

Regional educational system: prospects for regional university

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Abstract - The article deals with the aspects of the interaction of regional research and education system with the external environment: cooperation with universities and Academy of Science). It clarifies the role of regional research and education system in shaping a culture of innovation, and pay attention to the multidimensional process of formation of this type of culture in the region Changing approach from "passive" participants to "active" agents of the regional economy is a result of understanding the external challenges facing the Russian economy. Development of regional research and education system has to depend on the requirements of the regional economy, and the need to produce a specific resource region. This can significantly change the "map" of education and science in the region thus it is an important issue for regional universities.

Keywords - regional educational system, innovation transfer in region.

I. INTRODUCTION

Much of attention is paid to the theory of the regional innovation system in modern economic papers that devoted to the regional development. Regional innovation system (hereinafter - RIS) is "a set of nodes in the innovation chain, that includes directly generating knowledge of the company, as well as organizations, enterprises that use (apply) this knowledge, and a variety of structures that perform specialized mediation functions: support for infrastructure, financing of innovative projects, their market expertise and political support".

An analysis of RIS models showed that almost all of them are represented by an innovation chain, in which institutional relationships are presented sequentially. Actually, the first element of this chain is generation, transformation and translation of knowledge, and the final stage is the implementation of innovative products on the market. Thus, the main structural elements of RIS (as well as in the national innovation system, hereinafter NIS) are the state, business and educational institutions of the region as creators of intellectual human capital.

NIS is dealing with a set of universities and other higher education institutions, that is influenced by the state education policy, the historical development of the education and science, government policy regarding the interaction of universities and business community, etc. So,

there is a general vector of the development of the university infrastructure (with the whole variety of types and categories of state universities and other agents of the education system) on the national level.

Moreover, the structure of the national innovation system should focus increasingly on the production of innovations in the regions if we understand NIS and RIS as a structural non-linear model with a specific set and interrelation of institutions. In turn, the system of interrelated institutions in RIS could be understood as economic agents (enterprises, scientific organizations, universities, funds, investors, etc.) as well as social values, norms, a legal system based on regional specifics.

It seems that it would be correct to name the element "generation, transformation, and translation of knowledge" as the term "regional scientific and educational system". Thus, we are talking about the subsystem in RIS that is specifically designed to encourage and enhance the creative abilities of the individual.

Combining this element into a complex system consisting of a set of interacting components (subsystems) we apply a systematic approach to the study of RIS. In this case, we apply the principle of hierarchy of the system, i.e. when part of the system can be recognized as a specific system, or when each component of the system can be considered as a system. Very often an element of "knowledge generation" is presented with separate subelements: "education" and "fundamental science" and we consider this approach as wrong.

The need to maintain consistency in the approach to the investigation of RIS is obvious. Its subelements are highly connected and the inefficiency of any of them leads to the dysfunctionality of the system itself. Ineffective approaches to the development of secondary education system have led to an increase «mass effect» for higher education and to decrease of quality of higher education. The decrease of the quality of school education led to a loss of the quality of applicants and a further reduction of the quality of higher education (according to sociological research, 40% of university's success depends on the quality of students [1]).

II. RESULTS AND DISCUSSION

A. Terminology

The term "regional scientific and educational system" means the totality and unification of educational, scientific and research-educational institutions of the region on all levels.

Its structure and model itself will play an important role in the formation of the policy of "regional inequality" leveling out. We consider it as the main factor in leveling shortcomings and enhancing the region's competitive advantages by generating and incrementing human capital, developing regional infrastructure, institutions of the regional innovation system (factors of *second nature*).

The main economic function of the regional research and education system is to support the regional talent fund and to provide regional labor markets for new jobs with high-quality human capital.

This economic system, with a favorable approach and its development, should lead to fundamental changes in the regional labor market, the organization of society, and influence the problem of solving regional inequality (which will be discussed in further our research). The main goal of the system is education, but the specificity of the modern education paradigm is to teach not to translate knowledge but to learn the ability to generate knowledge.

Corporate training programs and corporate training courses are also proposed to be considered as a subsystem in the regional research-educational system. Do not forget that the carrier of human capital is often characterized by mobility in its work path, i.e. he inclines to change jobs. In the process of so-called "diffusion of knowledge" it happens when a carrier either shares its knowledge or adapts it to new conditions and thus the society (not only the carrier itself) gets new knowledge, skill, ability, useful for society.

B. Regional research-educational system and culture of innovation

The proposed and implemented reforms of the national education system seem to forget about the main postulate - the quality of the knowledge produced is determined by the social conditions of its emergence. So if we are talking about the need to build an education system in a way then specialists have sufficient capacity for creative and creative thinking, the ability, and - that is most importantly - the desire to participate in the creative process, then we should talk about the creation of relevant social and cultural environments.

What we have to consider primary for innovative creation? Social and cultural environment or technological changes in society? We must accept the long-established truth that there are so-called social and cultural environment forms "Culture of innovation". The latter participates in the process of concentration of a certain critical mass of the qualitative human capital of society for the generation of a qualitative leap in the technological development of society.

