

# On Implementing the Strategy of Scientific and Technological Development of the Russian North and the Arctic

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**Abstract**—In the work problems of development and successful implementation of the medium and long-term strategy of scientific and technological development are considered. It is shown that there is a need for assessing activities that take into account the specific features of the northern macroregion. Methodological principles and recommendations are suggested to be developed as the tools for such actions. Theoretical and methodological basis for assessing scientific, technical, and technological as well as innovative potential developed by international and domestic organizations and individual specialists is analysed.

The scientific and technological potential of seven regions completely related to the North and the Arctic according to the chosen method, which mainly takes into account the specific features of the northern territories was investigated. The maximum values of indicators of resources provision are typical for the Republic of Sakha (Yakutia). It is shown that the best indicators of the resulting component of scientific and technical potential among the northern regions are typical for the Yamal-Nenets Autonomous District.

The study showed that in the medium and long term it is only possible for the Yamal-Nenets Autonomous District to be recommended the scenario of achieving leadership in innovation and technological development. With the potential available taken into account for the other regions it is advisable to implement the scenario of inertial development with acquiring innovative technologies.

The necessity of continuing basic research for scientific substantiation of scenarios as well as the development and implementation of strategic directions of scientific and technological development is substantiated.

**Keywords**— *scientific and technological development, assessment, ranging, indicator, potential, the North, the Arctic, strategy.*

## I. INTRODUCTION

The regional component of the state scientific and technological policy has recently become of paramount importance in many developed countries of the world. This trend is objectively caused by significant differences of territories in the structure and concentration of economic as

well as scientific and technological potentials, other various types of resources and relations established between countries.

The relevance of development and implementation of the strategy of scientific and technological development of the Russian North and the Arctic (hereinafter referred to as the Strategy) is conditioned by a number of aspects including increased costs of production and life support for the population, forecasting challenges as priorities of the state policy, uncertainty of the economic situation in the world, sanctions from the western countries, and the necessity of the import substitution policy. Scientific and technological development of the North and the Arctic should be connected mainly with innovative transformations in the economy and ensuring the competitiveness of territories using the most important resource - knowledge [1, 2].

The special relevance of the Strategy is also determined by the Decree of the President of the Russian Federation of May 7, 2018, No. 204 [3], which is aimed at increasing the number of organizations carrying out technological innovations by 2024 to 50% of their total number. It should be noted that in recent years despite the measures taken by the Government of the Russian Federation the number of organizations implementing technological innovations, out of their total number (innovation activities according to the method of the Russian statistical agency) declines. According to the latest data of the Russian statistical agency for 2016 the average level of innovation activities in Russia was 8.4%, in the regions of the North and the Arctic - 8.9%. To achieve the tasks set by the President of the Russian Federation unprecedented measure are required to accelerate scientific and technological development of Russia and the northern and arctic regions.

The Strategy of scientific and technological development of the Russian Federation in 2016 determined two possible scenarios [4]:

- inertial scientific and technological development based on import of technologies;
- achieving national leadership in certain scientific and technical sectors.

Choosing the scenario and the corresponding strategy is determined by the regions' potentialities. In this regard in order to develop and successfully implement the Strategy it is necessary to carry out assessment activities that take into account the specific features of the northern macroregion. The tools for such assessment activities are the methodological principles and recommendations for their application. In international and domestic practice various methods of quantitative assessment of scientific technical, and technological as well as innovative potential have been developed. In Russian terminology these potentials use similar tools including:

- methods of the Meiji University, the World Bank, the World Economic Forum, the National Science Foundation of the United States, the Organization for Economic Cooperation and Development, the Commission of the European Communities of the Maastricht Institute of Economic Research in Innovation and Technology [5-11];

- methodology of the Center for Strategic Research "North-West", Higher School of Economics, National Association of Innovations and Development of Information Technologies, Expert RA rating agency, Financial University under the Government of the Russian Federation [12-17];

- methods of international specialists including M. Fisher, K. Freeman B. Lundwall, R. Nelson, et al. [18-21];

- methods of domestic scientists such as A.E. Varshavsky, M.A. Bendikov, V.V. Fauser, A.V. Chugunov, T.A. Shtertser, Yu. Bogachev, V. Vinokurov, K.A. Zadumkin, I.A. Kondakov et al. [22-28].

