RUSSIA'S SUSTAINABLE DEVELOPMENT POLICY AT THE REGIONAL LEVEL

ПОЛИТИКА УСТОЙЧИВОГО РАЗВИТИЯ РОССИИ НА РЕГИОНАЛЬНОМ УРОВНЕ

DOI:10.24411/2588-0209-2021-10286

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Abstract. In the context of changes in the territorial management system under the influence of restrictions caused by the coronavirus infection, the economy of modern Russian regions is becoming an increasingly independent sphere of activity, characterized by special mechanisms for coordinating various groups of interests – political, economic, and social. For the effective implementation of various types of administrative decisions, it is necessary to have an appropriate supporting infrastructure, which is formed, among other things, as a result of the development of the construction sector. Within the framework of the study conducted by the authors, based on the formation of groups (clusters) similar in structure, a hierarchical analysis of the development of the supporting infrastructure is carried out, which underlies the sustainable development of Russian regions. The result of the study was the formation of an index aggregate rating of Russian regions according to the level of infrastructure development that ensures their sustainable development. The main conclusions of the study can serve not only as a basis for a

more in-depth study of this issue in essence, but also as a basis for clarifying the development strategies of individual sectors of the national economy, as well as the general national strategy that ensures comprehensive sustainable development of the entire territory of the Russian Federation on a systematic basis.

Аннотация. В условиях изменения системы территориального управления под влиянием ограничений, вызванных коронавирусной инфекцией, экономика современных регионов России становится все более самостоятельной сферой деятельности, характеризующейся особыми механизмами согласования различных групп интересов - политических, экономических и социальных. Для эффективной реализации различных типов управленческих решений необходима соответствующая поддерживающая инфраструктура, которая формируется, в том числе, в результате развития строительной отрасли. В рамках исследования, проведенного авторами, на основе формирования групп (кластеров), сходных по структуре, иерархическая анализ развития вспомогательной инфраструктуры осуществляется, которая лежит в основе устойчивого развития российских регионов. Результатом исследования явилось формирование индексного агрегированного рейтинга регионов России по уровню развития инфраструктуры, обеспечивающей их устойчивое развитие. Основные выводы исследования могут служить не только основой для более глубокого изучения данного вопроса по существу, но и основой для уточнения стратегий развития отдельных секторов национальной экономики, а также общенациональной стратегия, обеспечивающая комплексное устойчивое развитие всей территории Российской Федерации на системной основе.

Keywords: Regional Economic, Sustainable Development, Territorial Development, Strategy Development of Russia, Multivariate Statistical Analysis, Cluster Analysis, Urban Planning, Construction Industry

Ключевые слова: региональная экономика, устойчивое развитие, территориальное развитие, стратегия развития России, многомерный статистический анализ, кластерный анализ, градостроительство, строительная отрасль.

1. Introduction

The importance of the construction industry for the economy of large agglomerations and individual territories cannot be disputed [1, 2]. The pace of construction characterizes the most important aspects of conjunctural and socio-economic transformations in the field of urban development policy of the state [3, 4, 5].

One of the essential aspects of the modern sustainable development of the territory of the Russian Federation is the acceleration of the pace of construction of residential, industrial, commercial and engineering infrastructure [6, 7]. The materials of scientific research on the problems of socio-

economic, administrative-financial, industrial-technological, ecological-recreational development of the territory of the subjects of the Russian Federation often do not contain sections dedicated to the construction industry, including interregional comparisons and classification throughout the country [8, 9, 10, 11, 12, 13]. Most often, a list of problems and possible ways out of the current situation is given without indicating the generalization of solutions to relatively homogeneous regions characterized by an equal rate of development of the construction industry. A significant intensification of investment resources in the construction industry is required [14, 15]. In turn, excessive and cheap financial resources (with proper control by the authorities) will be a source of continuous innovation [16, 17, 18, 19]. All this will make the life of ordinary people not only better, but also safer [20, 21]. Particular importance in this matter should be given to the development of digital technologies for analysis and forecasting of the development of territories. The fact of widespread implementation of multidimensional statistical models in data management systems and the formation of cloud technologies and storage with the use of systems based on artificial intelligence is indisputable and accomplished [22, 23, 24, 25]. The initial stage of this issue should be considered the formation of simple statistical models aimed at reconnaissance analysis of factual data, which is proposed by the authors as materials of this study. The algorithm of actions used in this study can be adapted for other management and analysis issues as well.

2. Materials and Methods

In order to characterize the regional component of the development of the construction industry, the most correlated indicators were selected from the data published by Rosstat in the context of the subjects of the Russian Federation. These indicators provide possible inputs for multivariate statistical analysis and cross-regional comparisons.

