

# Modern features of Russian Federation territory development

## Características modernas del desarrollo del territorio de la Federación Rusa

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### Abstract

One of the conditions for successful social and economic development of the country is a high level of economic development of its territory. In this regard, the article presents the results of a study of the rating and differentiation of the subjects of the Russia by a number of main indicators of territory development. In economic science and practice, tools have been developed for the strategic development of the Russian economic space that can overcome the factor of territorial inequality.

**key words:** regions, territory development, differentiation, rating, development factors

### Resumen

Una de las condiciones para el desarrollo social y económico exitoso del país es un alto nivel de desarrollo económico de su territorio. El crecimiento económico depende del grado de participación de los recursos del país en la esfera de los intereses estratégicos. La diferenciación territorial de las regiones, teniendo en cuenta su desarrollo económico, muestra, por un lado, polos prometedores de crecimiento económico, por otro, destaca los problemas problemáticos de la gestión eficaz de las regiones poco desarrolladas de la Federación. A este respecto, el artículo presenta los resultados de un estudio sobre la calificación y diferenciación de los sujetos de la Federación de Rusia por una serie de indicadores principales del desarrollo del territorio. En ciencia y práctica económica, se han desarrollado herramientas para el desarrollo estratégico del espacio económico ruso que pueden superar el factor de desigualdad territorial.

**Palabras clave:** regiones, desarrollo del territorio, diferenciación, calificación, factores de desarrollo

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## 1. Introduction

For the economy of the Russian Federation, the formation of effective mechanisms for the development of regional economies in combination with the task of increasing their stability is of great importance. Despite the high level of differentiation of the economic space and the heterogeneity of its development, these issues remain relevant and are still of strategic importance (Granberg, 2003).

The level of social and economic differentiation and territorial inequality is influenced by factors such as natural resources, due to the diversity of natural and climatic conditions and natural resources on the territory; ethnic diversity of the population; transport and infrastructure links, historical background, etc. Disparities between

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regions are an inevitable feature of the Russian space. All structural changes in the economic and geographical space in the regions are related to the location of productive forces (Gagarina, Arkhipova. 2015). One of its forms of manifestation is the development of the territory - inclusion in economic activity of territories that differ significantly in terms of natural and climatic conditions, and comfort for the population. As a result, this is reflected to some extent at the level of territory development (Gubanova & Klesch, 2017).

Sustainability management, including at the regional level, is of great importance in the effective development of poorly developed territories. In this regard, diagnostics of territorial differences is of great importance, which performs a number of functions: analysis of the characteristics of territories; identification of problems and risks that result in deviations from relatively normal development, resulting in interregional imbalances; identification of threats to economic security, including the consequences of major disasters and cataclysms (Krugman, 1991; Smagin & Neujmin, 2007; Zubarevich, 2010)

## 2. Materials and Methods

The main methods used in the study are the following:

Historical: in the course of studying the processes of territorial inequality in retrospect from 2011 to 2018;

Comparative: it allowed us to analyse the development of regions by population density, paved roads and mobile communications, capital-labour ratio, as well as the typology of regions in the group of ten, leading and poorly developed regions;

Analytical: to assess the interregional differentiation of territories based on the calculation of differentiation coefficients;

Statistical: when using data from the Federal State Statistics Service for the final assessment of the territory development;

Logical: in the course of building the structure of the study from the analysis of the degree of territorial differentiation to the assessment of the impact on the country's economy.

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## 3. Research Results

The importance of diagnosing territorial inequality also lies in the fact that it is necessary to develop a system of indicators of the degree of development of regions, identify the relationships between them and give them an integrated character for the purposes of planning and forecasting social and economic development (Kurbanov, Liadova, & Verzhinina, 2019).

The spatial development of the Russian Federation is not only uneven, but also highly concentrated in individual centres of economic activity, which leads to increased contrast in the level of social and economic development of regions (Gagarina, 2015).

