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## Assessment of the Socio-Economic Situation in the Arctic Municipal Districts of the Arkhangelsk Oblast Based on the Target Model \*

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**Abstract.** The relevance of this study is due to the need to develop a fairly understandable and in some sense universal tool for assessing the socio-economic situation in municipalities (districts and settlements) with pronounced territorial specifics, with clearly insufficient statistical and information support. The authors, with references to the results of their own research and to the work of their colleagues, present a detailed analysis of the key problems characteristic of the territories of the Russian Arctic, compare them with a set of main external factors of influence in relation to municipalities. Using the SEER expert procedure scheme and the hierarchy analysis method, according to the two-level model proposed by the authors, complex point estimates of the socio-economic situation in the Arctic settlements and municipal districts of the Arkhangelsk Oblast are calculated. The paper notes that the factors that are directly related to transport accessibility have the greatest impact on the development targets of Arctic municipalities. Therefore, the transport and logistics component should be fundamental in all strategic, program and planning documents aimed at achieving the goals of socio-economic development of the Arctic municipalities — districts and settlements. The obtained estimates are proposed to be used in the development of management decisions that could become the basis of a comprehensive interdepartmental inter-municipal program for the socio-economic development of Arctic municipalities.

**Keywords:** *Arctic zone of the Russian Federation, municipality, district and settlement, socio-economic situation, expert assessment, target model, management decision-making*

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### ***Introduction***

A lot of scientific research has been devoted to the issues of socio-economic development of municipalities, as well as the application of various methods and models for forecasting their development and making balanced management decisions. For example, theoretical and applied aspects of predicting socio-economic development of municipalities are reflected in studies [1, Baeva V.V., Novikov A.I.; 2, Fishman L.I., Ivanov M.Yu.; 3, Stepanova V.V. et al.]. Various approaches to modeling socio-economic processes in municipalities are described in the works [4, Oreshnikov V.V., Aitova Yu.S.; 5, Novoselova A.S. et al.; 6, Fattakhov R.V. et al.; 7, Nizamutdinov M.M. et al.; 8, Chekmareva E.A.]. The adoption of managerial decisions at the municipal level is disclosed in detail in the works [9, Grushin V.A., Baryshova Yu.N.; 10, Tebekina A.V., Tebekina P.A.], etc.

However, despite a large pool of systematic research in this area, at least two serious problems remain unresolved. The first one is associated with the apparent lack, and sometimes complete absence, of statistical and other relevant information necessary for the development, verification and implementation of the appropriate models. The second problem is the lack of universal, easily scalable models that do not require large amounts of information and that correctly take into account the territorial and other specifics that are characteristic of municipalities at the level of districts and their settlements. There are many reasons for this, but we will leave them outside the scope of this work. It should only be noted that municipal districts and settlements located in the territories of the Arctic Zone of the Russian Federation (AZRF) have such distinctive specifics, which will be discussed below.

#### ***Conceptual target model for assessing the socio-economic situation and developing management decisions in the Arctic municipalities***

Based on the available experience of interaction with the authorities of different levels, heads of enterprises and organizations, the business community, as well as being guided by practical feasibility, the authors propose to solve a number of tasks related to the development, adoption and implementation of managerial decisions aimed at the socio-economic development of municipal areas and settlements, using the following conceptual target model (Fig. 1).

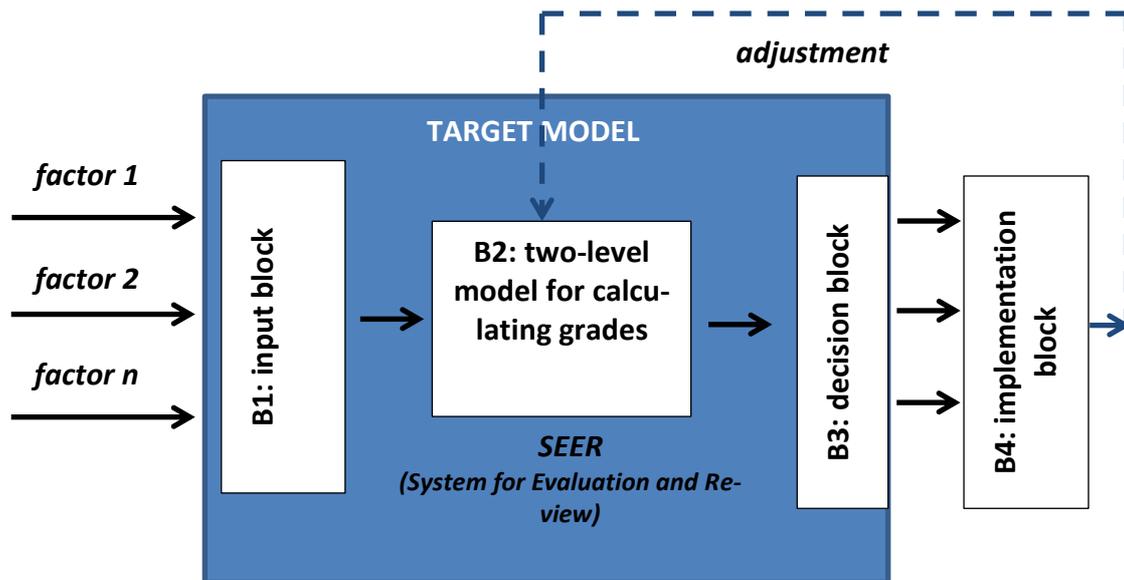


Fig. 1. Conceptual target model.

Before describing the functioning of this model, let us dwell on the specific problems of the object of modeling — the territories that are part of the Russian Arctic. Currently, the managerial problem area responsible for the socio-economic development of the Arctic municipalities is essentially reduced to the dilemma: to maintain an acceptable standard of living in these territories, or to invest certain resources in ensuring socio-economic growth (we do not consider the third possible scenario, which previously appeared in a number of draft strategic documents and is associated with the liquidation of unpromising settlements). Of course, when solving this issue, it is possible to “chase two birds with one stone”, but, as long-term practice shows, such a strategy usually does not bring anything good [11, Tutygin A.G., Chizhova L.A.].

This issue is not new and belongs to a number of organizational and economic problems of using limited resources. As noted in [12, Emelyanova E.E., p. 1830], the prospects for the socio-economic development of the Arctic municipalities are associated, first of all, with the successful functioning of industrialized centers: single-industry and “oil and gas” municipalities, as well as regional administrative centers.

