

# Role of the Higher School in Formation of Regional Innovative Clusters

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## Article Info

Volume 81

Page Number: 3666 - 3671

Publication Issue:

November-December 2019

## Abstract:

Higher school and its resources play an important role in the effective and successful development of both regional and national economic systems. At the same time, we can say that there is a stable tendency to increase the importance of this role of higher school and its resources in the world community focused on the formation of the information society. This means that the higher school is no longer just a tool for the innovative development of national systems, but a tool for their strategic development, which determines the success of the development of social relations in all areas. Such an increase in the importance of higher education resources allows, in turn, talking about the need to coordinate and create effective mechanisms for regulating the development of the national higher education system and increase the social return on the use of its resources. This is especially true for the Russian Federation, which currently lags behind the advanced countries in terms of development and effectiveness of the applied use of the scientific and educational potential of the higher school, which, accordingly, does not allow it occupying a worthy position in the world markets and complicates the development of its economic system.

An extremely relevant task at the moment is the fundamental understanding of the place and role of Russian higher education in the current and promising processes of innovation of the socio-economic environment. An analysis of this kind is complex, difficult to structure, but it is extremely necessary to increase the efficiency of using the resources of higher education at the same time, as it allows correctly and in more detail understanding what society is seeking from higher education and what it is ready to provide for its development. This article is devoted to a partial solution of the issue posed. The authors reveal the fundamental foundations characterizing the peculiarities of positioning higher school as the core of emerging regional innovation clusters in it.

## Article History

Article Received: 5 March 2019

Revised: 18 May 2019

Accepted: 24 September 2019

Publication: 18 December 2019

**Keywords:** higher education, innovation clusters, higher school clusters, regional innovation structures, clusters of the "future", clusters of the "past", systemic transformations.

## 1. INTRODUCTION

High technologies that define the face of the post-industrial world are clusterization and cluster management technologies. Technologies of the “way of life” at the micro level or technologies of the “standard of living” at the macro level are the humanitarian technologies aimed at sociocultural mixing of the gene pool. This is the technology of anti-terror from the standpoint of view of national security, and the creation of nutritious innovative environments from the standpoint of transnational corporation. At the educational level, these are the technologies of reproduction and changes of the structure of their societies by elites.

Many industrial and pre-industrial worlds turn into working material for cluster construction: partly becoming the elements of supporting landscapes and metabolisms, and partly settling in the form of traditions and values of the past.

From the point of view of cluster operation, the functioning of modern post-industrial institutions is the maintenance of load distribution modes in global networks. In essence, it emerges a world super-system, the nodes of which are the innovation clusters. The development of ever new sections of the institutional landscape of the noosphere by this supersystem, known as globalization, determines the main direction of human movement in the current segment of its history. Crystallization of the new nodes of this computer occurs as a result of fierce competition both within clusters and between them.

At the cluster pilot level, competition becomes a battle of strategies. Virtual performance, embodied in the ideology of innovation, makes us consider the ability to rapid change as the only criterion for survival. In turn, the only tool to achieve the goal of survival - domination - is the ability to deploy technologies

over time, managing to integrate them into the emerging institutional environment.

Posteconomics, which is the successor to the economy of the industrial world, is becoming the strategic and infrastructural support of the "network metabolism" technologies. It is increasingly turning into a topology of financial flows captured by a particular mode of a given information and economic environment. The uneven saturation of these flows over different parts of the material landscape objectively leads to stagnation of a number of socio-cultural-economic areas, which are beginning to intensively develop the values of counter globalization in the form of chimeric clustering of their information flows, their layering on western clusters.

As for Russia, the basic invariant of its state development will be implemented at the present stage - a certain dominance of closed metabolism in the form of increased exploitation of some of its regions by others, with a prerequisite for information dissemination of this phenomenon through the mediation of the federal center.

## 2. METHODS

Considering a higher school as a resource of a region, it is necessary to realize that a higher school in a region is not a relatively independent system [1, 2, 3]. It is an active link in more global systems - national, continental and world as a whole. Moreover, we can say that the “nesting effect” of subsystems significantly determines the development of subsystems by creating a certain “corridor” of opportunities for them.

Thus, if we consider higher education from the point of view of its scientific development, the modern world is the result of technogenic development of mankind, which determines, respectively, the technogenic direction of world science, on the one hand, and its technogenic conditionality, on the other hand.

