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CONFERENCE PROCEEDINGS CONTENTS

SECTION ECONOMICS AND TOURISM

PATTERNS OF DIFFERENT ECONOMIC SECTORS DEVELOPMENT FOR FORMATION OF NEW INDUSTRIES

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ABSTRACT

The process of forming new industries contributes to the resource region's promotion to a higher level of competitiveness.

A wide range of strategic analysis tools was used to develop an algorithm for territorial and sectoral development based on two major global trends. They are the transformation of production and technological chains, and new organizational forms of regional development that support and accompany these processes.

The revealed patterns of the spatial and branch development of the resource region are the basic prerequisites for the formation of new industries of the regional innovation ecosystem. They lead to the activation of clustering processes, cluster development considered as a source of competitiveness and a tool of regional industrial policy.

The emphasis is on sources of competitiveness of new industries in the region: expanding the integration capabilities of its ecosystem and integrating it into international and national technological initiatives.

As a result, the rigorous assessment system for new industries development in the priority areas of technological development and their positioning in the region's economy, considering the specific potential of the resources is proposed. The approach to determining additional integration effects from ecosystem interactions is tested on Krasnoyarsk Krai.

Keywords: patterns of development, sources of competitiveness, spatial organization of economic activity, interaction of ecosystems, algorithm for the formation of new industries

INTRODUCTION

Russia, as it was repeatedly noted both at the level of government bodies [1-2] and at the level of various studies [3-4], faces serious challenges and threats that require searching for new promising areas of socio-economic development that ensure its Competitiveness in the world space. Among these challenges and threats are the following:

– change in the structure of world demand for energy resources and their consumption patterns, development of energy-saving technologies and reduction of material consumption, development of "green technologies";

– exhaustion of the export-raw material model of economic development, which is also related to scientific and technological changes;

– absence of Russian non-oil companies among global leaders of the world economy;

– weak innovative activity, lag in the development and implementation of new and promising technologies;

– depletion of the resource base of the fuel and raw materials industries as the existing fields;

– limited scope of Russian non-primary exports, due to its low competitiveness, underdeveloped market infrastructure and weak involvement in the global "chains" of added value creation;

– low rates of economic growth due to internal causes, including limited access to long-term financial resources, insufficient development of transport and energy infrastructure;

– uneven spatial development of, strengthening the differentiation of regions and municipalities in terms of the level and pace of socio-economic development.

In addition, the analysis of experience and approaches to spatial development show that today there are two main global trends affecting the prospects for territorial and sectoral development. In particular, these are global and territorial changes leading to the transformation of production and technological chains, which in turn leads to a change in the organizational forms of world regional development that support and accompany these processes. That is, in accordance with the nature of the changes that are called, global calls can be divided into two types: evolutionary and transformational changes [5].

Considering all the above-mentioned challenges and threats, it is important to search for comprehensive solutions to overcome them not only at the level of the country as a whole, but also at the level of individual territories: regions and municipalities. The most vulnerable from this point of view are the regions of the commodity orientation, the peculiarity of which is the high degree of dependence on the extraction of raw materials: in most of them the production of competitive end products with high added value is poorly developed (Table 1).

Table 1 – Dynamics of the share of mineral extraction in the structure of the GRP of the raw material regions of Russia, %

The subject of the Russian Federation	Mining				Manufacturing Processes			
	2004	2009	2014	2015	2004	2009	2014	2015
Sakhalin Oblast	17.0	55.7	65.2	59.1	9.6	4.8	2.1	2.3
Tyumen Oblast, including:	56.7	50.5	53.1	55.7	8.6	6.0	4.1	3.9
Khanty-Mansi Autonomous Area	*68.4*	*63.4*	*66.2*	*67.8*	*1.9*	*2.7*	*2.0*	*2.0*
The Yamal-Nenets Autonomous	*60.3*	*47.7*	*49.6*	*54.9*	*1.9*	*1.5*	*1.7*	*2.0*