In general, the territories of the Arctic zone of the Russian Federation, according to a number of researchers, are characterized by the presence of personnel problems, the development of negative demographic and migration processes, poorly developed social infrastructure, critical disproportions between the contribution of the AZRF to the country’s economy and the living and working conditions of employees [13, Rzhantsyna L.S. , Kravchenko E.V., p. 78]. Projecting these problems to the level of municipalities only increases their acuteness and demand for a systematic solution. The study of our colleagues showed that the municipal and urban districts of the Arkhangelsk Oblast belong to the group of Arctic municipalities with extremely low values of indicators of both demographic state and economic development. At the same time, they found a direct correlation between the level of economic development and the demographic state of most Arctic territories [14, Ukhanova A.V. et al., p. 189].

### ***Problems specific to the Arctic territories at the regional and municipal levels***

It should be noted that all AZRF territories are characterized by a number of problems, both at the regional and municipal levels, described in detail, for example, in the works [15, Tutygin A.G., Chizhova L.A.; 16, Krapivin D.S.]. Let us consider them in more depth.

#### ***1. Decrease in production volumes, low share of processing and high-tech industries***

The index of physical volume of gross regional product in 2018, according to official statistics, decreased compared to the previous period in the Nenets Autonomous Okrug (NAO), Arkhangelsk and Murmansk oblasts. Compared to 2010, this indicator has decreased significantly in the Krasnoyarsk Krai (-2.5%), the Republics of Karelia and Komi (-3.3% and -4.1%), as well as in the NAO (-3.7%). The share of the manufacturing industry in the NAO and Chukotka Autonomous Okrug does not exceed 0.3%, in the Republic of Sakha (Yakutia) it is 1.1%, in the Yamalo-Nenets Autonomous Okrug — 1.6%, which is connected with the focus of the economy of these territories on the natural resources extraction. The largest share of the manufacturing industry is noted in such Arctic regions as the Krasnoyarsk Krai (31.8%), the Arkhangelsk Oblast (27.4%), the Republic of Karelia (20.8%). As for the share of organizations that carried out technological innovations, it should be said that in all AZRF regions, without exception, this indicator is below the national average. In the NAO it is four times lower than the average Russian value, and in the Republic of Karelia and the Chukotka Autonomous Okrug, it is two times lower. The depletion of the natural resource base, the high cost of production in the Arctic, and sometimes inefficient management led to the disappearance of a number of forestry and coal industries in the Arkhangelsk Oblast, the Republics of Karelia and Komi. Many of these enterprises were city-forming. Along with their disappearance, entire villages and even cities (for example, Vorkuta) turned out to be on the verge of extinction [17, Smirennikova E.V. et al., p. 25].

#### ***2. High level of tariffs for electricity and housing and communal services, a large share of dilapidated housing, high deterioration of utility infrastructure***

The cold climate and low average annual temperatures lead to large volumes of heat and electricity consumption. At the same time, high tariffs for energy resources in a number of Arctic regions have a significant impact on the cost of products, works and services and negatively affect the structure of household expenses. According to Energoseti Rossii Company, the single-rate electricity tariff for the population living in urban areas of the Arkhangelsk Oblast, the NAO, the Chukotka Autonomous Okrug and the Republic of Sakha (Yakutia) is much higher than, for example, for the population of the Vologda and Leningrad oblasts. It should be noted that in other regions of the Russian Arctic (Murmansk Oblast, Republic of Karelia, Krasnoyarsk Krai), electricity tariffs are low compared to other AZRF territories, but there are other problems there. For example, in the Murmansk Oblast, there is a problem of selling electricity generated by the Kola NPP, which also supplies neighboring Karelia with its electricity.

At the same time, a number of remote, coastal and island territories of the Russian Arctic, which do not have a centralized energy supply, use local energy sources, primarily diesel power

plants (DPP). In turn, the provision of diesel power plants with fuel is associated with a number of transport and logistics difficulties, including the problem of “northern delivery”. One of the approaches to solving the transport and energy tangle of problems of the Arctic territories is considered in detail, for example, in [18, Korobov V.B. et al.].

According to statistics, there is an increase in the share of emergency and dilapidated housing in all subjects of the Russian Arctic. For example, in the Arkhangelsk region, the share of emergency housing is 8.2%, in the NAO — more than 5%, in the Republic of Sakha (Yakutia) — 7.5%, in the YaNAO — 6.9% (with an average Russian indicator of 0.8% ). The situation with dilapidated housing is similar, its share in the Republic of Sakha (Yakutia) exceeds the average Russian level by 8 times, in the YaNAO — by 6 times, and in the Arkhangelsk Oblast — by 4 times.

The deterioration of communal infrastructure in the Arctic regions is quite high. For example, in the Arkhangelsk Oblast, the depreciation of heating networks is more than 50%, water pipes — more than 60%, and electricity networks — about 30%. Thus, the vast majority of AZRF territories lag behind in the quality of housing conditions, the provision of housing and communal services, and waste management, which, along with the limited scope of labor, stimulates an additional outflow of the population [19, Kutsenko S.Yu. et al., p. 15]. Let us also note that in many territories of the Russian Arctic, communication systems (Internet, mobile connection) are extremely underdeveloped, which significantly limits access to electronic services of various departments and organizations, markets for goods and services implemented through IT infrastructure.

*3. High share of transport in the price of products; moral and physical aging of fixed assets in all modes of transport*

Inaccessibility of areas without sustainable year-round transport links, quite a lot of which are in the Russian Arctic, is the reason for the low communication and logistics activity. Renovation, modernization and development of transport infrastructure facilities require large capital investments. At the same time, as it is quite reasonably noted, for example, in the monograph [20, Problems of modeling logistics operations..., p. 38], the AZRF transport infrastructure is not sufficient to meet the needs of the real sector of the economy and the needs of the population.

*4. Decrease in total population, migration*

The decrease in the population of the Russian Arctic, in addition to migration activity, is driven by a declining birth rate. An important feature of fertility dynamics in the Arctic regions of the Russian Federation is the reduction in the birth rate of second and third children in the family, the increase in the average age of mothers, and the level of abortion, higher than the average in the country. The peculiarity of reproductive attitudes of young people under 29 years old is the priority choice of a small family type, which, given the small number of this generation (born in the 1990s), can lead to depopulation and further desertification of the Arctic territories [21, Gubina O.V., Provorova A.A., pp. 540–542].