In Russian economic science, the main approaches to assessing the development of the country's territory and regions from the standpoint of economic analysis have been developed. In the monograph of B. I. Smagin, S. K. Neujmin "Development of the region's territory: theoretical and practical aspects" it is rightly noted that the study of regional development involves an approach from three positions: from the point of view of the development of the region's territory, production volumes, as well as the role of the region in the country's economy and the effectiveness of its activities (Smagin & Neujmin, 2007). In the economic science, the last two sets of indicators are traditionally analysed. However, there is almost no work to determine the level of

development of regions, its comparative assessment among the combination of subjects of the Russian Federation. Meanwhile, the transformation of the social and economic situation in the regions requires continuous economic and statistical monitoring of all areas (Kalendzhyan, Ermakova, & Glazov, 2019).

In this regard, the study uses the following characteristics as the main indicators of the level of development of the territories of the regions of the Russian Federation, many of which have been tested in the works of Russian scientists:

Population density (number of people/ 1 km<sup>2</sup>);

Density of paved public roads (km of roads /1000 km<sup>2</sup> of territory);

Capital-labour ratio of the territory of the regions (thousand rubles/km<sup>2</sup>);

Development of the region's territory by means of mobile communications (units/ 1000 people).

The time period for analysing and evaluating the differentiation of regions by territory development is defined from 2011 to 2018. This is a period when there were changes in the economic and geopolitical development of the country: economic recovery from the 2008 crisis, stabilization, Western sanctions, instability of domestic commodity markets and external instability, gradual recovery of economic growth.

In order to achieve the set goals, the study carried out calculations of such informative indicators as differentiation coefficients. They are calculated as the ratio of the maximum indicator (in the leading region) to the minimum (the region that occupies the last position). More objective is the decile coefficient of differentiation – the ratio of the minimum indicator in the 10% group of leading regions to the maximum indicator in the 10% group of regions-outsiders. It avoids the impact of large annual fluctuations in statistical indicators in the regions.

One of the main and traditional indicators of development of the territory of any hierarchical level is the population density. It shows the features of the territorial structure of the economy, the intensity of economic activity of the population (Kostenko, 2019). Population density is formed in the process of historical development of the territory under the influence of the level of social causes and economic and geopolitical priorities of society, economic laws and the natural and geographical environment (Kolomak, 2010; Kuznetsova, 2014).

Russian regions are highly differentiated by population density (Lokosov, Ryumina & Ulyanov, 2018). The top positions of the rating in both 2018 and 2011 were occupied by federal cities Moscow - 4925.9 people/km<sup>2</sup>, and St. Petersburg - 3848.4 people/km<sup>2</sup>. After the historic reunification with the Republic of Crimea, the Federal city of Sevastopol was included in the top three - 513.0 people/km<sup>2</sup>. The composition of the top ten has not changed much. The top ten outsiders include the most sparsely populated regions—the Magadan region - 0.34 people/km<sup>2</sup>, the Republic of Sakha (Yakutia) - 0.31 people/km<sup>2</sup>, the Nenets Autonomous District - 0.24 people/km<sup>2</sup>, the Chukotka Autonomous District - 0.07 people/km<sup>2</sup> and others (Table 1).

**Table 1**  
Differentiation of regions by population density, thousand people /km<sup>2</sup>

2018		Place	2011	
Region	Population density		Region	Population density
<i>Leading regions</i>				
Moscow	4852.03	1	Moscow	10 467.3
St. Petersburg	3845.6	2	St. Petersburg	3463.6
Sevastopol	492.4	3	Moscow region	154.9
Moscow region	171.6	4	Republic of Ingushetiya	114.7
Republic of Ingushetiya	138.2	5	Republic of North Ossetia-Alania	89.1
Republic of Chechnya	93.4	6	Republic of Chechnya	81,3
Republic of North Ossetia-Alania	87.5	7	Krasnodar territory	69.2
Krasnodar territory	74.8	8	Kabardino-Balkaria Republic	68.7
Republic of Crimea	73.3	9	Chuvash Republic	68.4
Kabardino-Balkaria Republic	69.5	10	Kaliningrad region	62.3
<i>Outsider regions</i>				
Arkhangelsk region	1.9	1	Arkhangelsk region	2.1
Republic of Tyva	1.9	2	Republic of Tyva	1.8
Khabarovsk territory	1.7	3	Khabarovsk territory	1.7
Krasnoyarsk territory	1.2	4	Krasnoyarsk territory	1.2
Yamal-Nenets Autonomous District	0.7	5	Kamchatka territory	0.7
Kamchatka territory	0.7	6	Yamal-Nenets	0.7
Magadan region	0.31	7	Magadan region	0.3
Republic of Sakha (Yakutia)	0.34	8	Republic of Sakha	0.3
Nenets Autonomous district	0.24	9	Nenets Autonomous District	0.2
Chukotka Autonomous District	0.07	10	Chukotka Autonomous District	0.1
<b>Coefficient of differentiation</b>				
<b>69 314.7</b>			<b>148 081.2</b>	
<b>Decile coefficient of differentiation</b>				
<b>44.0</b>			<b>40.3</b>	