R. Florida, in his book about the creative class [2] gives the results of Simonton's research on creativity. The latter discovered that "the creativity is developing most rapidly in those places and in those periods that are characterized by

the following four characteristics - core activities, intellectual susceptibility, ethnic diversity and political openness".

Many examples of the development of creative zones with a successful history of the commercialization of science, such as Silicon Valley or 71 quarter in Singapore, proof the proposed theory. Universities offer - within the framework of existing concepts of regional innovation systems - not only the territory itself for hosting high-tech or innovative companies. This territory is distinguished by corresponding social and cultural environments for the support and implementation of the "culture of innovation" including the above parameters.

It is curious that in the situation with the Soviet Union and its scientific breakthroughs, there is no parameter of *political openness* (due to the political conditions). However, despite the same huge losses (human, financial, infrastructural) as a result of the Second World War, the fourth part of the scientific discoveries and inventions of the period 50-60 years of the XX century had fallen in the USSR. Of course, this success was the result of a number of cumulative factors, which include:

- an intellectual breakthrough of the Russian Empire of the beginning of the XX century [3];

- the positive effects of the industrialization in the 30s [4];

- developed military industrial complex of the USSR and industrial espionage as a result of the opposition of the USSR, the USA and other capitalist countries.

Separately, it should be noted among the following favorable factors:

- development of engineering and technical education in the period of Soviet Russia and the USSR. The growing prestige of engineering specialties (which were historically considered to be elite professions both in the Russian Empire, and in Soviet Russia, and in the USSR) [5].

Partial data on the number of students in the USSR are given in Table 1.

TABLE I. QUANTITY OF STUDENTS IN THE USSR BY SPECIALIZATION (IN % AMONG TOTAL QUANTITY):

Specialization	1960-1961	1970-1971	1980-1981	1985-1986	1986-1987
Engineering	40.3	43.6	44.8	42.9	41.9
Economical	9.1	11.8	12.2	12.8	13.8
Law	1.7	0.9	0.8	0.8	0.9

For comparison, we present the following table showing the decline of elitism in engineering and technical specialties beginning in the 1990s. At the same time the percentage of students in economics and other humanitarian specialties was growing [6]. This led to the «massization» of these specialties (as a result to lose the quality of education of these specialties, "inflation of specialties") and oversaturation of labor markets, including regional ones.

TABLE II. QUANTITY OF GRADUATES OF STATE UNIVERSITIES BY SPECIALIZATION (IN % AMONG TOTAL QUANTITY)

Specialization	1990	2000	2005	2008
Economical and management	13.8	44.3	29.9	32.0
Engineering	36.4	22.6	22.2	21.6
Social and law	12.2	17.7	16.0	16.8

TABLE III. QUANTITY OF GRADUATES OF NON-STATE UNIVERSITIES BY SPECIALIZATION (IN % AMONG TOTAL QUANTITY)

Specialization	1990	2000	2005	2008
Economical and management	22.4	25.8	44.4	47.7
Engineering	-	-	-	-
Cybernetic science	No data	No data	0.5	1.2
Social and law	17.1	28.8	32.5	28.6

The attentive state support (financing, high wages, social benefits for scientists and teachers, inventors, etc.) contributed to the formation of the social and cultural environment as supporting areas for the culture of innovation.

Moreover, in the USSR there was a system of vocational guidance for young people with the developed infrastructure of numerous clubs and schools [7]. In addition to the established connection of industry and branch research institutes the system of local innovation was actively promoted (until the so-called era of Taylorism when the creativity of the worker was restrained by the bureaucratic system).

Therefore, it is necessary to consider the social and cultural environment as a supportive environment for creating innovations [8]. At the same time social and cultural environments have a recursion - that is they reproduce themselves with new qualitative elements accumulated in the previous cycle.

A university, or a regional network of universities, is not in itself capable of providing full-fledged social and cultural environments (although universities are doing their best on innovative projects, scientific developments, etc.) [9]. It is also difficult to assign this mission to enterprises engaged in corporate scientific developments with own laboratories and research centers. We have already mentioned about "rule of 40" (the success of the university depends on the quality of students or school graduates by 40 percent), which means that only the holistic development of the regional science and education system is able to ensure the development of cultural and social environments.

C. Regional research and educational system: RAS and regional universities

Despite the existence of scenarios for the development of the territories of the Russian Federation and the development of regional human capital in the framework of the development of education and science, the question about the role of RAS departments in this scenario and the division of authority between the RAS and regional universities is opened [10].

The Federal Law "On the Russian Academy of Sciences, the reorganization of state academy of sciences and the

introduction of amendments to certain legislative acts of the Russian Federation" No. 253-FZ dated September 27, 2013 points to the scientific and methodological guidance of the RAS on educational institutions of higher education, while the legislator reveals the mechanism of such interaction. In the Law, there is only a reference to the obligation to send the relevant reports to the RAS [11]. There is the practice of creating joint laboratories, basic departments and research centres.