*5. Social problems of the local population and indigenous peoples of the North (SIP): health care, education, employment, housing, etc.*

More than half of the indigenous peoples of Russia live on the Arctic territory. The Nenets people are the most numerous among them (about 44 thousand people). Here we also note that the main activity of the Nenets is reindeer breeding; fishing plays an important, but secondary role, being an addition to reindeer breeding [22, Tortsev A.M. et al., p. 273]. The depletion of pastures due to the growth of technogenic and anthropogenic pressure is one of the significant threats to the traditional life of the indigenous peoples. This, in turn, leads to a deterioration in the forage base of reindeer herding and, subsequently, to a change in the health status, which is determined by the natural environment, predominantly the quality of water and traditional foods (reindeer meat and local fish) [23, Pavlenko V.I. et al., p. 30].

#### *6. Problems of the budgetary system and interbudgetary relations*

The current mechanisms of interbudgetary relations in Russian regions do not always allow solving the problems associated with the implementation of the powers of state and municipal authorities. The current methodology for distributing subsidies for equalizing budgetary security at the expense of the budget of a constituent entity of the Russian Federation is imperfect. It does not show the principle by which subsidies are directed to municipalities and basically does not take into account their socio-economic development, the stimulating function of interbudgetary relations and the effectiveness of the activities of local governments [24, Finance and interbudgetary relations of the Arkhangelsk Oblast, p. 177]. The study [25, Matvienko I.I. et al., p. 42] carried out a detailed analysis and classified the budgetary powers of municipalities according to the level of their cost. At that, the powers in the spheres of housing and communal services and local transport, where capital investments prevail, which should be accumulated in regional and municipal investment programs, were referred to the high-cost ones.

#### *7. Low investment attractiveness*

As noted in [26, Zakharchuk E.A., p. 2], in the Russian Arctic, a significant channel for the outflow of financial resources is the public sector, which withdraws them through the mineral extraction tax. Therefore, the share of funds remaining at the disposal of municipalities depends on the degree of population settlement. The rotational method of attracting workers does not allow the territories to “restart” the financial resources of households in the service sectors. The incomes of employees are used in other regions, which reduces the economic potential of the Arctic municipalities and leads to a decrease in the entrepreneurial activity of small and medium-sized businesses, which are mainly concentrated in the field of trade and public services [27, Chizhova L.A. et al.]. In general, according to the approach proposed in [28, Tutygin A.G. et al., p. 44], investment attractiveness for municipalities can be determined based on the composite rating of investment potential and investment risk by a two-dimensional ranking. According to the calculations of the consolidated rating of investment attractiveness of the municipalities of the Arkhangelsk Oblast, such Arctic regions as Leshukonskiy, Mezenskiy and Onezhskiy fell into the “below average” category, while Pinezhskiy and Primorskiy — into the “average level”. Today, this situation has not changed fundamentally.

### ***Approbation of the target model for the Arctic municipal districts and settlements of the Arkhangelsk Oblast***

Based on the above-described problems of the Arctic territories, the key factors influencing the socio-economic situation of the municipalities located there by expert selection included the following: transport accessibility of settlements ( $X_1$ ), energy supply (sustainable electricity supply) ( $X_2$ ), availability of sustainable communications (communication, Internet) ( $X_3$ ), availability of infrastructure facilities for housing and communal services ( $X_4$ ), medical ( $X_5$ ) and educational institutions ( $X_6$ ), cultural institutions ( $X_7$ ), physical education and sports facilities ( $X_8$ ), as well as the availability of industrial infrastructure facilities ( $X_9$ ) [29, Lovdin E.N., Regeta A.I., p. 447].

The question of the inclusion of the environmental component in the key factors of influence has become controversial, from the authors' point of view. However, we decided not to consider it at the level of municipalities, largely appealing to the professional opinion of our colleagues. For example, in [30, Kotova E.I. et al.], it is noted that currently the environmental situation in the Russian Arctic cannot be called acute. There are local zones of pollution and violations of territories directly near the sources of impact. Extreme situations are quite rare. Let us just say that at the municipal level of management, the issues of "household" ecology are largely correlated with the functioning of the housing and communal services infrastructure (factor  $X_4$ ). In this factor, the environmental component that affects the socio-economic development of municipalities is partially taken into account within the powers of municipalities related to the removal (sorting) of MSW, provision of clean water and water disposal (drainage) services to the local population.

Table 1 correlates the main problems and relevant exogenous factors that have a significant impact on the socio-economic situation in the Arctic municipalities of the Arkhangelsk Oblast.

*Table 1*

*Comparison of problems and factors affecting the socio-economic situation in the Arctic municipalities of the Arkhangelsk Oblast*

Problems	Factors
1. Decrease in production volumes, low share of processing and high-tech industries	$X_1, X_2, X_9$
2. High level of tariffs for electricity and housing and communal services, a large share of dilapidated housing, high deterioration of utility infrastructure	$X_1, X_2, X_4$
3. High share of transport in the price of products; moral and physical aging of fixed assets in all modes of transport	$X_1, X_2$
4. Decrease in total population, migration	$X_1, X_3, X_4, X_5, X_6, X_7, X_8, X_9$
5. Social problems of the local population and indigenous peoples of the North (SIP): health care, education, employment, housing, etc.	$X_4, X_5, X_6, X_7, X_8, X_9$
6. Problems of the budgetary system and interbudgetary relations	$X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9$
7. Low investment attractiveness	$X_1, X_2, X_9$

Returning to the target model (Fig. 1), we note that it corresponds to the two-level expert procedure SEER — one of the modifications of the well-known Delphi method [31, Ostreikovskiy V.A.].

The exogenous factors listed above are input information for B1 block of the target model, which results in assigning appropriate weighting coefficients to them as follows.

Let  $X_1, X_2, \dots, X_n$  be a set of factors expressed on a nine-point scale (the highest score is 9, the lowest score is 1),  $w_1, w_2, \dots, w_n$  — non-negative weights of these factors,  $\sum_{i=1}^n w_j = 1$ , obtained by using the hierarchy analysis method [32, Classification methods for solving...]. Estimates and pairwise comparisons of factors are made by experts of the second (upper) hierarchy level of the SEER procedure.