At the initial stage of the study, the studied indicators were more than one thousand, but the requirements for working with the initial statistical sample for multidimensional calculations led to a significant reduction in the variables. After summarizing all the initial data, which are officially published in the open press and can be used in the study, a preliminary division of the subjects of the Russian Federation was carried out according to the degree of uniformity in the context of the development of the construction sector. For these purposes, cluster analysis was used. The most informative indicators were selected from the list of available ones.

In addition, standard verification procedures were carried out, including checking for homogeneity (uniformity), multicollinearity and compliance of the initial data with the normal distribution (histograms of the normal distribution were constructed and deviations of the actual values from the theoretical bell curve were checked).

As a software tool for processing source information, Tibco's STATISTICA program has gained wide popularity in the Russian market. For the purposes of this study, the official version of Tibco Statistica 13.3 - Basic Academic Package 32/64-bit (English) was used. The official published data of the Federal State Statistics Service served as the statistical base of the conducted research.

3. Results

As a result of the preliminary selection of indicators, the following variables remained: X21 (number of people employed in construction, unit-person), X197 (cost of construction work performed, unit-rubles), X463 (cost of fixed assets in construction, unit-rubles), X642 (number of construction organizations and enterprises, unit-enterprise), X685 (volume of monetary turnover in construction, unit-rubles), and X747 (number of small construction enterprises, unit-enterprise). This case, in particular, demonstrates the need for methodological improvement of the statistical

accounting process and determines the expansion of both the list of indicators currently being formed in the system of national accounts, and the completeness and quality of the data collected. Five groups of regions (clusters) were obtained, which are characterized by sufficient uniformity of the considered indicators. Undoubtedly, the leaders were the cities of federal significance Moscow and St. Petersburg. Since 2014, another city of federal significance, Sevastopol, has been allocated as part of the Russian Federation, however, as you can see, its infrastructural development is below the national average and cannot yet serve as the basis for socially sustainable development.

As a method of constructing a cluster structure, a hierarchical agglomerative method was used, in which dendrograms (Tree Diagram) are built. All 85 regions of the Russian Federation took part in the analysis. To determine the distance between the clusters, the simplest geometric distance on the plane (straight line, Euclidean distances) was used; as a method of grouping, the Ward's method was used, which is universal for economic research of this kind. As a scale, the authors developed and proposed the following: Moscow, Leading Regions, Developed Regions, Backward Regions, and finally Crisis Regions.

The results in the form of a list are also reflected in the table and are convenient for further subject analysis (Table 1).

Table1. Rating of Russian regions by the level of infrastructure development that ensures the sustainable development of the regions

#	##	Regions*	X21**, thousands of people	X197, billion rubles	X463, billion rubles	X642, thousands of enterprises	X685, billion rubles	X747, thousands of enterprises
		Cluster 1 - Moscow						
1	1	Moscow	932,1	876,8	241,5	95,7	1074,0	53,0
		Cluster 2 - Leading regions						
2	1	Moscow Region	313,1	328,5	84,9	22,9	209,0	13,8
3	2	St. Petersburg	295,9	626,1	131,8	39,2	462,0	27,5
4	5	Krasnodar Territory	222,4	252,1	99,6	18,6	108,0	13,1
5	5	Republic of Tatarstan	195,2	336,9	95,3	15,5	146,0	10,4
6	5	Sverdlovsk Region	134,2	185,5	97,9	17,2	55,0	11,7
		Cluster 3 - Developed Regions						
7	1	Rostov Region	164,7	159,3	30,8	8,5	35,0	6,4
8	2	Republic of Dagestan	136,5	133,4	76,3	4,6	11,0	1,2
9	3	Republic of Bashkortostan	164,1	191,4	40,4	11,6	84,0	8,0
10	4	Perm Territory	105,0	104,9	27,8	9,7	34,0	8,4
11	5	Nizhny Novgorod Region	151,8	153,2	43,6	10,7	34,0	6,0
12	6	Samara Region	144,0	187,6	36,6	12,2	64,0	8,5
13	7	Tumen Region	108,5	159,8	37,6	7,3	68,0	6,1
14	8	Khanty-Mansijsk Aut.Distr.-Yugra	105,0	197,0	98,8	6,5	124,0	4,3
15	9	Chelyabinsk Region	154,5	122,7	25,1	11,5	41,0	8,3
16	10	Krasnoyarsk Territory	112,4	201,7	42,9	8,7	78,0	6,9
17	11	Irkutsk Region	90,4	131,8	44,4	6,4	45,0	4,6
18	12	Novosibirsk Region	91,4	114,9	41,8	12,1	21,0	8,7
		Cluster 4 - Backward Regions						
19	1	Belgorod Region	56,5	71,0	17,2	4,6	32,0	3,4
20	2	Bryansk Region	33,7	27,8	10,0	2,1	6,0	1,6
21	3	Vladimir Region	57,5	34,3	4,4	3,2	7,0	2,5
22	4	Voronezh Region	76,2	100,4	26,2	5,8	21,0	4,3