When moving from the world science system to the level of national systems, for example, we can say that the humanistic values of global science are undoubtedly transferred to the national level: many countries deliberately limit research in the field of nuclear and bacteriological weapons, in the field of cloning human genome or in the field of fascist ideology; these same countries are actively trying to oppose those who pursue anti-human values. At the same time, there are various areas of scientific and educational activities, the development of which is stimulated by the world community, which is associated primarily with the solution of various kinds of environmental problems and the future development of mankind.

The "nesting effect" of higher education systems is also present in the education system: there are some general principles of education that are interpreted in different ways, taking into account the cultural and historical features of national communities - first at the national and then at the regional and municipal levels.

As a result, we can talk about the regional system of higher school not only as an element of the global scientific system, but also as a somewhat separate structure with its specific features. The same processes occur within the regional system of higher school: the higher school in the region is divided into various directions, which begin to function to a certain extent independently of each other. We can also say that clustering processes are inherent in higher school and that the regional system of the Russian higher education is a combination of innovative educational clusters forming the corresponding regional cluster of the national higher school system.

### 3. RESULTS AND DISCUSSION

Drawing an analogy with the industrial clusters, the higher school clusters can be determined using the following basic features.

1. Spatial concentration: this factor provides wide possibilities for removing the space-time barriers arising from their professional communication and joint activities for the representatives of higher school (scientists, teachers, students).

2. Sociocultural proximity of economic agents, which ensures the formation of uniform rules and principles of behavior: it is obvious that each community has its own value systems and its own vision of the priorities of systemic structural development; therefore, if a violation of this condition is observed, it is impossible to talk about the possibility of effective interaction in the field of creating a high-quality scientific product that expands the innovative potential for regional development.

3. Intensive vertical and horizontal scientific and economic relations: the scientific community is a unified system only if the formation of developed relationships between the system elements is observed and there is an intensive intra-system information exchange inside this system. Of course, we can talk about intensive cooperation only when the scientists and specialists are engaged in solving similar problems. Moreover, when it comes to solving problems related to industry (i.e., solving some practical problems), we shall be aware that there is an increase in the need for interaction between the scientific and industrial clusters (which, obviously, implies at least the presence of consistent structural foundations (relationships) of these cluster systems) with the formation and development of industrial clusters.

4. Joint activities of public and private institutions that provide support for the functioning of higher school in this region: higher school is an institute engaged in science and including not only universities and research institutes, but also other (including private) organizations engaged in innovative and

educational activities, as well as various state and non-state funds stimulating the development of science and education in the region (country). Higher school is a system that covers a significant number of diverse participants, which means the need to form mechanisms for their effective interaction in order to accelerate the pace and improve the quality of innovative processes.

All the above features are in many respects inherent in regional systems of higher school. This suggests that it is possible to form typical regional innovation clusters that characterize the most important structural and functional features of a regional higher school. At the same time, the concept of “cluster” can be replenished by highlighting the core in it - those structure-forming elements of the cluster forming its frame and ensuring its integrity and dynamic stability.

In fact, the “core” of the innovation cluster is the “generator” of scientific, innovative and educational activities [4, 5]. Obviously, the cluster core shall represent such an institutional element (i.e., some organization) having leadership qualities, namely: 1) the “opinion” of this organization is significant for other cluster elements; 2) this organization has a significant level of professional training, which is higher in comparison with other cluster elements; 3) the organization has a certain potential, sufficient to defend its own interests.

In practice, such “core” of the innovation cluster can be represented by the “state universities, because the main bases of scientific knowledge and teaching methods have been historically accumulated in the system of universities first of all” [6, 7]. On this basis, it is this category of higher education institutions that determines the fundamental structure for the implementation of fundamental scientific research. All other innovative organizations do not possess such scientific multilateral potential and

actively use the potential of universities in the course of their professional activities.

The most important element of the cluster of higher school is research and design centers in the territories [8, 9]. Despite the fact that they do not specialize in the formation of human capital, the quality and orientation towards promising scientific and technological shifts on their part determine the “depth” of the generated knowledge with its subsequent transformation into a practical environment.

The activities of innovative firms are primarily applied in nature. Practical knowledge, undoubtedly, also has a value, although it relies heavily on the fundamental basis that is being formed in the systems of universities, research institutes, and design centers. However, the importance of innovative firms for the development of higher school clusters lies, first of all, in the fact that they form an effective metabolism of the cluster system, ensuring the cluster “survival” by transforming the input flows (resources that the cluster possesses (practical and theoretical knowledge, human capital)) into output ones - the results of research products.