The issue of interaction and integration of academic and university science is really difficult for the regions [12]. In Soviet times three intellectual clusters were responsible for the development of higher education and science: the USSR's Academy of Sciences with a high level of fundamental researches and state funding, industry science with its proximity to industry and higher education with its highly qualified teaching staff.

When the behavior patterns of the economic agents of the Soviet economy existed, this system was quite effective. When we revise the role and functions of institutional areas, the internationalization of higher education, science and industry, the university has begun to unlock university and industry science, and universities with "National Research" status should also carry out fundamental research (according to their western types).

The functions of the universities with "National Research" status are also to interact with the government sector in order to coordinate and develop directions for the development of high-tech sectors of the domestic economy, thus we have indirectly reorganizing the outdated tradition of the vertical institutional matrix of education and science management [13]. Do the RAS functions have to go completely to this category of universities?

But the practice of «successful» regions shows that the integration of academic and university science is one of the factors for the effective development of a regional innovation system influencing the synergistic effect [14]. Fundamental science, as is known, is not subject to the mechanisms of a market economy, it is primarily aimed at expanding scientific knowledge, while applied science is integrated into a market.

The symbiosis of the RAS with fundamental science and the university plays the role of a cultural barrier for government itself and its attempts to make all scientific knowledge produced commercialized (when the demand for scientific knowledge will be determined solely by its good commercial perspective in a short time) [15].

In addition, historically RAS and branch research institutes were the centers of science. The system of higher education was primarily focused on the development of educational capital. The balance between scientific capital and educational capital seems to remain - universities are still more oriented to the educational process than to the scientific one. Firstly, the staff of universities is more focused on the educational process in view of the established traditions and work experience, secondly, the increasing academic load and its bureaucratic maintenance do not allow teachers to engage in science [16].

The situation with the integration of the institutions of science and education in the regional innovation system

raises another problem of a more global scale. The Soviet education system, of which we were all proud, is becoming a thing in the past. Education as a social good and science as a social institution must meet external challenges. However, copying of Western models of universities and education systems are so-called the catching-up model which basically has the reproduction of some institutional model.

This leads to the fact that the structure of the domestic university is not reformed, but it is adapted to some external standards. And this is a problem because science and education belong to the categories of public goods which means that the social conditions for the formation of educational and scientific capital affect the quality and specificity of these capitals as we can see by analyzing the "success stories" of various universities in the world.

In all cases the transmission of new knowledge and expanding the scope of activities is effectively supported by reforms of the internal structure of a scientific and educational institution which includes human resources with its established traditions, relationships, accumulated experience including historical. Therefore it is important to develop a clearer and more systematic mechanism for interaction between the Russian Academy of Sciences and regional institutions of higher education.

In modern conditions the competitiveness of the market subject depends on the ability to respond to the requirements of the knowledge economy. Knowledge, as is known, is a specific product, it has the ability to become obsolete quickly hence the speed of its exchange between market participants has a main factor. Reducing the "market" distance between participants in the knowledge economy significantly increases the useful properties.

There is another reason forcing to develop the discussed cooperation. According to Alexander Abramov, corresponding member of RAO, "one of the most serious problems of modern Russian society is that raising readiness for strenuous work and perception of learning as serious work fell out of the sphere of public and school attention" [17].

A regional research and education system is a full-fledged element in the region's innovation chain. Therefore it is necessary to take into account how the system participates in the «value creation» process as a source of knowledge for creating a new product or service.

Low indicators of direct cooperation between academic institutions and the business community could be explained by such factors as:

- business distrust of the academic community (the problem of "theorists" and "practitioners");

- low professionalism of representatives of academic institutions involved in direct cooperation with practitioners from business structures who understand the challenges of the market;

- lack of domestic historical experience of cultural and professional interaction of academic institutions and institutions of higher education with the business community in the framework of the commercialization of science. A corridor for joint applied research in domestic

practice existed with industry research institutes, and this apparently still continuing trend is noted in the table above.

Changing the approach from "passive" participants to "active" agents of the regional economy is a result of understanding the external challenges facing the domestic economy. The development of a regional scientific (research) and educational system should depend on the requirements of the regional economy and the need to produce a *specific resource* of the region. This can significantly change the regional map of education.

III. CONCLUSION

It is possible that the "redundancy" of some of the received specialties that are not in demand in the regional economy will lead to a reduction in them. This means we can get a restructuring of the organization structure of higher education institutions in the region, and best of all this will be done in an evolutionary way.

However the ratio of the specifics of the regional economy and its needs with the potential of the regional research - the educational system is necessary for the framework of the formation of the human (intellectual) potential of the region.

This article did not pay attention to other levels of education in the regional system of science and education but this would be somewhat beyond an idea of the article. Because the effects and problems of interaction of the RAS or business structure under consideration are most clearly manifested at the level of higher education in the regional scientific and educational system.

The study of the role of other levels will be considered in further works. Also point of interest is the further study of the Triple Helix model (university-state-business) precisely when expanding the active elements of this model to the element proposed in this article - the regional research-educational system..

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