is namely open educational technologies, networking cooperation between universities, academic mobility and introduction of distance learning in education that represent major tendencies of universities development.

The infrastructure of information- and communication system within the information- and educational cluster will also make it possible to reform university management system and to ensure transparency of management activities. Networking cooperation will promote more speedily interaction of the Board of Rectors of universities of the North Caucasus Federal District and could assist in holding conferences and meetings in the remote- and protected format.

Thus, the inter-regional innovation- and educational cluster acts as an institutional resource, which helps to upgrade organizational and economic system of the North Caucasian Federal District universities and to enhance efficiency of the innovation system of the regional economy.

The results of this study facilitate the realization of the project of generation of the distributed innovation- and educational cluster of the North Caucasian Federal District. The cluster in question provides for a distributed fourth generation-technopark and a virtual business incubator. In total, the project is 90% complete. Under the

project, professional social network has been created and is in operation. It provides a unique identification of the network participants. The project also involves a global innovation- and educational portal,

an all-Russian online community of college graduates and a system identification- and support of individuals with outstanding abilities.

REFERENCES

1. Savzihanova, S.Je. Rol' klastera v razvitii jekonomiki regiona i povyshenii ego konkurentosposobnosti // Rossijskoe predprinimatel'stvo. – 2014. – № 15. – pp. 95–102.
2. Nauchno-metodicheskoe obespechenie innovacionnogo razvitija obrazovatel'nogo klastera v uslovijah integracii nauki, obrazovanija i proizvodstva (dlja rukovoditelej, prepodavatelej i masterov proizvodstvennogo obuchenija uchrezhdenij sistemy professional'nogo obrazovanija, nauchnyh rabotnikov i aspirantov): nauch.-metod. posobie / R.S. Safin, A.R. Masalimova, R.G. Zjaljaeva, E.L. Matuhin; pod nauch. red. G.I. Ibragimova. – Kazan': Danis, 2014. – 109 p.
3. Sistema menedzhmenta dlja upravljajushhih kompanij innovacionnyh territorial'nyh klasterov Rossijskoj Federacii [Jelektronnyj resurs]: otchet / OAO RVK, NIU Vyssh. shk. jekonomiki, CSR "Severo-Zapad". – [M.: b. i.], 2014. – 250 p. – URL: http://www.rvc.ru/upload/iblock/946/201403_management_companies_clusters.pdf, svobodnyj. – Zagl. s jekrana (data obrashhenija: 11.11.2015).
4. Povestka razvitija innovacionnoj infrastruktury v RF [Jelektronnyj resurs]: rezjume dokl. Min-va jekon. razvitija i OAO RVK / A.E. Shadrin, E.B. Kuznecov, V.N. Knjagin in i dr. – [B. m.: b. i., b. g.]. – 25 p. – URL: http://www.engineering-info.ru/wp-content/uploads/2015/09/Povestka_razvitia_innovacionnoy_infrastruktury.pdf, svobodnyj. – Zagl. s jekrana (data obrashhenija: 11.03.2016).
5. Ob organizacii raboty po formirovaniju nauchno-obrazovatel'nyh medicinskih klasterov [Jelektronnyj resurs]: prikaz Min-va zdravoohraneniya Ros. Federacii ot 26.11.2015 g. № 844. – URL: http://stgmu.ru/userfiles/depts/cluster/Prikaz_844.pdf, svobodnyj. – Zagl. s jekrana (data obrashhenija: 11.03.2016).