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INNOVATIVE INFRASTRUCTURE AS ELEMENT ENSURING COMPETITIVENESS IN THE REGION (CASE STUDY: THE REPUBLIC OF MORDOVIA)

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ИННОВАЦИОННАЯ ИНФРАСТРУКТУРА КАК ЭЛЕМЕНТ ОБЕСПЕЧЕНИЯ КОНКУРЕНТОСПОСОБНОСТИ РЕГИОНА (НА ПРИМЕРЕ РЕСПУБЛИКИ МОРДОВИЯ)

The article studies the impact of innovative infrastructure onto the region's competitiveness. Competitiveness factors and conditions for efficient performance of an innovative infrastructure are addressed in the case study of the Republic of Mordovia.

COMPETITIVENESS. INNOVATIVE INFRASTRUCTURE. INNOVATION POTENTIAL. INNOVATION DEVELOPMENT.

Рассматривается влияние инновационной инфраструктуры на конкурентоспособность региона, а также факторы конкурентоспособности и условия эффективного функционирования инновационной инфраструктуры на примере Республики Мордовия.

КОНКУРЕНТОСПОСОБНОСТЬ. ИННОВАЦИОННАЯ ИНФРАСТРУКТУРА. ИННОВАЦИОННЫЙ ПОТЕНЦИАЛ. ИННОВАЦИОННОЕ РАЗВИТИЕ.

The fact that Russia has joined the World Trade Organization makes provision of nation competitiveness an especially important task. Currently, Russian economy is mixed (the elements of the advanced, sixth mix are now appearing in a number of industries; however, the fourth and, in some industries, fifth mix prevail), and unequally developed, which brings specific features when solving this problem.

There are a lot of approaches to define the concept of *competitiveness*. On the whole, one can define competitiveness of a certain object (product, service) or business system (company, region, national economy) as its capability to compete with other similar objects or systems in the market. In this aspect, a national economy's competitiveness is characterized by the competitiveness of regional economies. The latter ones act as structural elements of the national economy. In its turn, competitiveness of a region's economy depends on competitiveness of territorial economic systems, both industrial and inter-industrial ones (clusters) [1, p. 9].

When analyzing competitiveness, one has to consider the industrial structure of an economy.

According to major classifications, basic sectors of economy include agriculture, raw materials industry, processing industry and information technology sector, i. e. all industries producing goods that can be potentially traded in the global market, which is why they frequently work in the conditions of real competitiveness. Supporting sectors are market service industries, including ones which ensure distribution of goods (wholesaling and retailing), support production (business services) or produce such goods and services that can only be sold in the local market (construction, real estate, hospitality, restaurants). Infrastructure sectors primarily comprise non-market services and production, particularly public administration, education, health care, transport and communications.

The analysis of the Russian economy growth by industrial sector groups within the period of 2003–2009 shows that the sectors with higher competitiveness grew more quickly (Fig. 1).

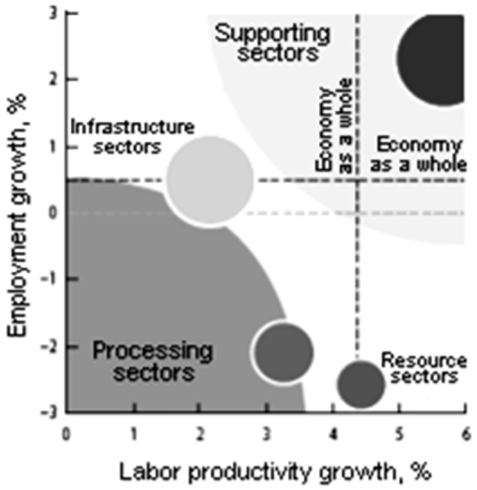

Fig. 1. Dynamics of employment and labor productivities by industrial sector groups, 2003–2009 (average annual growth rates, %).

Processing sectors form the basic industrial group in the economy of Russia. Source: [2].

From the perspective of the strategic management approach, provision of competitiveness, in the long term run, can be seen as one of the major goals on which the development strategy of any economic entity is based.

Global economic organizations, such as World Bank, World Economic Forum, estimate the competitiveness of a country on the multitude of criteria, distinguishing between 12 components of a national economy's competitiveness [3] (Fig. 2).