Let us proceed to the description of block B2. In [29, Lovdin E.N., Regeta A.I.], the following two-level model was proposed for a comprehensive socio-economic assessment of municipalities. Let us denote  $v_{ij}$  — point score of the  $i$ -th municipality of the first level (settlement) by the  $j$ -th factor, where  $i = 1, 2, \dots, m, j = 1, 2, \dots, n$ . Then a comprehensive assessment of the  $i$ -th settlement for the entire set of factors will be represented by the formula:

$$V_i = \sum_{j=1}^n w_j \cdot v_{ij}, i = 1, 2, \dots, m \quad (1)$$

Next, we group the settlements  $O_1, O_2, \dots, O_m$  by districts (municipalities of the second level). At the same time, the weight coefficients  $\lambda_i$  of the objects-settlements included in the corresponding district will be determined by their share in the total population of the municipal district. Then the integrated assessment for the corresponding area  $K_p$  is calculated as:

$$K_p = \sum_{O_i \in K_p} \lambda_i \cdot V_i = \sum_{O_i \in K_p} \lambda_i \cdot \left( \sum_{j=1}^n w_j \cdot v_{ij} \right) \quad (2)$$

Subsequently, the model can be adjusted with a specified frequency, firstly, by recalculating the weights of factors based on the upper level of the hierarchy of the SEER procedure, secondly, by replicating pairwise comparisons of the lower level, and, thirdly, by making changes to the redistribution population by locality. At the same time, the model template allows to make such adjustments quite easy.

Let us present the calculations performed for the Leshukonskiy, Mezenskiy, Onezhskiy, Pinezhskiy and Primorskiy municipal districts of the Arkhangelsk Oblast, the territories of which are included in the Russian Arctic. As a starting point, we take the results obtained for the Arctic municipalities of the region by one of the authors in [33, Lovdin E.N., Lets O.V., p. 41]. The positioning of municipalities was carried out in it, as a result of which Leshukonskiy, Onezhskiy, and Pinezhskiy districts fell into the most problematic of the matrix sectors. Although the Mezenskiy and Primorskiy districts turned out to be in a more favorable position, they nevertheless have a significant disproportion between the economic and social components, which can lead to an in-

crease in social tension. In view of the above, we combine all five districts into one problematic group that is significantly influenced by a set of factors common to them.

The method of Thomas Saaty [34] was used to conduct a pairwise comparison of the main exogenous factors that, as noted above, have the greatest influence on the socio-economic development of territories (Table 2). The expert group of this level, according to the SEER procedure and taking into account the recommendations given in [35, Korobov V.B. et al.], included seven representatives of the scientific community and public authorities of the region.

Table 2

*Matrix of pairwise comparisons of factors by the method of T. Saaty*

	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$	$X_7$	$X_8$	$X_9$
$X_1$	1.00	5.00	7.00	5.00	4.00	6.00	8.00	9.00	5.00
$X_2$	0.20	1.00	2.00	1.00	3.00	5.00	6.00	7.00	2.00
$X_3$	0.14	0.50	1.00	0.33	0.33	1.00	5.00	6.00	0.20
$X_4$	0.20	1.00	3.00	1.00	2.00	3.00	5.00	6.00	1.00
$X_5$	0.25	0.33	3.00	0.50	1.00	3.00	4.00	5.00	1.00
$X_6$	0.17	0.20	1.00	0.33	0.33	1.00	3.00	4.00	0.20
$X_7$	0.13	0.17	0.20	0.20	0.25	0.33	1.00	2.00	0.17
$X_8$	0.11	0.14	0.17	0.17	0.20	0.25	0.50	1.00	0.14
$X_9$	0.20	0.50	5.00	1.00	1.00	5.00	6.00	7.00	1.00

The weight coefficients of the factors were calculated by the hierarchy analysis method (HAM) (Table 3). It should be noted that the consistency ratio of this expert procedure was  $OS = 8.7\%$ , which does not exceed the recommended level of 10% [36, Tutygin A.G. et al.]. The highest weights were given to the factors of transport availability — 0.38 and energy supply — 0.15.

Table 3

*Weight coefficients of factors calculated on the basis of HAM*

Factor	Factor description	weight
$X_1$	Transport accessibility of the settlement	0.377188
$X_2$	Energy supply (sustainable power supply)	0.148416
$X_3$	Availability of stable communications: telephone connection, Internet	0.054888
$X_4$	Availability of housing and communal services infrastructure facilities	0.118872
$X_5$	Provision with medical institutions	0.091152
$X_6$	Provision with educational institutions	0.043309
$X_7$	Provision with cultural institutions	0.022962
$X_8$	Provision with physical culture and sports facilities	0.017077
$X_9$	Availability of industrial infrastructure facilities	0.126136

The complex estimations of the settlements, calculated by the formula (1), and their shares in the total population of the districts are presented in Table 4. Point estimates  $v_{ij}$  in the context of settlements were set by experts at the municipal level — deputies, managers and specialists, activists of territorial public self-government, representatives of local business communities. It should be noted that the number of experts involved at this stage of the procedure (taking into account the deviation of extreme and anomalous estimates) for each of the municipalities amounted to 10–12 people.