The subject of the Russian Federation	Mining				Manufacturing Processes			
	2004	2009	2014	2015	2004	2009	2014	2015
District								
Chukotka Autonomous District	6.4	40.8	41.9	46.5	3.0	0.4	0.2	0.4
The Republic of Sakha (Yakutia)	40.6	28.3	44.1	48.2	3.6	1.9	1.6	1.3
Orenburg region	33.1	34.8	35.9	36.9	13.6	10.3	12.0	11.9
Komi Republic	28.6	29.4	33.3	36.4	8.3	9.4	10.7	11.4
Tomsk Region	33.0	22.0	28.5	29.5	16.3	13.5	9.8	9.8
Magadan Region	31.9	18.6	17.2	28.9	6.3	2.5	2.0	1.8
Arkhangelsk Region, including:	21.0	31.5	26.9	26.0	19.6	12.1	13.1	14.8
Nenets Autonomous Okrug	*74.9*	*77.3*	*73.8*	*67.5*	*0.3*	*0.2*	*0.3*	*0.3*
Kemerovo Region	20.6	25.2	21.5	25.6	24.5	16.3	18.9	17.4
Udmurt republic	19.4	24.2	23.9	25.3	22.3	18.7	18.0	19.0
Astrakhan Region	1.9	2.7	21.1	25.1	24.9	14.8	5.3	4.2
Irkutsk Region	3.1	5.3	19.6	24.3	22.9	15.7	12.4	13.4
Republic of Tatarstan	26.4	22.8	19.9	21.6	17.8	15.3	18.7	19.1
Krasnoyarsk Krai	**4.2**	**5.0**	**17.0**	**17.5**	**47.8**	**34.4**	**31.1**	**33.5**
Amur region	4.6	10.5	11.4	16.5	5.6	4.6	3.8	3.7
Perm Krai	13.7	13.3	15.5	16.4	24.8	26.8	30.6	29.5
Samara Region	9.2	11.8	14.5	16.2	32.3	20.5	24.0	24.0
Murmansk Region	18.7	11.1	12.6	14.7	21.8	16.7	11.7	11.3
The Republic of Khakassia	6.6	10.3	11.1	12.9	18.5	12.9	12.5	15.4
Transbaikal Region	7.2	7.1	7.5	11.1	3.3	4.0	3.2	3.3
Belgorod Region	21.1	8.4	12.4	10.5	23.0	20.8	17.4	18.5
Kursk Region	19.6	6.6	9.3	8.6	11.8	16.0	17.4	19.0

As the results of analytical studies show, the raw material regions are still not the centers of innovative development of the country, and their intentions to diversify the economy remain declared program activities. World and domestic experience demonstrates the complexity of economic diversification and the weakening of dependence of countries and their regions on resource rent [4]. However, if no timely measures are taken to reduce such dependence, this may lead to future weakening of the economic positions of the raw material regions and countries due to the exhaustion or significant reduction in the extraction of natural resources.

Thus, it remains an open question to look for opportunities to form new industries in order to reduce the dependence of raw material regions on resource rent, which should help them to enter a higher level of competitiveness.

New industries, in the research are defined as emerging high-tech economic activities, the key features of which [6]:

– use of fundamentally new technologies;

– have a large share of products with high added value;

– have a large proportion of highly skilled workers in the structure of employment.

At present, the main trends in the development of the economic sectors have become their growing dependence on each other and interpenetration - the blurring of borders between different sectors of the economy, which is, global synchronization in the advanced industries, convergence of various fields of science and technology. Accordingly, the further development of the economic sectors largely depends on the organization of mutually beneficial cooperation between the representatives of these sectors with the use of innovative forms of interorganizational ties. In this aspect, cluster development is becoming the most optimal form of interorganizational ties for the raw material region.

As new industries are newly emerging high-tech economic activities, the search for sources of their competitiveness should be based on the principles of technological development of the region, namely:

– *dynamic* processes of interaction of economic agents of scientific and technological development on the basis of reconfiguration of the system of strategic planning and management using mechanisms for updating strategic initiatives regarding the requirements of "global challenges";

– *integration* of interaction between the subjects of the system "science – education – production" on the basis of international, interregional programs of scientific and technological cooperation and cluster management mechanisms for the stages of the "life cycle" of products;

– *coordinated* mechanisms for implementing the directions of technological development in accordance with state long-term development programs based on optimization of financial, material, information and management resources of the federal center and region;

– *systemic and synchronized* processes of management of technological development on the basis of changing the role of regional authorities and interaction formats with subjects of science, education and business outside the existing regulations, functional and administrative technologies of federal, regional and municipal authorities;

– *consistency* of key parameters of scenarios of technological development in terms of the nature and characteristics of R & D (large, small, fundamental, applied, mission-oriented, result-oriented); on efficiency (economy, productivity, productivity); by the degree of readiness (technology, production, management).

With regard to the competitiveness of new industries, the most important is the principle of integration and inclusion in international and national technology initiatives. Such an approach should help to create interrelated demand for innovative products, provide access to resources that facilitate innovative development (education, experience, professional competencies, new technologies, equipment, and finance), develop innovative business and commercialize the products of new industries.