## II. ASSESSMENT OF SCIENTIFIC AND TECHNICAL POTENTIAL OF THE NORTH AND THE ARCTIC REGIONS

To carry out an objective assessment of the scientific and technological potential the method by V.V. Razuvaev [29], which mainly takes into account the specific features of the North and the Arctic regions was chosen. The necessary calculations based on the data of the Russian statistic agency for the seven regions completely related to the North and the Arctic allowed estimating the resource component of the scientific and technological potential for 2012-2016. (Table 1).

The assessment showed that only the Republic of Sakha (Yakutia) has the necessary resources provision to successfully implement the strategy of scientific and technological development including the number of personnel engaged in research and development, the number of researchers having academic degrees, the internal costs of research and development; costs of technological innovation. The lowest values of the resource component of the scientific and technological potential are typical for the Chukotka Autonomous District and the Nenets Autonomous District.

The indicators of the resulting component of the scientific and technological potential of the North and the Arctic regions were calculated (Table 2).

Table 1. Resource component of the scientific and technological potential of the North and the Arctic regions

	2012	2013	2014	2015	2016
Kamchatka Krai	0,383	0,369	0,400	0,446	0,357
Magadan Region	0,205	0,208	0,256	0,321	0,213
Murmansk region	0,762	0,830	0,855	0,899	0,586
Nenets Autonomous District	0,063	0,027	0,027	0,020	0,045
The Republic of Sakha (Yakutia)	0,814	0,947	0,950	0,936	0,966
Chukotka Autonomous District	0,000	0,003	0,001	0,083	0,001
Yamal-Nenets Autonomous District	0,237	0,104	0,122	0,219	0,123

Table 2. The resulting component of the scientific and technological potential of the North and the Arctic regions

	2012	2013	2014	2015	2016
Nenets Autonomous District	0,040	0,042	0,003	0,039	0,038
Murmansk region	0,260	0,338	0,468	0,325	0,259
Yamal-Nenets Autonomous District	0,636	0,543	0,592	0,648	0,671
The Republic of Sakha (Yakutia)	0,400	0,638	0,504	0,390	0,553
Kamchatka Krai	0,081	0,222	0,060	0,081	0,093
Magadan Region	0,427	0,461	0,080	0,317	0,070
Chukotka Autonomous District	0,010	0,020	0,057	0,065	0,032

The highest indicators of the resulting component of the scientific and technological potential among the regions of the North and the Arctic for the analyzed period are typical for the Yamal-Nenets Autonomous District that allows using the scenario of achieving leadership in innovative and technological development.

To develop and further implement the strategy of scientific and technological development the regions of the North and the Arctic were ranked according to the final indicators (Table 3).

The analysis of the final indicators of the scientific and technological potential made it possible to identify that in the medium and long-term it is only possible for Yamalo-Nenets Autonomous District to recommend a scenario of achieving leadership in innovative and technological development. For the other regions taking into account the existing potential it is

possible to implement the scenario of inertial development with acquiring innovative technologies.

Table 3. The final indicators of the scientific and technological potential of the North and the Arctic regions

	Scientific and technological potential		Resources		Efficiency	
	rating	place	rating	place	rating	place
Kamchatka Krai	0,239	4	0,357	3	0,093	4
Magadan Region	0,149	5	0,213	4	0,070	5
Murmansk region	0,441	2	0,586	2	0,259	3
Nenets Autonomous District	0,042	6	0,045	6	0,038	6
The Republic of Sakha (Yakutia)	0,782	1	0,966	1	0,553	2
Chukotka Autonomous District	0,014	7	0,001	7	0,032	7
Yamal-Nenets Autonomous District	0,366	3	0,123	5	0,671	1

### III. RESULTS

The assessment of the scientific and technological potential of the North and the Arctic regions made it possible to determine the efficiency of resource use and to recommend development scenarios of medium and long-term strategies and directions for their implementation. Thus for the Yamal-Nenets Autonomous District it is possible to develop and implement a strategy for achieving scientific and technological leadership. For the other regions the scenario of inertial development is recommended.

### IV. CONCLUSION

The proposed tools allow substantiating the development of the scenario for a regional medium and long-term strategy of scientific and technological development and the possibility of its efficient implementation.

It is necessary to continue basic research in the direction of scientific substantiation of scenarios as well as the development and implementation of strategic directions of scientific and technological development.

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