In a concentrated form, the structure of the regional cluster of higher school is presented in Figure 1.

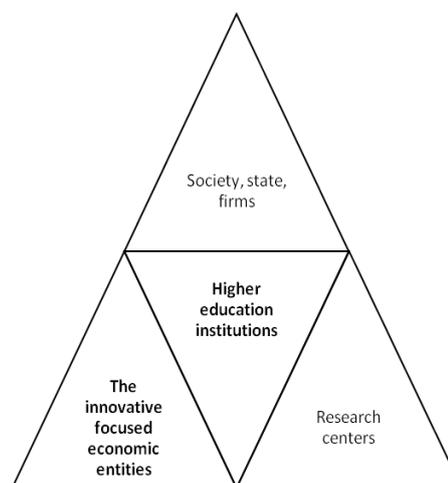


Figure 1 - Organization of the higher school cluster

It is obvious that there are other elements in addition to the elements presented above, which determine the framework of the higher school cluster. It should be emphasized that this kind of elements cannot be classified as system-forming, but rather, as auxiliary system (financial institutions, government bodies) [6].

#### 4. SUMMARY

Such a general idea of the place of higher education in regional innovation structures allows highlighting the following advantages arising from the systematic use of regional resources in the framework of the formed cluster systems.

1. Lower transaction costs. On the one hand, a cluster implies a certain geographical proximity of all the elements that make it up. On the other hand, any cluster has its own specific industry scientific specialization (for example, a petrochemical cluster).

2. Relative stability of the order system, which is determined by the proximity of producers and consumers of the results of scientific and educational activities.

3. Specialization of the regional cluster of higher school. The concept of "specialization" implies the selection of certain areas of scientific activity, which stimulates the growth of the quality of generated knowledge, education and the degree of fundamentality of these types of activities within the identified areas. At the same time, the process of regional clustering of higher school makes it possible to increase the growth efficiency of the "quality" of knowledge, which is achieved not so much due to ever-increasing specialization (which narrows the "range of opportunities"), but due to the close and intensive cooperation of research groups within the high school cluster (the so-called "collaboration").

4. Financing. Systematization of relations between financial institutions and research groups,

existence of a stable consumer system and close cooperation with them in the process of preparing and implementing the "order" allow talking about the possibility of a growing interest of financial institutions in participating in the innovative projects, reducing their risks due to greater participation in these programs and due to the formation of a project portfolio system.

5. Increase in the importance of higher school products for public systems in the region. Society, regional or nationwide, has its own development priorities. Clusterization of higher education allows, through the participation of state institutions in the development and functioning of cluster systems, adjusting the development of higher school clusters from the point of view of their compliance with the priorities of regional and national development.

We can continue this list of advantages obtained by higher education due to the processes of increasing their heterogeneity and subsequent clustering. At the same time, fundamentally all these advantages can be formulated in terms of "savings", arising from the use of more effective schemes for organizing regional innovative resources, by highlighting three basic groups: internal savings (formed as a result of increased efficiency in the use of human capital); savings resulting from the generation of localization effect in the clustering process; saving regional costs as a result of reducing transaction costs of enterprises and organizations united in a cluster.

#### 5. CONCLUSIONS

In general, it is possible to distinguish clusters of the "future" and clusters of the "past" in the system of regional school. Clusters of the "past" are primarily aimed at maintaining the competitiveness of those sectors of the region's economic system that are currently "cash cows", and the resource of their social significance and economic profitability is close to exhaustion.

Obviously, such clusters of higher education have a certain current financial well-being. However, the establishment and development of economic "stars" - areas that are able to ensure the economic well-being of the regional system in the future - is extremely important for successful regional development. It, accordingly, creates the need for the development of intensive clusters of the "future" that would generate "future technologies". These innovative clusters are currently largely unprofitable and require significant resource costs. It is possible indeed that the state shall bear the burden of such costs as a representative of the strategic interests of the development of regional and national systems. For this reason and because the clusters of the "past" have no development prospects within the framework of the implemented scientific (and economic) directions, the best solution is most likely to create clusters of the "future" on the basis of clusters of the "past" by transforming the latter.

## 6. ACKNOWLEDGEMENT

This work is performed at the expense of the subsidy allocated to Kazan State University for the fulfillment of the state task in the field of scientific activity (No. 26.9776.2017/BCH (Russian: 26.9776.2017/БЧ)

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