Source: compiled by the authors on the basis of (Rosstat, 2019)

If in 2011 the coefficient of differentiation was 148,081 times, in 2018 it decreased to 69,314. 7, i.e., twice. On the one hand, this indicates a decrease in regional differentiation by population density. On the other hand, the coefficient of differentiation, calculated as the ratio of the maximum and minimum indicators, is less objective. For example, the area of Moscow increased from 1.1 to 2.6 km<sup>2</sup> and, accordingly, the population density decreased. In a number of regions, the population has grown and the population density has increased (Krasnodar territory). Decile coefficients increased from 40.3 in 2011 to 44.0 in 2018. They are more objective due to the use of similar values instead of maximum and minimum indicators, but in 10% groups. That is, there is an increase in territorial inequality in terms of population density and development of the territory, caused by the movement of labour from the Eastern regions to the West of the country.

The impact of population density on the social and economic state of the territory is diverse. On the one hand, high population density causes threats to economic security, as large cities consume a huge amount of water, food and fuel per day, and in return emit a huge amount of gaseous, liquid and solid waste into the atmosphere. In addition, the load on public transport increases, which leads to accelerated depreciation of fixed assets, which can cause various man-made accidents. If the current population growth rate is maintained and concentrated in large industrial cities, the consumption of energy and mineral resources will increase several times in the coming decades. Pollution of water, air, and soil leads to an increase in the incidence of diseases of the population, and a deterioration of their living environment. An excess of labour, an increase in the number of unemployed, creates additional pressure on workers, leads to a devaluation of the labour force and a decrease in the level of remuneration.

On the other hand, large and densely populated regions are poles of economic growth, centres of localization of high-quality human capital, innovative projects, and science. In this regard, the Spatial Development Strategy of the Russian Federation focuses on these regions in improving the efficiency of the country's economic space. The leading regions in terms of population density (Moscow, St. Petersburg, Sevastopol, Moscow region, and the Republic of Ingushetiya) have high values of industrial production indices that exceed all-Russian indicators. In these regions, the number of people employed in science and research, the innovative activity of enterprises and organizations, the volume of goods and services produced, foreign investment, the gross regional product, and other indicators are higher.

Another indicator of territory development is the density of roads per unit of territory, which represents the social and economic framework of the country.

The road sector is one of the largest segments of the Russian public domain. Without a road network, the articles of the Constitution of the Russian Federation, which guarantee the rights to freedom of movement of citizens, free movement of goods and services, and unity of the economic space, cannot be implemented. In addition, transport development is of great geopolitical, economic and strategic importance for Russia.

Road transport is less tied to the territory. It does not need to lay expensive special roads, it is more mobile and is used mainly for transportation over relatively short distances. Of course, high-quality and comfortable paved roads are a priority for all regions of the Federation. In the whole country, their share is 70.6%. The minimum share of such roads in the Chukotka Autonomous District and the Republic of Sakha (Yakutia) does not reach 40%. The maximum – in Moscow and St. Petersburg – is more than 98% (Table 2).

