

# Prospects for the Resource Regions' Growth Considering the Specific Features of the Mineral and Raw Materials Complex Development

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**Abstract.** The classification of the Russian resource regions is carried out in the study. It is shown that it is necessary to take into account the dynamic aspects of development of raw materials territories in the analysis of the social-and-economic development of resource regions. The recommendations to increase the role of the subjects of the Russian Federation in regulating the mineral and raw materials complex are proposed.

## 1 Introduction

The vast literature is devoted to the problems of resource dependence, the influence of resources on economic growth [1, 2]. Most of the research is connected with the analysis of these issues at the macro level, at the country level [3-5]. The peculiarity of the approach being developed is connected with the attempt to take into account the specifics of the mineral resource base in analyzing the development of the economy of resource regions, since it largely determines the opportunities for social-and-economic development.

The Raw Materials Complex (RMC) is of key importance for the social-and-economic development of both the resource regions of the country and Russia as a whole [6]. The most important specific factors affecting the social-and-economic development of resource regions include:

- the scale of development of raw materials complex (specific volumes of extraction, gross added value of RMC per capita);
- the types of raw materials that form the basis for the development of a regional RMC [7]. For example, prices for hydrocarbon raw materials usually contain a larger rental component than prices for other types of minerals. This, in turn, creates prerequisites for the growth of income of employed (not only in the RMC), revenues to regional budgets. As a result, a financial basis for the implementation of effective social policy is formed;
- the stage of development of raw materials potential of this or that subject of the Federation. For example, at the stages of increasing production and maturity of resource territories there are much greater prerequisites for active social policy compared with the stages of late production, when RMC no longer generates rental income, and often requires the state support itself. [8-10]

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The proposed approach makes it possible to focus exactly on the specifics of resource regions that are of crucial importance from the point of view of the country's social-and-economic development. A more detailed grouping of resource regions (in contrast, for example, from one aggregated cluster of raw material subjects of the Federation) should be considered as the specifics of the approach, which creates prerequisites for the development of sound recommendations for the regional economic policy.

## 2 Materials and methods

One of the approaches to analyzing the features of resource regions development is related to their classification. The purpose of developing such typologies is to analyze and monitor the economic situation in the regions, as well as to develop recommendations for regional policy measures.

A number of indicators can be used to identify and analyze resource countries and regions, for example, indicators of resource dependence and wealth of resources – per capita output, exports of RMC products. Unfortunately, a number of indices characterizing resource dependence in practice cannot be correctly applied to the regional level, for example, export volumes of RMC products. Another problem is related to a limited set of indicators that are available in open Russian statistical sources. The use of indicators based on the volume of reserves is associated with a number of methodological problems: the reserves and resources of which categories should be taken into account, how to measure the reserves of different types of minerals, what prices should be used in case of transfer to cost values. As a result, as indicators for identification of Russian resource regions, the following were accepted:

- the share of type of economic activity (TEA) "extraction of minerals" in the gross regional product (GRP) of the subject of the Federation;
- the share of employed in RMC in the total average annual number of employed in the economy of the region;
- the volume of shipped products of RMC in the region per capita.

These indicators clearly reflect the contribution of RMC to the economic and social development of resource regions, which is consistent with the objectives of this study. The main Russian resource regions by criterion the share of type of economic activity "extraction of minerals" in GRP are presented in Table 1.

**Table 1.** The main Russian resource regions.

Region	The share of production in GRP, %				Resource
	2005	2010	2014	2015	
The Khanty-Mansy AD	74.9	63.0	66.9	67.8	Oil, Gas
The Nentsy AD	74.3	78.6	74.3	67.5	Oil
The Sakhalin Region	22.1	59.3	65.7	59.1	Oil, Gas
The Yamalo-Nenets AD	61.4	47.9	50.2	54.9	Gas, Oil
The Sakha Republic	39.5	40.1	44.5	48.2	Diamonds, Coal, Oil
Chukot Peninsula	7.5	38.2	42.9	46.5	Gold
The Orenburg Region	37.0	35.9	36.0	36.9	Gas, Oil
The Komi Republic	34.3	33.5	33.6	36.4	Oil, Coal
The Tomsk Region	35.4	23.9	28.5	29.5	Oil
The Magadan Region	27.1	20.6	17.2	28.9	Gold
The Kemerovo Region	27.1	31.4	21.6	25.6	Coal
The Udmurt Republic	26.7	23.4	24.2	25.3	Oil