In addition, competitiveness of a country implies the multitude of institutions, politics and factors which define the productivity level of the country.

A country's competitiveness is evaluated as a result of interaction of the aforementioned factors, specific features of economic and political environment, organizational capabilities and efficiency of the economy's and its business entities' functioning mechanism. Global competitiveness index is calculated on the result of the competitiveness factors' evaluation.

According to the assessment of Russia's economy development parameters, it took 63rd place among 139 national economies that were assessed in 2010-2011. On the average scale, Russia falls behind both OECD countries (on the 7 score scale, the global competitiveness index of Russia is 4.2 whereas that of OECD countries is 4.9) and BRICS countries (4.4). In comparison with the previous year the results of Russia did not change. Before the crises, the country's results had improved considerably (51 place in the rating of 2008–2009), but in the post-crisis period the situation has worsened again. Russia still belongs in the group of countries whose economy is based on efficiency factors, but it is more like an outsider rather than a leader in this group.

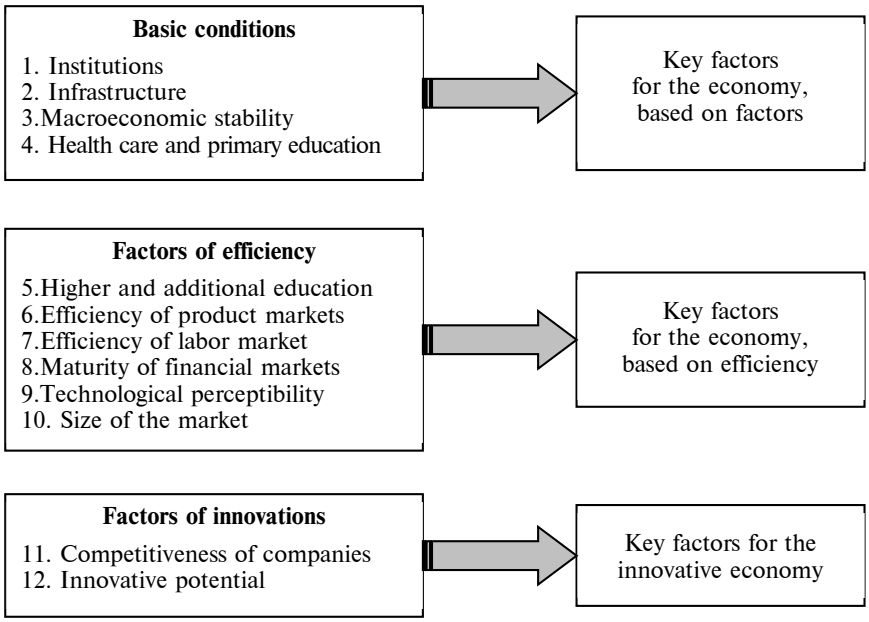

Fig. 2. Twelve components of a national economy's competitiveness

One of the major strengths of Russian economy is the fact that it is rich in many natural resources: oil, gas, coal, precious metals and agricultural lands, forests and water resources. Russia is the biggest exporter of mineral fuel and oil products (in 2009 Russia's share was 10.6% of the global market). The country also owns 8.4% world's water resources, 8.1% farm land and 23% forest cover.

Abundance in natural resources is, probably, one of the key reasons why the regions of Russia are developed unequally. Regional specific features include the mixture of natural, economic, social, culture-historical and institutional conditions which exist in a region and make it different from other regions. From the economic standpoint, the specifics of the region is not so much about its relative independence as an economic entity but the way for special distribution of macro and microeconomic parameters (average and maximum costs of factors of production, prices, welfare, services, incomes, savings, employment, etc.) [1].

To increase the competitiveness level it is necessary to expand competitive advantages of definite regions, taking into account their specific features. The condition of regional economy, socio-economic situation in the regions define, to a large extent, the position of the country as a whole.