RESULTS

The algorithm for identifying promising industries considering the patterns of development of various sectors of the regional economy is based on the procedure for identifying priorities for technological regional development. At the same time, the authors proceed from the premise that the prioritization of the directions of technological development is based on the principles [5]:

– maximizing the potential of technology for shaping the future economy;

– integrating the effects of regional development at the national level for positioning as a center for global technological development.

The proposed algorithm includes 3 stages:

Stage 1 – Assessment of the industrial development potential of the territories of the region.

In the case of the Krasnoyarsk Krai, such an assessment was carried out based on the results of a spatial analysis of its raw materials base, labor potential, innovation potential, development of production, efficiency and infrastructure potential. As a result, it was established that the most promising industrial areas are: timber processing (East and Priangar macro regions), biotechnology (Central and Western macro regions), metallurgy (Central and Northern macro regions), production of polymer materials (Central and Western macro regions), navigation and communications Central and Northern macro regions), machine building (Central Mac rion) and agro-industrial production (Western and Southern macro regions).

Stage 2 – Identification of priorities for technological development of the region based on analysis of global and national trends in technological development, identification of technological backwardness risks and assessment of technological development opportunities for the economic sectors of the region in the sequence presented in Table 2 [5].

Table 2 – Stages of prioritizing the technological development of the region

Stage	Selection Criteria	Result
1. Assessment of technology's ability to withstand "global challenges"	Technology: – corresponds to the priorities of the technological development of the country and the region; – is able to withstand "global challenges".	The list of preventive technologies that can ensure the development of traditional sectors of the economy and accelerate the formation of new ones.
2. Identifying belonging to convergent technologies	The technology is convergent (nano, bio and infotechnology, cognitive technologies).	Identifying convergent technologies and their grouping by types (ICT, biotechnology, rational nature-use, nanotechnology and materials).
3. Assessment of the possibility of transition to a new technological structure, the	Technology: – can influence the formation and development of new markets; – is able to ensure the receipt of	– grouping of technologies in the sectors of the economy of the region in accordance with the scenarios of technological development; – establishing the potential for the

Stage	Selection Criteria	Result
formation and development of new markets.	results that have a significant scientific novelty, and the transition of the economy of the region to a new technological order.	development, production and use of priority technologies in the economy of the region on the basis of identifying existing elements of the scientific and technological system, production centers and consumption centers for technological products.

In the case of the Krasnoyarsk Krai, the above approach was used to identify the main areas of

– biotechnology for various sectors of the economy and goals (new products, the transition from traditional processes and products to biotechnology, etc.);

– technologies of rational nature management, ensuring the growth of energy efficiency, the spread of waste less technologies, the restoration of the environment, the more efficient use of natural resources, the use of non-toxic and biodegradable materials;

– information and communication technologies (ICT);

– new materials and nanotechnologies – nanostructured and composite materials, materials with special properties (resistant to the environment, "adaptable", with special electrical, magnetic, optical properties, etc.), nanoparticles and nanofibers, etc.

Stage 3 – making a list of promising new industries in the region considering the identified priorities for its technological development.

In the Krasnoyarsk Krai, such promising new industries can include:

– biotechnology;

– technologies of rational nature management;

– information and communication technologies;

– new materials and nanotechnology.

At the same time, as it was mentioned earlier, to ensure the formation of these new industries and their most effective implementation, it is necessary to ensure the cluster development of the region, within which the applicability of the products of these industries will be ensured. An assessment of cluster development potential in the Krasnoyarsk Krai [7] identified promising clusters of high-tech production and the knowledge economy, including the biotechnological cluster mentioned above, the metallurgical cluster, the polymer materials cluster, the navigation and communication cluster, and the cluster for the development of education for high-tech sectors. In addition, cluster systems of the traditional type of production have good prospects: agro-industrial, timber processing, machine-building clusters.

For long-term forecasting of the tempos and trends in the economy development of the Krasnoyarsk Krai, division of the Krasnoyarsk Krai economy was made considering the differentiation of its macro-areas development, and the tendencies of their economic development, namely, the formation of innovation-industrial development zones (IIDZ) is proposed on its territory. The identified specialization of the Krasnoyarsk Krai's

macro regions, as well as a list of new industries and priority cluster initiatives, will in many ways become the determining factors for their subsequent positioning (Figure 1).