Table 4

## Comprehensive assessments of settlements

Settlements	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$	$X_7$	$X_8$	$X_9$	$V_i$	$\lambda_i$
<b>Leshukonskiy district</b>											
Vozhgora	2	5	5	1	2	9	9	2	2	2.95	0.0984
Leshukonskoe	8	5	5	8	9	9	9	5	9	7.62	0.6910
Koinas	3	5	5	1	7	9	9	2	2	3.79	0.0995
Olema	2	5	5	1	2	2	2	2	2	2.49	0.0418
Tsenogora	3	5	5	1	5	9	9	2	2	3.61	0.0693
<b>Mezenskiy district</b>											
Bychye	2	5	3	1	5	9	9	2	2	3.12	0.0512
Dolgoschelye	2	5	5	1	5	9	9	2	2	3.23	0.0795
Dorogorskoye	7	5	5	1	5	9	9	2	3	5.24	0.0525
Kamenka	5	5	9	7	9	9	9	2	5	6.04	0.2490
Koida	3	5	3	1	5	9	9	2	5	3.87	0.0575
Mezen	8	5	9	9	9	9	9	5	9	7.96	0.4497
Ruchyi	3	5	1	1	5	9	2	2	3	3.35	0.0317
Soyana	2	5	3	1	5	2	9	2	2	2.82	0.0288
<b>Onezhskiy district</b>											
Zolotukha	5	9	5	3	5	9	9	2	2	5.19	0.0276
Codino	6	9	6	3	7	9	9	2	5	6.18	0.0690
Maloshuyka	6	9	6	7	7	9	9	2	9	7.16	0.0974
Nimenga	6	9	6	3	5	9	9	2	5	6.00	0.0334
Onega	8	9	9	9	9	9	9	9	9	8.62	0.7181
Pokrovskoe	7	9	6	7	5	2	9	9	2	6.29	0.0545
<b>Pinezhskiy district</b>											
Vercola	5	9	5	1	5	2	9	2	5	5.03	0.0205
Karpogory	6	9	9	6	9	9	9	5	9	7.44	0.3486
Kevrola	4	9	4	1	5	9	2	2	2	4.36	0.0218
Mamonikha	2	9	5	3	2	2	2	2	2	3.32	0.0205
Mezhdurechensky	2	9	5	3	2	9	9	2	2	3.79	0.1246
Nyukhcha	3	9	4	1	5	1	9	2	3	3.92	0.0224
Pinega	6	9	6	6	7	2	9	5	9	6.79	0.2185
Pirinem	2	9	5	3	5	3	9	2	2	3.80	0.0333
Sosnovka	3	9	5	3	7	9	9	2	3	4.75	0.0718
Sura	4	9	4	3	7	9	9	2	4	5.19	0.0814
Yasnyy	5	9	5	6	7	9	9	2	5	6.11	0.0367
<b>Primorskiy district</b>											
Vaskovo	9	9	9	9	5	9	9	2	9	8.52	0.1288
Voznesenye	3	9	9	3	5	9	9	2	3	4.78	0.0427
Zimnyaya Zolotitsa	2	5	2	1	5	9	9	2	2	3.06	0.0297
Lastola	3	9	4	3	5	9	9	2	3	4.51	0.0535
Letnyaya Zolotitsa	2	5	2	1	5	9	2	2	2	2.90	0.0179
Lyavlya	8	9	5	3	5	2	2	2	4	6.11	0.0420
Pertominsk	2	5	2	1	5	9	2	2	2	2.90	0.0365
Pustosh	4	9	4	3	5	9	9	2	4	5.01	0.0560
Pushlakhta	1	5	1	1	5	2	1	2	1	2.02	0.0061
Rikasikha	9	9	9	9	7	9	9	5	5	8.24	0.2824
Solovetskiy	5	5	5	3	7	9	9	5	5	5.21	0.1027
Talagi	9	9	9	9	9	9	9	2	9	8.88	0.2017

Table 5 presents the calculated by the formula (2) complex estimations of  $K_p$  of municipal districts, as well as weighted average values of factors in the context of these districts.

Table 5

*Comprehensive assessments and average factor values for municipal districts*

Municipal districts	Factors									$K_p$
	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$	$X_7$	$X_8$	$X_9$	
Leshukonskiy	6.31	5.00	5.00	5.84	7.54	8.71	8.71	4.07	6.84	6.3
Mezenskiy	5.80	5.00	7.39	6.09	7.80	8.80	8.78	3.35	6.15	6.2
Onezhskiy	7.46	9.00	8.13	7.92	8.21	8.62	9.00	7.41	8.02	8.0
Pinezhskiy	4.74	9.00	6.49	4.68	6.78	6.81	8.70	3.70	6.40	6.0
Primorskiy	7.05	8.23	7.24	6.50	6.58	8.66	8.28	3.16	5.76	7.0

The information presented in the penultimate column in Table 4 and in Table 5 is the output for block B2 of the target model, the input for block B3 (Fig. 1) and may serve as a basis for making decisions related to the socio-economic development of the municipality (group of municipalities). It should be noted that in our example, all municipal districts received their comprehensive assessments in the range from 6 to 8 points, which, according to T. Saaty's scale, refers to the "above average" group. At the same time, we should distinguish those factors, the average values of which do not exceed the comprehensive score of the corresponding municipal district (Table 6). They, in our opinion, meet the targets that require the use of priority response measures and resources.

Table 6

*Main problematic factors in the context of municipal districts*

Districts	Main problematic factors
Leshukonskiy	Transport accessibility; energy supply (sustainable power supply); the presence of sustainable communications: telephone connection, the Internet; availability of housing and communal services infrastructure facilities; provision with physical culture and sports facilities
Mezenskiy	Transport accessibility; energy supply (sustainable power supply); availability of housing and communal services infrastructure facilities; provision with physical culture and sports facilities; availability of industrial infrastructure facilities
Onezhskiy	Transport accessibility; the presence of sustainable communications: telephone connection, the Internet; availability of housing and communal services infrastructure facilities; provision with physical culture and sports facilities
Pinezhskiy	Transport accessibility; availability of housing and communal services infrastructure facilities; provision with physical culture and sports facilities
Primorskiy	Transport accessibility; availability of housing and communal services infrastructure facilities; provision with physical culture and sports facilities; availability of industrial infrastructure facilities

In all the districts included in the study group, transport accessibility is a particularly problematic factor. A detailed description of the situation related to it was given in [29, Lovdin E.N., Regeta A.I.], where, in particular, it is noted that the transport accessibility factors have the greatest impact on development targets. Thus, the transport and logistics component should be fundamental in all strategic, program and planning documents aimed at achieving the goals of the socio-economic development of the Arctic municipalities — regions and settlements. For all municipi-

palties, the factors of availability of housing and communal services infrastructure are also in the problem zone. At the same time, the presence (absence) of industrial infrastructure facilities is not critical for the Leshukonskiy, Onezhskiy and Pinezhskiy districts due to the fact that significant, but often unused production facilities with associated infrastructure were left on these territories by the former enterprises of the timber industry complex. The task of efficient use of capital facilities (buildings, structures, access roads, etc.) is inextricably linked with the investment policy pursued in these territories by authorities at all levels. Currently, a set of relevant mechanisms, such as the provision of property, tax and investment benefits, preferential financial and credit products, the creation of priority development areas, etc., is already being widely introduced by the state into economic practice.

Unexpectedly for the authors, a significant problem in all municipalities was the state of provision of physical education and sports facilities, which was uncharacteristic almost ten years ago. Here we rely on the results of sociological research conducted in the territories of the municipalities of the Arkhangelsk Oblast in 2012–2013.<sup>1</sup> It should be noted that the increased attention of the population to the topic of physical culture and sports is directly related to the growing popularity, especially among the youth, of a healthy lifestyle as one of the values of this generation [37, Blynskaya T.A., Malinina K.O.].

The question of the suitability of the proposed target model for assessing the socio-economic development of urban districts can naturally arise. The answer may be as follows: conceptually, yes, but with the use, perhaps, of other factors and weights of influence, determined by the relevant groups of competent experts.