23	5	Ivanovo Region	27,0	20,8	9,7	3,2	3,0	2,4
24	6	Kaluga Region	50,5	53,9	14,0	3,0	26,0	2,2
25	7	Kursk Region	31,2	44,9	15,0	2,2	13,0	1,4
26	8	Lipetsk Region	42,6	42,4	15,5	2,2	11,0	1,7
27	9	Ryazan Region	44,5	40,2	11,5	3,6	7,0	2,8
28	10	Smolensk Region	31,8	23,9	13,4	2,5	5,0	1,8
29	11	Tver Region	39,2	26,1	13,6	3,2	14,0	2,6
30	12	Tula Region	57,6	41,7	14,9	4,0	27,0	2,9
31	13	Yaroslavl Region	41,3	46,2	14,1	5,9	15,0	4,1
32	14	Komi Republic	33,6	105,3	21,5	2,3	14,0	1,6
33	15	Arkhangelsk Region	28,8	48,0	11,0	2,4	8,0	1,8
34	16	Vologda Region	37,3	65,8	11,4	6,7	8,0	4,0
35	17	Kaliningrad Region	45,7	72,2	23,4	7,0	11,0	3,7
36	18	Leningrad Region	85,6	98,2	19,9	3,1	76,0	2,3
37	19	Murmansk Region	23,6	34,4	21,7	1,8	5,0	1,4
38	20	Novgorod Region	17,3	58,2	11,5	1,7	5,0	1,2
39	21	Volgograd Region	86,4	77,0	24,0	4,9	34,0	4,1
40	22	Republic of Chechen	75,2	26,5	13,2	1,8	7,0	1,0
41	23	Stavropol Territory	99,3	52,0	17,7	4,5	21,0	3,0
42	24	Udmurt Republic	58,8	42,7	11,9	4,8	27,0	3,5
43	25	Chuvash Republic	58,5	35,8	14,1	3,0	13,0	2,5
44	26	Kirov Region	32,6	33,7	12,9	3,1	7,0	2,7
45	27	Orenburg Region	69,4	49,8	14,6	4,4	18,0	2,9
46	28	Penza Region	56,2	33,6	8,8	2,3	8,0	1,8
47	29	Saratov Region	86,5	54,9	13,3	4,2	19,0	3,4
48	30	Ulyanovsk Region	43,6	41,7	7,9	2,8	13,0	2,2
49	31	Yamalo-Nenets Aut.District	61,7	177,2	22,1	2,1	90,0	1,2
50	32	Republic of Buryatia	29,3	23,6	11,6	2,1	3,0	1,7
51	33	Altai Territory	65,0	45,8	8,0	4,6	11,0	3,7
52	34	Kemerovo Region	72,8	95,7	34,8	4,6	39,0	3,7
53	35	Omsk Region	76,3	62,7	17,6	5,4	18,0	3,7
54	36	Tomsk Region	37,2	57,4	8,3	3,4	22,0	1,9
55	37	Republic of Sakha (Yakutia)	39,6	116,0	30,2	4,1	17,0	2,6
56	38	Primorye Territory	61,5	66,9	17,0	6,1	6,0	4,3
57	39	Khabarovsk Territory	67,0	59,8	32,0	5,5	33,0	4,4
58	40	Amur Region	48,9	52,8	31,1	2,0	26,0	1,5
59	41	Sakhalin Region	39,0	86,1	17,8	2,2	51,0	1,5
60	42	Crimea Republic	75,4	7,5	16,3	3,1	8,0	2,6
		Cluster 5 - Crisis Regions						
61	1	Kostroma Region	17,8	10,9	2,5	1,8	3,0	1,4
62	2	Orel Region	21,6	19,5	5,6	1,7	6,0	1,3
63	3	Tambov Region	17,3	32,7	6,1	1,8	10,0	1,4
64	4	Republic of Karelia	19,9	17,0	4,3	2,4	3,0	1,5
65	5	Nenets Autonomous District	2,7	8,7	3,4	0,1	3,0	0,1
66	6	Pskov Region	21,1	21,1	5,3	1,5	3,0	1,2
67	7	Republic of Adygeya	14,2	12,9	4,6	0,8	5,0	0,6
68	8	Republic of Kalmyk	8,5	1,3	1,1	0,4	3,0	0,2
69	9	Astrakhan Region	31,4	26,5	7,0	1,8	9,0	1,3
70	10	Republic of Ingushetia	15,4	8,2	2,7	1,0	3,0	0,4
71	11	Kabardino-Balkan Republic	38,4	14,9	2,4	1,2	3,0	0,6
72	12	Karachaevo-Circassian Republic	14,8	12,9	1,5	0,6	9,0	0,4
73	13	Republic of North Ossetia-Alanya	23,5	24,0	3,7	0,9	6,0	0,6
74	14	Republic of Marij-El	16,2	13,2	4,7	1,6	5,0	1,3