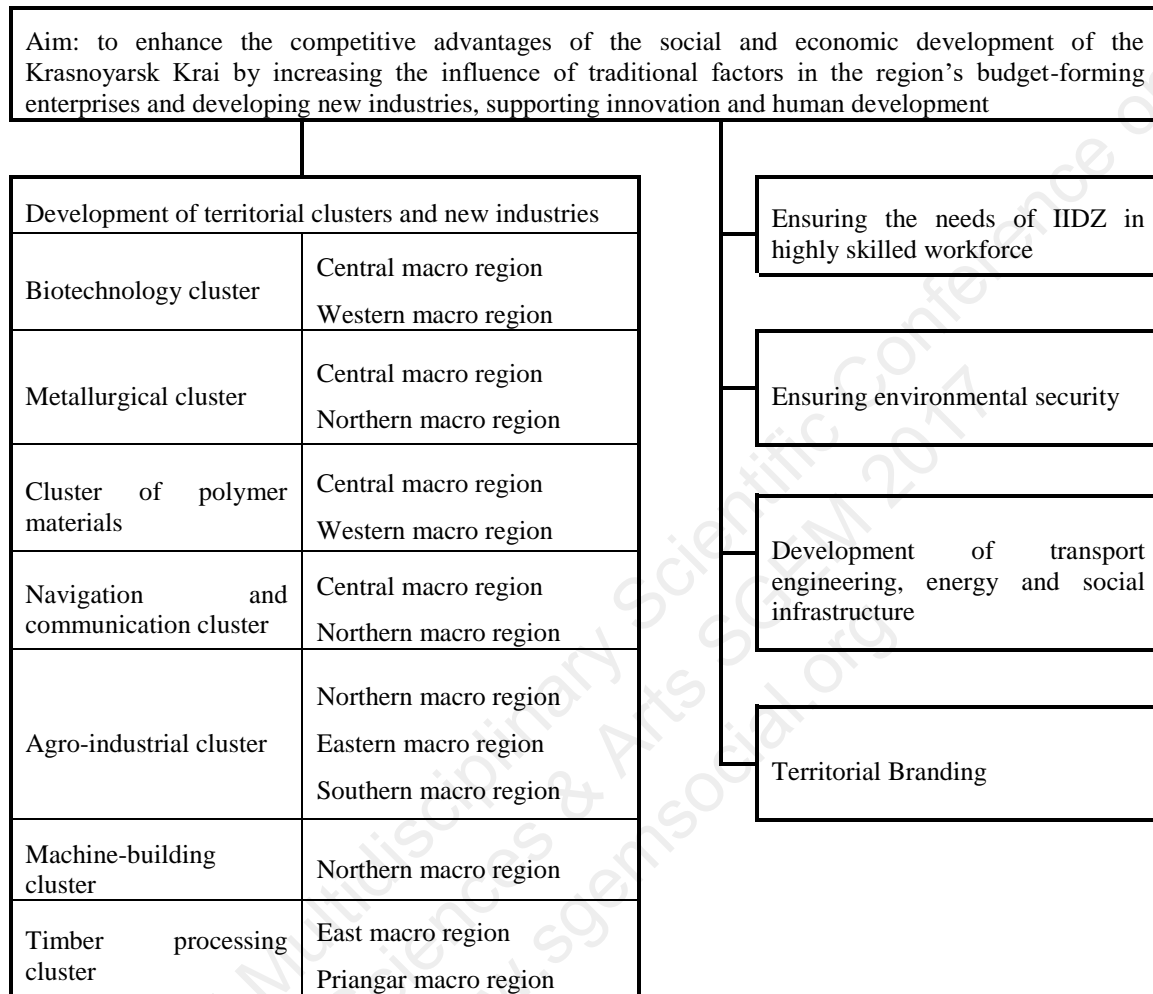| Aim: to enhance the competitive advantages of the social and economic development of the Krasnoyarsk Krai by increasing the influence of traditional factors in the region's budget-forming enterprises and developing new industries, supporting innovation and human development	
Development of territorial clusters and new industries	Ensuring the needs of IIDZ in highly skilled workforce
Biotechnology cluster — Central macro region / Western macro region	
Metallurgical cluster — Central macro region / Northern macro region	Ensuring environmental security
Cluster of polymer materials — Central macro region / Western macro region	
Navigation and communication cluster — Central macro region / Northern macro region	Development of transport engineering, energy and social infrastructure
Agro-industrial cluster — Northern macro region / Eastern macro region / Southern macro region	
Machine-building cluster — Northern macro region	Territorial Branding
Timber processing cluster — East macro region / Priangar macro region	

Figure 1 – Positioning of the macro regions of the Krasnoyarsk Krai

Such positioning of macro regions is based not only on the possibilities of creating new industries on their resource base, but also on the development of basic industries that are economically forming, form strategic initiatives for technological improvement and the allocation of new promising areas for development. Integration with the federal technological and international clusters of initiatives will help them to enter a new level of interaction in the innovation sphere and industrial production and increase the competitiveness of products, companies and industries.

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