**Table 2**  
Differentiation of regions by density of paved public roads, km of tracks/1.000km<sup>2</sup>

2018		Place	2011	
Region	Density of public roads with hard surface		Region	Density of public roads with hard surface
<i>Leading regions</i>				
Moscow	2524	1	St. Petersburg	2500
St. Petersburg	2490	2	Moscow	2300
Sevastopol	1084	3	Moscow region	670
Republic of Ingushetiya	848	4	Republic of Ingushetiya	489
Moscow region	776	5	Republic of North Ossetia-Alania	485
Belgorod region	731	6	Kabardino-Balkaria Republic	472
Republic of North Ossetia-Alania	715	7	Kaliningrad region	439
Kabardino-Balkaria Republic	589	8	Republic of Chechnya	388
Republic of Chechnya	586	9	Republic of Tatarstan	324
Republic of Adygeya	571	10	Chuvash Republic	318
<i>Outsider regions</i>				
Tyumen region	15	1	Tyumen region	8.8
Krasnoyarsk territory	12	2	Khabarovsk territory	7.4
Khabarovsk territory	12	3	Krasnoyarsk territory	6.4
Khanty-Mansi Autonomous District	11	4	Khanty-Mansi Autonomous District	6.2
Magadan region	5.6	5	Magadan region	4.7
Kamchatka territory	4.5	6	Kamchatka territory	3.6
Republic of Sakha (Yakutia)	3.9	7	Republic of Sakha (Yakutia)	2.7
Yamal-Nenets Autonomous District	3.1	8	Yamal-Nenets Autonomous District	1.8
Nenets Autonomous District	1.4	9	Nenets Autonomous District	1.1
Chukotka Autonomous District	1.2	10	Chukotka Autonomous District	0.8
<b>Coefficient of differentiation</b>				
<b>2103.3</b>			<b>3125</b>	
<b>Decile coefficient of differentiation</b>				
<b>49.1</b>			<b>60.6</b>	

Source: compiled by the authors on the basis of (Rosstat, 2019)

The differentiation of regions by road density differs significantly. It is significantly larger – more than 2 thousand times as of 2018. Nevertheless, it has decreased by 1.5 times, in 2011 it was more than 3 thousand times. Decile coefficients also decreased from 60.6 to 49.1. The commissioning of paved roads occurred in all groups of regions. Attention is drawn to the preservation of positions in all outsider subjects. While in the group of regions with the most equipped roads, 7 regions out of the leaders retained their positions in 2011. The leaders included the Belgorod region, the Republic of Adygeya and the city of Sevastopol.

Most of the motor roads in Russia form a closed Federal network, the maximum density of which in the European part of Russia decreases as we move to the North-East. It is noteworthy that among the leading regions in terms of road density there are not only highly developed regions, but also the republics of the North Caucasus, for which the road transport system is often the main one and provides access to recreational and tourist areas. In

addition, the road networks of the southernmost macroregion of the country are included in the international transport axis "North-South" to ensure export-import traffic and attract international transit. However, at the present time, the road transport industry in the North Caucasus often maintains an unsatisfactory organization of traffic management, a low level of transport service, and unsafe traffic.

The level of road density in the Northern regions of the North-Western, Siberian and Far Eastern federal districts (Chukotka, Nenets, and Magadan regions) is the lowest, and many of them are not connected to the federal network. In many Northern regions, such as the Chukotka Autonomous District, there is no reliable transport network on paved roads between the district and district centres and their subordinate localities. In addition, road exits to the adjacent regions of the Russian Federation are difficult. The density of roads in the region is 1.2 km per 1000 km<sup>2</sup>, which is by 52.5 times less than in Russia as a whole (63 km per 1,000 km<sup>2</sup>).

The prospects for the development of Russian regions largely depend on the state of roads, the renewal of regional road infrastructure, the growth of allocations for road construction and maintenance of roads, the rhythmic financing of works during the year, the use of new materials that can dramatically increase the service life of the road surface and the level of safety on roads.

The development of the territory of the regions is characterized by an indicator of its capital-area ratio. Fixed assets largely determine the country's production potential and economic growth opportunities. Territorial allocation of fixed assets is a condition for the regional development of productive forces (Arkhipova, Gorokhova & Demenko, 2019). Their role as part of the national wealth in the functioning of the production sector is undeniable. Improving the quality of their use can solve many problems related to the modernization and innovative development of the regional economy.