75	15	Republic of Mordovia	31,0	28,1	4,2	1,5	12,0	1,2
76	16	Kurgan Region	19,4	12,2	5,2	1,6	3,0	1,0
77	17	Altai Republic	4,9	7,5	1,3	0,6	1,0	0,4
78	18	Republic of Tyva	4,1	4,9	2,0	0,3	3,0	0,2
79	19	Republic of Khakassia	21,1	15,1	3,6	1,1	8,0	0,7
80	20	Zabaikalye Territory	26,4	28,7	8,8	1,6	5,0	1,1
81	21	Kamchatka Territory	11,2	23,0	11,4	1,2	18,0	1,0
82	22	Magadan Region	7,8	14,7	4,7	0,4	5,0	0,3
83	23	Jewish Autonomous District	4,6	4,9	2,3	0,3	1,0	0,2
84	24	Chukotka Autonomous District	1,9	4,3	2,2	0,1	5,0	0,1
85	25	Sevastopol	13,3	18,5	1,2	1,2	5,0	1,0

Note: * authors' calculations
** Federal State Statistics Service

The results of dividing Russian regions into groups, obtained on the basis of the hierarchical clustering method, were checked by the divisional method (k-means), one of the advantages of which is the ability to check the results by variance analysis. The use of this kind of verification by the authors was carried out taking into account general assumptions about the comparability of the results obtained by both methods. According to the results obtained on the basis of the variance analysis, no significant deviations from normality were revealed – the inter-group variance in all cases significantly exceeded the intra-group variability in the obtained clusters, the significance level (p-level) at which the null hypothesis is rejected (that the data are not interrelated) for all variables was also much less than the threshold value of 0.05, which is acceptable for any kind of socio-economic research.

Based on the amplitude and significance levels, the average annual number of people employed in construction (X21) and the number of construction enterprises and organizations (X642) became the main ones when deciding on the distribution of regions by clusters).

According to the results of the analysis, it can be argued that in twenty-five subjects of the Russian Federation belonging to the fifth cluster, the degree of intensification of the construction industry is insufficient and significantly lags behind the average Russian values, which allows us to judge them as a crisis. These regions should be treated with great attention both in the distribution of federal transfers, and in monitoring the implementation of national and regional projects and programs.

5. Conclusion

Currently, regional authorities are receiving more and more powers to solve the most pressing socio-economic problems. This affects the potential of local governments to change the critical state of affairs in various branches of administrative activity. Along with the frequently discussed problems of the socio-economic development of Russian territories, such as a shortage of labor resources, low qualifications of personnel, depopulation, a low quality of life, an unfavorable environmental situation, a high physical deterioration of fixed assets, and more, according to the authors, insufficient attention is paid to the construction of infrastructure that provides all this for the sustainable development of Russian regions. It is also necessary to state a small number of scientific publications containing mathematical conclusions regarding the strategic directions of development of both the economy of individual constituent entities of the Russian Federation, and the construction sector, in particular. Meanwhile, construction is the engine of the economy. The consistent removal of restrictions on the development of the construction market in the constituent

entities of the Russian Federation will accelerate labor, production, financial and administrative processes, and will also make it possible to fulfill the main provisions of the Decree of the President of the Russian Federation V.V. Putin on the breakthrough scientific, technological and socio-economic development of Russia, which must be reached by 2024.

6. Acknowledgments

The authors are grateful for assistance to Academician of the Russian Academy of Sciences, Rector of the State University of Land Use Planning, Doctor of Economics, Professor, Sergei N. Volkov, as well as Mikhail P. Burov, Professor, Doctor of Economics, a member of Scientific Council of the Russian Academy of Sciences on complex problems of Eurasian economic integration, modernization, competitiveness and sustainable development.

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Conflict-of-interest notification

The authors of this article, bindingly and explicitly declare of the partial and total lack of actual or potential conflict of interest with any other third party whatsoever, which may arise as a result of the publication of this article. This statement relates to the study, data collection and interpretation, writing and preparation of the article, and the decision to submit the manuscript for publication.

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