A region's general competitiveness can be determined on the basis of the notion which A.Z. Seleznoyv suggested [4, p.30]: competitiveness of a region is the position (which is dependent on economic, social, political and other factors) of the region and some of its manufactures in domestic and foreign markets which is reflected through indexes (indicators) that adequately characterize such a condition and its dynamics. Since competitiveness characterizes capabilities of a region to compete successfully with other regions in terms of resources, investments, product markets, the general approach is based on the system of individual potentials. Thus, according to the methods of the rating agency *Expert – RA*, the investment rating of a region (which is, in our opinion, an important characteristic of competitiveness – the higher the investment rating is, the easier it is for the region to invest resources for development) comprises the investment potential and the level of the related investment risk [5]. The potential shows the share of the region in the Russian market, whereas the risk characterizes the scale of problems that investors may encounter in it. Each of these synthetic parameters, in their turn, is described with the system of individual measures (table). Every individual potential or risk is characterized with a specific group of indexes.

Region's Investment Attractiveness Components

Parameter	Individual Measures	Impact on Competitiveness
Investment potential	Labor potential	Strengthens positions in the labor resource market
	Financial potential	Allows acquiring absent competitive positions
	Production potential	Strengthens positions in product market
	Consumer potential	Strengthens positions in domestic market
	Institutional potential	Allows creating tools to reach competitiveness
	Infrastructure potential	Allows creating infrastructure to reach competitiveness
	Natural resources potential	Strengthens positions in the resource market
	Tourist potential	Creates specific advantages in domestic and foreign market
	Innovation potential	Creates steady competitive advantages
Investment risk	Financial risk	Risk of financial provision when creating competitive advantages
	Social risk	Social strain risk
	Management risk	Inefficient management risk
	Economic risk	Economic inefficiency risk
	Environmental risk	Risk of adverse ecological situation
	Criminal risk	Risk to competitive advantage creation, risk of uncontrollability

Since steady competitiveness can be based on a broad multitude of competitive advantages [2], it is important to develop different individual potentials. However, innovation potential is top priority, as it is a basis for a number of competitive economic industries. Due to dynamic development of innovative production it is possible to build up competitive advantages in the regions without considerable resource-based or labor potential.

In this case, a region is seen as a place where innovation active companies are concentrated. Therefore, it is essential to strengthen interaction between companies, universities, research centers, small and big businesses located in the region in order to build up long-term competitive advantages on the basis of regional intellectual resources.

The problem of assessment of Russian regions' innovation potential has been studies by different authors. Thus, the paper [6] studies the innovative potential of the regions. The authors of the project *Innovation Development Strategies – Innovative Russia – 2020* [6] also point out successful innovation-active subjects of the Russian Federation (regions) and refer to them St. Petersburg, Novosibirskaya Oblast, Tomskaya Oblast, the Republics of Tatarstan and Mordovia.

Innovation potential of the regions cannot be developed if key elements of innovative infrastructure are not built up. These key elements include technological transfer centers, technology parks, innovative technological centers and venture capital firms. Innovative infrastructure is the basis for innovation potential to develop, which enables to boost other potentials of regional competitiveness: human resources, financial, production and investment potentials (Fig. 3).

Today, the most developed – from the standpoint of innovation potential – Russian regions have all essential elements of the innovative infrastructure. Thus, since 2002, 13 offices of technology commercialization have been created in all universities and research institutes in Tomskaya Oblast. A design technological business incubator has been set up under Tomsky Polytechnic University, where more than 86% of companies implement projects directly related with development and introduction of new technologies. In Kaluzhskaya Oblast four innovative business incubators operate and they function effectively, which means that tax revenues flowing into the region's budget from the companies located in the business incubators fully cover the costs paid from the Oblast's budget for setting up such structures [7].

The problem related to the assessment of performance of the regional innovative infrastructure is rather new for this country. Earlier, major efforts – both at the federal and regional level – were directed on creation of different elements to support innovation activities. As a result, the key elements of the regional innovative infrastructure have been created in Russian regions. However, as a whole, the performance of these tools remains low in the country.

When assessing the performance of a region's innovative infrastructure the multidimensionality of this notion has to be taken into account. An innovative infrastructure has to meets the needs of different stakeholders:

regional government agencies;

region's businesses;

innovative infrastructure organizations, etc.