### **Conclusion**

The resulting and periodically updated comprehensive estimates of municipalities at both levels can be used as targets in planning, development and decision-making on the allocation of limited resources (financial, property, etc.). One of the practical applications of the target model is the design of mechanisms containing consumer priority indicators that characterize the expected performance and allow the resource to be distributed in proportion to efficiency [38, Tutygin A.G., Ambrosevich M.A.]. At the same time, as noted in [39, Tutygin A.G. et al.], it is often not possible to unambiguously assess the current situation when making management decisions. For example, a standard situation is when one part of the influencing factors can be assessed quantitatively and

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<sup>1</sup> Otchet po Gosudarstvennomu kontraktu №012400000613000728 ot 07.05.2013 na okazanie uslug po provedeniyu sotsiologicheskogo issledovaniya na temu «Otsenka udovletvorennosti naseleniya Arkhangel'skoy oblasti meditsinskoy pomoshch'yu, uslugami v sferakh obrazovaniya, kul'tury, fizicheskoy kul'tury i sporta, zhilishchno-kommunal'nymi uslugami, a takzhe deyatel'nost'yu organov mestnogo samoupravleniya gorodskikh okrugov i munitsipal'nykh rayonov, v tom chisle ikh informatsionnoy otkrytost'yu», v 2-kh t., OOO «LIAS», 2013. 716 s. [Report under the State contract No. 012400000613000728 dated 05/07/2013 for the provision of services for conducting a sociological study on the topic "Assessment of satisfaction of the population of the Arkhangelsk region with medical care, services in the fields of education, culture, physical culture and sports, housing and communal services, as well as the activities of local authorities self-government of urban districts and municipal districts, including their information openness", in 2 volumes, LIAS LLC, 2013. 716 p.].

the other — only qualitatively, even if it is possible to give them a numerical assessment. This is precisely the situation in our case.

The most realistic tool for the socio-economic development of the group of Arctic municipalities described in this article could be a comprehensive inter-municipal program of socio-economic development, which should be based on the creation of a transport and energy framework for these territories. At the same time, such a program should have a multilevel, interdepartmental and interterritorial character. The general supervision over the development and subsequent implementation of the program is proposed to be concentrated in the relevant departments of the Ministry of the Russian Federation for the Development of the Far East and the Arctic, while the executors could be the federal, regional and municipal authorities and agencies.

## References

1. Baeva V.V., Novikov A.I. Teoretiko-metodologicheskie aspekty prognozirovaniya sotsial'no-ekonomicheskogo razvitiya munitsipal'nykh obrazovaniy [Theoretical and Methodological Aspects of Forecasting the Socio-Economic Development of Municipalities]. *Vestnik nauki*, 2019, vol. 3, no. 1 (10), pp. 33–35.
2. Fishman L.I., Ivanov M.Yu. Strategii sotsial'no-ekonomicheskogo razvitiya munitsipal'nykh obrazovaniy: opyt analiza [Strategy of Social and Economic Development of Municipal Units: Experience of the Analysis]. *Intellekt. Innovatsii. Investitsii* [Intellect. Innovations. Investments], 2018, no. 9, pp. 71–78.
3. Stepanova V.V., Sivobrova I.A., Nikolaev A.V. Metodicheskie podkhody k otsenke effektivnosti sotsial'no-ekonomicheskogo razvitiya munitsipal'nykh obrazovaniy [Methodological Approaches to Assessing the Effectiveness of Socio-Economic Development of Municipalities]. *Regional'naya ekonomika: teoriya i praktika* [Regional Economics: Theory and Practice], 2012, no. 47, pp. 2–12.
4. Oreshnikov V.V., Aitova Yu.S. Primenenie metodov ekonomiko-matematicheskogo modelirovaniya pri razrabotke strategii razvitiya munitsipal'nogo obrazovaniya [Application of Economic and Mathematical Modeling Methods When Elaborating a Municipality Development Strategy]. *Voprosy territorial'nogo razvitiya* [Territorial Development Issues], 2019, no. 3 (48), pp. 1–13. DOI: 10.15838/tdi.2019.3.48.3
5. Novoselov A.S., Kovalev A.E., Gayduk E.A. Sovershenstvovanie munitsipal'nogo upravleniya na osnove modelirovaniya sotsial'no-ekonomicheskikh protsessov [Improving Municipal Management Based on Socio-Economic Modeling]. *Region: ekonomika i sotsiologiya*, 2021, no. 2 (210), pp. 236–266. DOI: 10.15372/REG20210210
6. Fattakhov R.V., Oreshnikov V.V. Prognozirovaniye razvitiya sotsial'no-ekonomicheskikh sistem munitsipal'nogo urovnya s primeneniem model'nogo instrumentariya (na primere g. Ufy) [Forecasting the Development of Socio-Economic Systems at the Municipal Level Using Modeling Tools (the Ufa City Case Study)]. *Regional'naya ekonomika: teoriya i praktika* [Regional Economics: Theory and Practice], 2015. № 13 (388). С. 2–15.
7. Nizamutdinov M.M., Oreshnikov V.V. Metodicheskie i prakticheskie aspekty zadachi modelirovaniya i stsenarnogo prognozirovaniya razvitiya territorial'noy sistemy munitsipal'nogo urovnya [Modeling and Scenario Forecasting of Territorial System Development at the Municipal Level: Methodological and Practical Considerations]. *Ekonomicheskii analiz: teoriya i praktika* [Economic Analysis: Theory and Practice], 2017, vol. 16, no. 7, pp. 1204–1216. DOI: 10.24891/ea.16.7.1204
8. Chekmareva E.A. Agent-orientirovannyye modeli v munitsipal'nom upravlenii [Agent-Based Models in Municipal Administration]. *Problemy razvitiya territorii* [Problems of Territory's Development], 2017, no. 6 (92), pp. 121–135.
9. Grushin V.A., Baryshova Yu.N. Protsess formirovaniya, realizatsii i spetsifika razrabotki upravlencheskikh resheniy v sisteme gosudarstvennogo i munitsipal'nogo upravleniya [The Process of Creation, Implementation and Specifics of Development of Management Decisions in the System of State and Municipal Management]. *Vestnik Moskovskoy mezhdunarodnoy akademii* [Bulletin of the Moscow International Academy], 2019, no. 1, pp. 66–73.