The Astrakhan Region	2.7	3.5	21.5	25.1	Oil
Russia	12.8	10.4	10.6	11.2	Oil, Gas, Coal

Note. AD – autonomous district. The table shows regions with a GRP share in the extraction of mineral resources of more than 25% in 2015. The subjects of the Russian Federation are located in order of decreasing the share of production in GRP in 2015.

To identify and group the resource regions, hierarchical clustering was used. As a result, all subjects of the Federation were divided into three clusters:

I – the regions with the dominant role of mining (The Nentsy, Khanty-Mansy, Yamalo-Nenets Autonomous Districts, The Sakhalin Region – 4 regions);

II – the subjects of the Federation with a leading role of resource sector (22 regions);

III - non-resource regions.

Subjects of the Federation forming the first two clusters (I and II) are considered as resource regions. Further, the II cluster was divided into groups based on the following indicators: the share of the fuel and energy resources (FER) in the structure of the shipped products of RMC; the share of TEA "processing industries" in the GRP.

This approach is defined by the specific role of fuel and energy resources (FER), and also by the expediency of identifying a group of resource regions with a relatively diversified economy. FER (primarily hydrocarbons) in comparison with other mineral raw materials is of particular importance for Russia in terms of generation of rental income, pumping up the federal and regional budgets, and forming foreign exchange earnings. So the extraction of FER amounts to about 90% of the volume of shipped products in general by type of economic activity "extraction of minerals". FER generates more than 90% of the total amount of tax revenues from RMC to the Russian budget system.

As a result, three groups of regions were formed within the cluster of subjects of the Federation with a leading role of resource industries:

1) group II.1 – the regions with a high share of fuel and energy resources in the extraction of minerals, medium and low role of processing industries (Irkutsk, Kemerovo, Orenburg, Tomsk regions, the Komi Republic, Sakha (Yakutia), Tatarstan, etc.);

2) group II.2 – the subjects of the Federation with a high share of FER and relatively developed manufacturing industries (Samara, the Tyumen regions, Krasnoyarsk, the Perm region);

3) group II.3 – the regions with a low share of fuel and energy in extraction and weak development of processing industries (Amur, Magadan, Murmansk, Chukotka, etc.).

The identified resource regions (clusters I and II) provide about 78% of those engaged in the extraction of minerals, 95% of investments in fixed assets, about 95% of the added value of RMC, and more than 80% of the volume of shipped products of RMC.

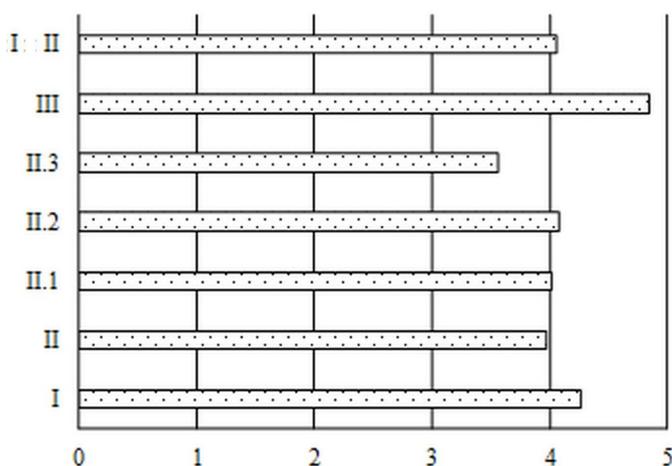
### 3 Results and Discussion

A feature of resource regions is that the indicators of their social-and-economic development largely depend on the state of the mineral and raw materials base. For example, in the initial period of development of a new region those investments are significant which are directed to the development of infrastructure and facilities. Then the level of investment is usually reduced. At the late stages of development of resource areas due to the depletion of resource base, there is usually a significant increase in unit costs, a decrease in production volumes and, correspondingly, added value in RMC [11].