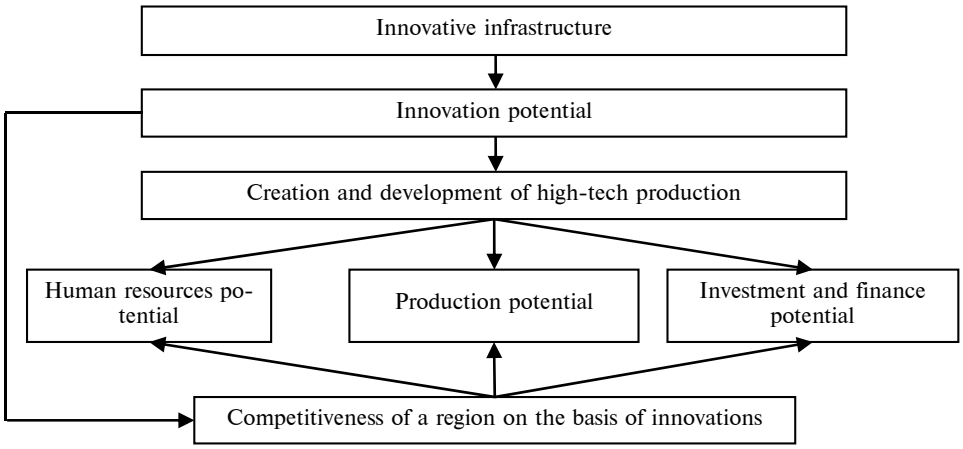

Fig. 3. Innovative infrastructure in the formation of region's competitiveness

Correspondingly, innovative infrastructure efficiency, $E_{R\&D}$ can be measured as:

$$E_{R\&D} = f(E_{\text{org.}}; E_{\text{business}}; E_{\text{II}}),$$

where E_{org} – organizational efficiency, characterizing the impact the infrastructure organizations make on the region's innovation development indexes; E_{business} – economic efficiency (profitability) of innovation-active businesses in the region; E_{II} – economic efficiency of the innovative infrastructure organization in the region.

The first index is dynamic and can be measured by the dynamics of the innovation activities in a region versus other comparable regions. The other two indexes can be measured by the profitability indexes of companies and innovative infrastructure organizations.

It is worth mentioning that there is no satisfactory statistics which permits analyzing and comparing indexes of innovative infrastructure development between each other. Research has been carried out in the USA and European Union [8], as for Russia, no consolidated research has evr been done.

Moreover, there is no entrenched opinion about what is the right way to define how efficiently certain elements of an innovative infrastructure function – technology parks and business incubators [9]. This can be explained by diversification of their forms, missions, lines of business and functions. In addition, research [9] says it is impossible to develop unified approaches to assess how efficient these elements of an innovative infrastructure are because of different missions they strive for.

The aforementioned makes it justifiable to use a benchmarking approach when assessing how efficiently a regional innovative infrastructure functions. Benchmarking becomes the most important stage in innovation diagnostics, which is a process when goods and business practices of a company are compared to those of competitors or leading companies in other sectors in order to search for means to increase quality of goods and efficiency of a company. When it comes to technology parks and business incubators, we can say that with benchmarking it is possible to find ways to excel their activities, which will result in their stronger role in the regional system of innovation generation, support and maintenance.

Applying benchmarking approach and analysis of practices in the best innovative regions we can say that some factors are crucial for innovative development, such as: presence of universities in the region which perform as knowledge generators and labor suppliers for innovation active business; interest of the region's companies in innovation development and investments in innovation; government support and intensive chain interaction between stakeholders involved in innovative activities [10].

We have to say that creation of an innovative infrastructure in regions which do not have considerable natural resource or production potential is important not only for their innovation development, but also for their competitiveness as a whole.

The Republic of Mordovia is one of such regions in Russia. The region does not have rich natural resource reserves and its strategic production sectors are considerably less developed comparing to the neighboring subordinate entities of the Federation. In the rating of investment attractiveness of 2012, the region takes 67$^{\text{th}}$ position by investment potential and 63$^{\text{rd}}$ position by investment risk, belonging among the group of regions with insignificant potential and moderate risk. However, positions of the region are much better by innovation and infrastructure potential (43$^{\text{rd}}$ and 38$^{\text{th}}$ places correspondingly). Mordovia was one of the ten innovative regions of Russia until 2012.