One of the results of the study is that the positions and composition of the regions have not changed much (Table 3). Only in 2018, the Republic of Crimea and the city of Sevastopol were among the leaders. They ousted the Chuvash Republic and the Lipetsk region from the leading group.

**Table 3**  
Differentiation of regions by capital-area ratio, mln. rubles / km<sup>2</sup>

2018		Place	2011	
Region	Capital-area ratio		Region	Capital-area ratio
<i>Leading regions</i>				
Moscow	14078817	1	Moscow	6886593
St. Petersburg	5117061	2	St. Petersburg	1882805
Sevastopol	338263.3	3	Moscow region	100282.8
Moscow region	181582.3	4	Republic of Tatarstan	37269.37
Republic of Crimea	84765.94	5	Samara region	33122.69
Krasnodar territory	78646.24	6	Krasnodar territory	28331.92
Republic of Tatarstan	68715.34	7	Chuvash Republic	26955.52
Samara region	60792.05	8	Lipetsk region	26462.33
Kaliningrad region	56071.85	9	Kaliningrad region	26363.64
Belgorod region	55418.71	10	Belgorod region	24780.92
<i>Outsider regions</i>				
Zabaikalsky Krai	2186,69	1	Zabaikalsky Krai	1372,77
Khabarovsk territory	2061.38	2	Republic of Buryatia	1146.76
Republic of Buryatia	1829.39	3	Khabarovsk territory	1027.30
Krasnoyarsk territory	1522.95	4	Krasnoyarsk territory	688.02
Altai republic	1418.63	5	Altai republic	535.91
Kamchatka territory	1164.73	6	Kamchatka territory	418.92
Republic of Sakha (Yakutia)	716.09	7	Magadan region	313.33
Magadan region	607.50	8	Republic of Sakha (Yakutia)	251.91
Republic of Tyva	590.59	9	Republic of Tyva	232.23
Chukotka Autonomous District	236.11	10	Chukotka Autonomous District	105.87
<b>Coefficient of differentiation</b>				
<b>59628.21</b>			<b>65045.24</b>	
<b>Decile coefficient of differentiation</b>				
<b>33.2</b>			<b>25.76</b>	

Source: compiled by the authors on the basis of (Rosstat, 2019)

The differentiation in 2011 and 2018 shows a narrowing of the gap between the absolute leader – Moscow and the Chukotka Autonomous District. In the capital, which has increased in the area, the most expensive fixed assets are concentrated. At the same time, the decile coefficient increased from 25.76 to 33.2. This is due to the fact that the gap between the outsider region in the top 10 percent group and the leader in the last 10 percent group of regions has become larger than previously between the regions occupying the same places due to a more significant increase in capital-area ratio in the regions of the first group. If the gap between outsiders increased by 1.7 times, then between leaders - by 2.3 times. Thus, it can be noted that the differentiation of regions by the level of provision with fixed assets is increasing in favour of more developed economies of compact subjects located in the European part of the country.

Currently, one of the most important indicators of the comfort of the territory and its accessibility to financial and information centres is the number of mobile devices available to the population, i.e. the overall *level of mobile communication equipment of the population*. In addition, assurance of safety and reliability of regional



network structures using communication means allows you to minimize the risk of accidents (Gretchenko A.I., Gorokhova I.V., Demenko O.G., & Gretchenko A.A., 2018). In this regard, it can be noted that significant interregional disparities have been formed in the number of connected mobile subscriber devices per 1,000 people (Table 4).