"Mature" resource regions require new technologies to develop resources and significant investments not for increasing the production, but for maintaining the volume achieved [12]. A typical example is the current situation in the Tomsk region. The stabilization of production at the level of 10-11 million tons of oil that has been observed

for several years is associated with a significant amount of investment. In 2011-2016 the volume of investments in the extraction of fuel and energy resources was at the level of 30 billion rubles, which was about 40% of investments in fixed assets in the region for all types of economic activity.

One of the most important generalizing indicators of regional development dynamics is the GRP growth rate. The average annual growth rate of GRP in 2001-2015 (Figure 1) shows that, in general, resource regions grew at a lower rate than non-resource regions and, on average, all subjects of the Federation. Among the resource regions, relatively high growth rates were achieved by the regions of the I cluster (the most resource-dependent subjects of the Federation). The lowest growth rates were shown by the resource regions of group II.3 – the subjects of the Federation, where the role of FER is insignificant. Moreover, among the resource regions of the II cluster, the highest growth rates were achieved by the group with a diversified economy (group II.2).



**Fig. 1.** The average annual growth rate of GRP in 2001-2015 by clusters and groups of regions, %.

The impact of RMC on the social-and-economic development of resource regions depends to a large extent on the characteristics and dynamics of the extraction of raw materials, the stages of the development of raw materials areas. The slowdown in the growth rates in resource regions can occur as a result of objective circumstances – depletion of the resource base, changes in the level of prices for raw materials.

For example, since 2008, there has been a drop in production in the main oil region of Russia – the Khanty-Mansy Autonomous District, which slows down the economic development indicators in the district, which is reflected in the growth rate of the 1st cluster as a whole. The share of RMC in the GRP of the district tends to decrease: if in 2005 this share reached 75%, then in 2015 it amounted to 67.8%. At the same time, oil production in the district in 2005 was 267.9 million tons, and in 2015 – 243.1 million tons (in 2017 it fell to 235.3 million tons).

A feature of Russian practice, primarily in the oil and gas sector, is that the dynamics of world prices, for example, on oil, have little effect on the value added in RMC for the producing regions. This is due, inter alia, to the fact that the prices for the sale of raw materials are formed within vertically integrated structures. Its contribution to the correction of the added value created in production regions is also due to the fact that when the prices are changed, the level of tax burden on oil companies is also substantially corrected.

## 4 Conclusion

The dynamic character of the development of raw materials territories determines the active participation of regions in the regulatory processes of the RMC. Mechanisms for regulating RMC should be adapted in accordance with the specifics of raw material territories development, which is more effective at the regional level. To fulfill their role, regions should have adequate financial resources and competencies. Expanding the powers and capacities of the regions in regulating RMC will contribute to increasing the social-and-economic benefits of subsoil development, the emergence of regions on the trajectory of sustainable inclusive development [13, 14].

The dynamics of the development of raw material territories determines, from the standpoint of increasing social and economic benefits, the significant and changing role of the subjects of the Federation in regulating RMC. For example, at the stage of growing production, monitoring and control of the processes of subsoil development, compliance of the applied technologies with norms and rules of development, precedents of best practice are required. At the stage of falling production, it is important to prolong production at old facilities, which is especially important for solving social problems, especially for maintaining the level of population employment.

At present, there is a qualitative complication of the resource base and extraction conditions for the main types of minerals. Therefore, the role of innovation in the development of such resources is increasing. In these conditions, the importance of the subjects of the Federation in the formation of regional innovation systems, the creation of conditions for the innovative development of mineral and raw materials complex is growing. A special place in these processes should be occupied by resource regions with a relatively diversified structure of the economy and a developed scientific and educational complex.

Another area of regional policy is the creation of prerequisites for the formation of effective relationships among participants in the development of mineral resources, including extractive companies, suppliers of materials, equipment and services. Another important factor from the point of view of economic growth in resource regions is the development of processing of extracted raw materials on its territory [15, 16].

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