10. Tebekin A.V., Tebekin P.A. Metody prinyatiya upravlencheskikh resheniy v sisteme gosudarstvennogo i munitsipal'nogo upravleniya [Methods of Making Managerial Decisions in the System of State and Municipal Administration]. *Transportnoe delo Rossii* [Transport Business of Russia], 2020, no. 2, pp. 107–111.
11. Tutygin A.G., Chizhova L.A. Metodologicheskiy podkhod k formirovaniyu investitsionnykh stszenariy razvitiya ekonomicheskikh sistem [Methodological Approach to Formation of Investment Scenarios of Development of Economic Systems]. *Ekonomika i predprinimatel'stvo* [Journal of Economy and entrepreneurship], 2015, no. 10–2 (63), pp. 66–69.
12. Emelyanova E.E. Problemy i priority razvitiya munitsipalitetov rossiyskoy Arktiki v usloviyakh krizisa [Development Issues and Priorities of Municipalities in the Russian Arctic during the Crisis]. *Natsional'nye interesy: priority i bezopasnost'* [National Interests: Priorities and Security], 2018, vol. 14, no. 10, pp. 1830–1844. DOI: 10.24891/ni.14.10.1830
13. Rzhantsina L.S., Kravchenko E.V. Rynok truda v Arkticheskoy zone Rossiyskoy Federatsii [Labor Market in the Arctic Zone of Russian Federation]. *Arktika 2035: aktual'nye voprosy, problemy, resheniya* [Arctic 2035: Pressing Issues, Problems, Solutions], 2021, no. 1, pp. 74–78. DOI: 10.51823/74670\_2021\_1\_74
14. Ukhanova A.V., Shelomentsev A.G., Smirennikova E.V., Voronina L.V. Otsenka demograficheskoy situatsii i ekonomicheskogo sostoyaniya v munitsipal'nykh obrazovaniyakh Arkticheskoy zony Rossiyskoy Federatsii [Assessment of the Demographic Situation and Economic Condition in Municipalities of the Arctic Zone of the Russian Federation]. *Fundamental'nye issledovaniya* [Fundamental Research], 2019, no. 11, pp. 184–190. DOI: 10.17513/fr.42609
15. Tutygin A.G., Chizhova L.A. Individual'nye i obshchesistemnye problemy regionov Arkticheskoy zony Rossiyskoy Federatsii: vozmozhnosti sovместnogo resheniya [Individual and Systemic Problems of the Arctic Zone Regions of Russia: The Possibility of a Coordinated Solution]. *Nauchnoe obozrenie* [Scientific Review], 2016, no. 24, pp. 193–197.
16. Krapivin D.S. Osnovnye faktory i ugrozy, vliyayushchie na ustoychivoe sotsial'no-ekonomicheskoe razvitiye pribrezhnykh regionov Arkticheskoy zony Rossiyskoy Federatsii [Main Factors and Threats Affecting the Sustainable Socio-Economic Development of the Coastal Regions of the Arctic Zone of the Russian Federation]. *Fundamental'nye issledovaniya* [Fundamental Research], 2020, no. 6, pp. 75–79. DOI: 10.17513/fr.42781
17. Smirennikova E.V., Voronina L.V., Ukhanova A.V. Otsenka demograficheskogo potentsiala arkticheskikh regionov Rossiyskoy Federatsii v kontekste innovatsionnogo razvitiya [Assessment of the Demographic Potential of the Arctic Regions of the Russian Federation in the Context of Innovative Development]. *Arktika: ekologiya i ekonomika* [Arctic: Ecology and Economy], 2021, vol. 11, no. 1, pp. 19–29. DOI: 10.25283/2223-4594-2021-1-19-29
18. Korobov V.B., Serbin Yu.V., Tutygin A.G., Chizhova L.A., Antipov E.O. Problemy energeticheskogo obespecheniya transportnoy infrastruktury pribrezhnykh i ostrovnykh territoriy Arkticheskoy zony Rossiyskoy Federatsii [Problems of Transport Infrastructure's Energy Supply for Coastal and Island Territories of the Arctic Zone of the Russian Federation]. *Regional'naya ekonomika i upravlenie: elektronnyy nauchnyy zhurnal* [Regional Economy and Management: Electronic Scientific Journal], 2019, no. 1 (57), pp. 1–10.
19. Kutsenko S.Yu., Pavlenko V.I., Plate' A.N., Leksin A.B. Osobennosti sostoyaniya zhilishchno-bytovykh usloviy naseleniya Arkticheskoy zony Rossiyskoy Federatsii kak odnogo iz vazhneyshikh faktorov ustoychivogo razvitiya makroregiona [Features of Housing and Living Conditions of the Population of the Arctic Zone of the Russian Federation As One of the Most Important Factors of Sustainable Development]. *Vestnik evraziyskoy nauki* [The Eurasian Scientific Journal], 2020, vol. 12, no. 1.
20. Tutygin A.G., Antipov E.O., Korobov V.B. *Problemy modelirovaniya logisticheskikh operatsiy v Arkticheskoy zone Rossiyskoy Federatsii: monografiya* [Problems of Modeling Logistics Operations in the Arctic Zone of Russian Federation]. Arkhangelsk, KIRA Publ., 2020, 244 p. (In Russ.)
21. Gubina O.V., Provorova A.A. Reproduktivnye ustanovki naseleniya kak uslovie obespecheniya zaselennosti arkticheskogo regiona [Reproductive Attitudes of the Population as a Condition for Ensuring the Population of the Arctic Region]. *Problemy obespecheniya ekologicheskoy bezopasnosti i ustoychivoe razvitiye arkticheskikh territoriy: sbornik materialov Vserossiyskoy konferentsii s mezhdunarodnym uchastiem II Yudakhinskije chteniya* [Problems of Ensuring Environmental Safety and Sustainable Development