The strategy of socio-economic development of the Republic of Mordovia up to 2025 defines, as the major development goal of the Republic of Mordovia, increased competitiveness of the region due to innovation sector of economy and improved quality of life of its population [10].

Today, the major lines of development for the economy of Mordovia are to boost innovative activities of companies, increase production (primarily – high tech products), saturate the market with up-to-date competitive products, improve research and development potential of the companies, create export-oriented and import-substituting productions, strengthen material and technical facilities in all sectors of the economic complex. They also work to form elements of the innovative infrastructure: a business incubator for small businesses has been built up, a venture capital

fund has been set up on the principle of private and public partnership, a guarantee fund for small business support has been created, a decision has been made by the Russian Federation Government to found in Mordovia a technology park in the field of high technology, a number of consulting organizations have been set up.

Even though scientific and innovative activities are activated, the republic still lacks consistency in the subjects of innovative activities, efficient interaction between innovative process stakeholders, information and communication technology is used poorly when implementing innovations, there is lack or inconsistency in the elements of the public system which support research and development and innovative activities at the regional level. So, as to improve the situation in this field an effective innovative infrastructure has to be created in the region.

Currently, the innovative infrastructure of the region is mostly concentrated in Saransk and it is built on the basis of the National Research University named after N.P. Ogaryov and a high technology park, which is now being created. The most important element of the Technology park is meant to be Innovation and Industrial Complex, which is built on the basis of the Research Institute of Light-Emissive Device named after A.N. Lodyguin and which include companies involved in projects related to development of materials and components of electronics and element basis for information and communication technology.

This complex is designed to boost the development of innovative and industrial clusters of the republic and federal significance. They include: electronic device production on the basis of silicone carbide and gallium arsenide, optronics, energy-efficient devices, among them the ones on the basis of bright LEDs.

However, the construction work in the technology park has not been finished yet and the efficiency of this project can be assessed only in its future perspective.

As of December 2012, the region lacks innovative companies with dynamic development [10][1]. A considerable part of projects in the republic is oriented on the neighboring regions, which are more developed from the industrial standpoint, such as Nizhegorodskaya Oblast, the Republic of Tatarstan.

Apart from the aforementioned elements of the innovative infrastructure, the region also has 12 innovation and technology centers, a transfer technology centre, a regional venture capital fund.

In order to improve efficiency of the innovative infrastructure and provide innovation development in the region it is essential to focus efforts on the elements which are still missing and which should guarantee:

support and provision of funding for the innovative projects, located in the "poison valley" (projects at an early development stage, which require investing in the amount between 2 and 25 million rubles). According to the calculations made by the agency *Expert – RA*, the availability of funding which regional innovation programs provide for innovative companies (including regional venture capital funds) was between 2% and 20%, which is much lower of the similar index in Europe and the USA (between 45% and 60%) [11];

competition support for the already existing innovation companies, which is designed to increase efficiency of RIS. Currently, such subsidies are distributed proportionally between all companies which apply, i. e. distribution of subsidies does not have economic feasibility. As for funding of the innovative infrastructure elements that include technology parks and business incubators (built at higher institutions of the technology commercialization centre and, as a rule, financed from the funds of the federal budget);

The business incubator at the National Research University named after N.P. Ogaryov, in Mordovia, mostly include companies which has been set up in accordance with law 217-FZ. Their number, due to objective obstacles which are related to registration of such companies, is not big and there is no multiplication effect. It is necessary to improve openness of the regional innovative infrastructure elements and to create comprehensive system for research, support and training of entrepreneurs in the innovation field. This system must not be limited to start-ups or development of small innovation business, but

[1] None of the companies of the region is in the rating of 100 innovation active middle companies

must embrace, as well, search for innovation inside businesses, favorable environment for generation of innovation in the existing companies.

So, the increased efficiency of the innovative infrastructure is going to favor the innovation development of the region. For such regions as the Republic of Mordovia, where innovation potential is pulling off other competitiveness components, this line of activities becomes a considerable reserve to increase competitiveness.

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