**Table 4**  
Number of connected mobile subscriber devices, units per 1000 population

2018		Place	2011	
Region	Number of connected mobile subscriber devices		Region	Number of connected mobile subscriber devices
<i>Leading regions</i>				
Moscow and Moscow region	2965.0	1	Yamal-Nenets Autonomous District	2366.9
St. Petersburg and Leningrad region	2766.3	2	Moscow and Moscow region	2288.6
Krasnodar territory	2490.3	3	St. Petersburg and Leningrad region	2272.0
Yamal-Nenets Autonomous District	2314.2	4	Murmansk region	2260.9
Nizhny Novgorod region	2250.8	5	Republic of Karelia	2061.0
Kaliningrad region	2089.8	6	Kostroma region	2050.4
Tyumen region	2062.5	7	Krasnodar territory	2021.9
Oryol region	2038.4	8	Kaliningrad region	1989.9
Sakhalin region	2006.8	9	Novgorod region	1978.3
Kaluga region	1992.7	10	Khanty-Mansi Autonomous District	1976.0
<i>Outsider regions</i>				
Zabaikalsky Krai	1430.7	1	Altai territory	1354.3
Kabardino-Balkaria Republic	1380.2	2	Republic of Ingushetiya	1304.5
Republic of Ingushetiya	1358.4	3	Republic of North Ossetia-Alania	1285.5
Karachay-Cherkess Republic	1317.9	4	Chukotka Autonomous District	1270.2
Republic of Chechnya	1303.4	5	Zabaikalsky Krai	1270.0
Republic of Tyva	1208.4	6	Karachay-Cherkess Republic	1267.6
Republic of Dagestan	1176.7	7	Kabardino-Balkaria Republic	1259.3
Republic of Adygeya	1050.2	8	Republic of Adygeya	1244.5
Republic of Crimea	241.2	9	Republic of Chechnya	1186.8
Sevastopol	45.9	10	Republic of Dagestan	1181.9
<b>Coefficient of differentiation</b>				
<b>64.6</b>		<b>2.0</b>		
<b>Decile coefficient of differentiation</b>				
<b>1.5</b>		<b>1.54</b>		

Source: compiled by the authors on the basis of (Rosstat, 2019)

The rating of regions shows that differentiation is increasing. Thus, if in 2011 the indicator in the outsider regions was half as low as in the most mobile-connected regions, in 2018 this difference was almost 65 times. At the same time, the decile coefficient has almost the same value, which indicates that there is no significant stratification of regions by the number of mobile communication devices. In 2018, the last place was occupied by the city of Federal significance – Sevastopol with a population of 435 thousand people. This is also associated with a large differentiation between regions. The line above is the Republic of Crimea, which difference with Moscow and the Moscow region is much lower –12.3 times. In addition, it is noteworthy that the ten regions that occupy the last ten places have not changed much (7 out of 10 are in the top ten), while the group of leading

regions has changed, it includes large population and economically developed regions. Of course, the development of space from the point of view of providing the population with mobile communication devices is directly related to the population size, the area of the subjects of the Russian Federation equipped with towers of mobile operators. This is much more difficult in the mountainous republics of the North Caucasus, a number of which are included in the group of lagging regions.

The Ministry of Digital Development, Communication and Mass Communications of the Russian Federation published amendments to the law "On communication" in early 2019. In particular, the matter is that cellular communication should appear in all localities where more than 100 people live. In these places, cellular communication will receive the status of a socially significant (universal) service. The state will compensate the operator for losses from its provision from the special universal service reserve. There is one universal operator in Russia - Rostelecom. Under a 10-year contract with the state to eliminate digital inequality, it must build WiFi access points in almost 14,000 locations with a population of 250-500 people. The state seeks to cover even small localities with cellular communication and thereby improve the quality of life of the population living in remote regions (the State wants to cover small localities with cellular communication-link).

Of particular importance in the provision of mobile communications is the fact that the lack of availability of telecommunication means makes it difficult for the population to transmit information in the shortest possible time in cases of natural disasters, that is, this is one of the factors that increase the economic security of the country.

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#### 4. Conclusions

The high level of development of the territory is typical, first of all, for the capital regions (Moscow, St. Petersburg and the Moscow region), and second – for compact and densely populated regions of the Russian Federation, which have a high level of transport infrastructure development, export specialization of the economy (Kaliningrad region, Krasnodar region, Belgorod region). In 2011-2018, the top ten regions with the most developed territory remained virtually unchanged.

The least developed and involved in economic activity are the subjects of the Federation with low population density, highways, mobile communications and fixed assets: Chukotka and Nenets Autonomous districts, Republic of Sakha (Yakutia), Magadan region, Kamchatka territory. The traditionally high-cost economies of these regions, however, are of great importance for the development of the Russian Federation due to their unique natural resource potential, current geopolitical role and export orientation.

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