- of the Arctic Territories: Proc. All-Russ. Conf. with Intern. Participation II Yudakhin Readings], 2019, pp. 537–542.
22. Tortsev A.M., Studenov I.I., Semushin A.V. Ispol'zovanie korennyimi malochislennymi narodami rybnyykh resursov Nenetskogo avtonomnogo okruga [Use of Fish Resources by Indigenous Peoples of the Nenets Autonomous Area]. *Arktika: ekologiya i ekonomika* [Arctic: Ecology and Economy], 2021, vol. 11, no. 2, pp. 266–276. DOI: 10.25283/2223-4594-2021-2-266-276.
23. Pavlenko V.I., Petrov A., Kutsenko S.Yu., Dettler G.F. Korennye malochislennye narody rossiyskoy Arktiki (problemy i perspektivy razvitiya) [Indigenous Peoples of the Russian Arctic (Problems and Development Prospects)]. *Ekologiya cheloveka* [Human Ecology], 2019, no. 1, pp. 26–33.
24. Matvienko I.I., Chizhova L.A., ed. *Finansy i mezhhbyudzhetye otnosheniya Arkhangel'skoy oblasti* [Finance and Interbudgetary Relations of the Arkhangelsk Region]. Arkhangelsk, Izdatel'skiy tsentr Publ., 2013, 234 p. (In Russ.)
25. Matvienko I.I., Chizhova L.A., Tutygin A.G. Sovershenstvovanie mekhanizma mezhhbyudzhetykh otnosheniy v subyekte Rossiyskoy Federatsii dlya povysheniya effektivnosti ispolneniya polnomochiy na territorii munitsipal'nykh obrazovaniy [Improving the Mechanism of Interbudgetary Relations in the Subject of the Russian Federation to Improve the Efficiency of the Execution of Powers on the Territory of Municipalities]. *Finansovaya analitika: problemy i resheniya* [Financial Analytics: Science and Experience], 2011, no. 45 (87), pp. 39–45.
26. Zakharchuk E.A. Vliyaniye promyshlennogo osvoeniya arkticheskikh territoriy na finansovoe razvitiye munitsipal'nykh obrazovaniy [Impact of Industrial Development of the Arctic Territories on the Financial Development of Municipalities]. *Regional'naya ekonomika i upravlenie: elektronnyy nauchnyy zhurnal* [Regional Economy and Management: Electronic Scientific Journal], 2021, no. 1 (65), 6501. DOI: 10.24412/1999-2645-2021-165-1
27. Chizhova L.A., Laskin A.A., Lets O.V. Individual'naya predprinimatel'skaya aktivnost' kak indikator regional'noy ekonomicheskoy politiki [Individual Entrepreneurial Activity as an Indicator of Regional Economic Policy]. *Fundamental'nye issledovaniya* [Fundamental Research], 2021, no. 4, pp. 102–110. DOI: 10.17513/fr.43008
28. Tutygin A.G., Chizhova L.A., Matvienko I.I. Analiz investitsionnoy privlekatel'nosti munitsipal'nykh obrazovaniy Arkhangel'skoy oblasti [Investment Analysis for Municipalities in Russia's Arkhangelsk Region]. *Ekonomika i upravlenie* [Economics and Management], 2012, no. 10 (84), pp. 40–48.
29. Lovdin E.N., Regeta A.I. Razrabotka dvukhurovnevoy modeli dlya kompleksnoy sotsial'no-ekonomicheskoy otsenki na primere arkticheskikh munitsipalitetov Arkhangel'skoy oblasti [Development of a Two-Level Model for a Comprehensive Socio-Economic Assessment on the Example of the Arctic Municipalities of the Arkhangelsk Region]. *Upravlencheskiy uchët* [Management Accounting], 2021, no. 7–2, pp. 445–452.
30. Kotova E.I., Korobov V.B., Pavlenko V.I. Ekstremal'nye zagryazneniya na territorii Arkticheskoy zony Rossiyskoy Federatsii: sluchai i analiz [Extreme Pollution in the Arctic Zone of the Russian Federation: Cases and Analysis]. *Problemy regional'noy ekologii* [Regional Environmental Issues], 2018, no. 1, pp. 67–72.
31. Ostreykovskiy V.A. *Teoriya system* [Theory of Systems]. Moscow, Vysshaya shkola Publ., 1997, 239 p. (In Russ.)
32. Korobov V.B., Tutygin A.G., eds. *Klassifikatsionnye metody resheniya ekologo-ekonomicheskikh zadach: monografiya* [Classification Methods for Solving Ecological and Economic Problems]. Arkhangelsk, Pomor University Publ., 2010, 309 p. (In Russ.)
33. Lovdin E.N., Lets O.V. Osobennosti sotsial'no-ekonomicheskogo razvitiya arkticheskikh munitsipalitetov Arkhangel'skoy oblasti [Features of Socio-Economic Development of the Arctic Municipalities of the Arkhangelsk Region]. *Fundamental'nye issledovaniya* [Fundamental Research], 2021, no. 5, pp. 36–45. DOI: 10.17513/fr.43036
34. Saati T.L. *Prinyatie resheniy: Metod analiza ierarkhiy* [Decision Making: Hierarchy Analysis Method]. Moscow, Radio i svyaz' Publ., 1993, 314 p. (In Russ.)
35. Korobov V.B., Tutygin A.G., Klepikovskaya E.V. Issledovanie minimal'nogo chisla ekspertov dlya polucheniya ustoychivyykh otsenok vliyayushchikh faktorov v zadachakh prirodopol'zovaniya [Research in Minimal Number of Experts for Becoming Stable Estimates of Influencing Factors in Problems of Nature Use]. *Problemy regional'noy ekologii* [Regional Environmental Issues], 2010, no. 4, pp. 51–55.

36. Tutygin A.G., Korobov V.B., Men'shikova T.V. Kombinirovannyi sposob rascheta vesovykh koeffitsientov v mnogofaktornykh ekonomicheskikh modelyakh [Combined Method for Calculating Weighing Coefficients in Multi-Factor Economic Models]. *Vestnik grazhdanskikh inzhenerov* [Bulletin of Civil Engineers], 2020, no. 3(80), pp. 221–228. DOI: 10.23968/1999-5571-2020-17-3-221-228
37. Blynskaya T.A., Malinina K.O. Analiz motivatsii pokoleniya Z k osoznannomu vyboru zhiznennoy strategii (na primere g. Arkhangel'ska) [Analysis of Motivation of Generation Z to Make Conscious Choice of Life Strategy (Example of Arkhangelsk)]. *Alma Mater (Vestnik Vysshey Shkoly)*, 2020, no. 10, pp. 28–34. DOI: 10.20339/AM.10-20.028
38. Tutygin A.G., Ambrosevich M.A. Funktsional'noe raspredelenie resursov v organizatsionnykh sistemakh [Functional Distribution of Resources in Organizational Systems]. *Ekonomika i upravlenie* [Economics and Management], 2007, no. 9 (special issue), pp. 105–107.
39. Tutygin A.G., Chizhova L.A., Korobov V.B. Neopredelennost' v otsenkakh vliyayushchikh faktorov razlichnymi kategoriyami lits, prinyimayushchikh resheniya [Uncertainty in Assessments of Influencing Factors by Various Categories of Decision Makers]. *Ekonomika i upravlenie: nauchno-prakticheskiy zhurnal* [Economics and Management: Research and Practice Journal], 2020, no. 2(152), pp. 84–89. DOI: 10.34773/EU.2020.2.18

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