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Study of the information space for assessing the quality of life of the Arctic zone population

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***Abstract* — At the present stage of economic development, issues related to the use of digital technologies come to the fore. The article substantiates the need to develop a model of economic management in the digital market, aimed at ensuring the coherence of information resources of the territories of the Russian Federation. The authors present an algorithm for the integrated assessment of socio-economic indicators of the life quality of the population on the example of the largest urban municipalities of the North-West Federal District of the Russian Federation related to the Arctic zone, based on the available information**

Keywords — arctic zone, quality of life, integrated assessment, digitalization of the economy

I. INTRODUCTION

By 2017, the Russian Federation adopted a number of strategic planning documents that provide measures aimed at stimulating the development of digital technologies and their use in various sectors of the economy.

Digital economy is economic activity, the key production factor in which is digital data. The introduction of information and communication technologies plays a huge role in the development of socio-economic relations, increasing the country's competitiveness and the quality of life of citizens, ensure economic growth and national sovereignty.

At the same time, there is currently a shortage in the field of efficient use and management of information resources due to inconsistency between the state statistics service and executive authorities in the regions.

Therefore, the effective use of information systems requires an understanding of the directions and components of the transformation of data arrays into information systems as a strategic resource of public administration.

Accordingly, in the framework of the informatization of modern society, it is necessary to develop models for managing the economy in the new conditions of the digital market and to solve the problem of improving literacy in the field of digital economy management, aimed at ensuring the coherence of the Russian Federation through the creation and use of telecommunication systems.

A significant number of publications, both domestic and foreign scientists and economists, are devoted to the problems of the digital economy.

A.A. Zatsarinnyy and A.R. Shabanov in their article "Model of a Prospective Digital Platform to Consolidate the Resources of Economic Activity in the Digital Economy" consider a digital platform model that provides the interaction of management systems of various economic entities - federal, regional, institutional, commercial, in order to solve economic problems.

Emmanouil Tranos, Aura Reggianib and Peter Nijkamp in the article "The Accessibility of cities in the digital economy" raise the issue of heterogeneity of information and communication technologies and digital accessibility of cities, proposing the adoption of a new model of the city's infrastructure hierarchy.

Lorna Philipa and Fiona Williamsb (2019), Jason C. Young (2019) consider the features of the digital economy in rural areas, highlighting the problems of insufficient use of digital platforms in rural areas.

One of the most important conditions for maintaining the national security of the Russian Federation is to ensure the sustainable development of the northern and Arctic regions by improving the quality of life of the population.

Currently, there is a normatively fixed term "Arctic zone". This zone consists entirely of 4 subjects of the Russian Federation - the Murmansk Region, the Nenets, Yamalo-Nenets and Chukotka Autonomous Districts; as well as 16 municipalities, including 5 urban districts and 11 municipalities.

These territories have quite significant differences in comparison with other (non-Arctic) regions of the Russian Federation - natural-climatic, demographic, infrastructural,

economic conditions, social and cultural-historical features peculiar only to northern areas.

There is a number of problems affecting the quality of life that are specific of these territories. Among them is a significant deterioration of the utility networks of public utilities infrastructure, most of the public roads of local importance do not meet regulatory requirements and require reconstruction and modernization, an acute problem of a lack of pedagogical and medical personnel in municipal institutions, since the limited capacity of local budgets does not allow for social support measures to attract young professionals, etc.

The main problem is the decrease in population, which is caused not only by a natural decline, but also by a negative migration balance. Migration outflow, which is mainly the population of working age, leads to a decrease in tax revenues to the budget (especially in terms of personal income tax). In this regard, various negative consequences arise (untimely payment of wages, an increase in debt for utilities, obligations to suppliers and contractors, etc.).

To determine the integral assessment of socio-economic indicators of life quality of the population of the selected municipalities, it is necessary to determine a set of indicators.

Federal and territorial statistical services publish a lot of different information, but it is mainly presented by regions. Municipal statistics in some constituent entities of the Russian Federation are rather poorly represented. Let us dwell on the methodology proposed by the authors for conducting an integrated assessment of the quality of life based on the available open data arrays.

II. RESEARCH METHODOLOGY

The study was conducted on the basis of statistics from the Federal State Statistics Service of Russia.

In the work, the statistical and economic method was used as a set of techniques used to assess the quality of life through the analysis of digital data arrays.

In order to assess the economic indicators of the life quality of the Arctic zone population in the North-West Federal District, the largest municipal formations (MF) with a population of more than 35 thousand people were selected - Murmansk and Apatity (Murmansk region), Arkhangelsk, Severodvinsk, Novodvinsk (Arkhangelsk region), Vorkuta (Komi Republic). Information on the number of these MFs is presented in Table 1.

TABLE I. POPULATION OF URBAN MUNICIPALITIES OF THE ARCTIC ZONE OF THE NORTH-WESTERN FEDERAL DISTRICT, THOUSAND PEOPLE.*

	Murmansk	**Apatites**	**Arkhangelsk**	**Severodvinsk**	**Novodvinsk**	**Vorkuta**
Population, thousand people. as of 31.12.2016	298.1	56.4	358.6	185.0	38.7	80.1
Population, thousand people. as of 31.12.2017	295.4	55.7	356.9	184.3	38,4	77.3
Population, thousand people. as of 31.12.2018	292. 6	55.1	355.3	183.6	38.1	74.8

*Compiled by the authors according to municipal statistics

City districts annually publish reports on the results of their activities and on the socio-economic situation of the territory. However, these publications do not have a single format and contain various indicators. For example, the experts of the RIA Rating, Rating Agency, when determining the rating of the socio-economic situation of the constituent entities of the Russian Federation, use the volume of production of goods and services as one of the main indicators.

Analysis of the presented data sets, information on this indicator is not fully published in order to ensure the confidentiality of primary statistical data received from organizations. For this reason, it is not possible to use this indicator for a comparative assessment in the context of individual municipalities.

In order to compare the results and correctly evaluate them, the authors of the study selected the following indicators:

1) The number of employees of organizations - shows the level of economic activity of the population, excluding small businesses.
2) The average monthly salary of employees of organizations characterizes the level of income of the population of the MF, excluding small businesses.
3) The volume of investment in fixed assets characterizes the level of investment activity and determines the prerequisites for the economic development of the MF.
4) Budget revenues - characterize the provision of financial resources to the MF.
5) Tax revenues - show the contribution of their own sources in the formation of the revenue side of the budget.

In general, the algorithm for integrated assessment of socio-economic indicators can be represented as a sequence of the following actions:

1) For a more objective assessment, indicators will be considered per capita. For this, a division is made of the average annual population of the MF. The number of

employees of organizations is determined per 1000 inhabitants.

The data are presented in the form of a table (matrix Aij), where the indicators (i = 1,2,3, ..., n) are recorded in rows and the names of municipal formations (MF) (j = 1,2,3 , ..., m).

2) For each indicator, the maximum value is found and entered in the column of the conditional standard (^{max}) (Table 2).

3) The initial indicators of the matrix^{Aij} are standardized with respect to the corresponding indicator of the standard by the formula:

$$Xij = \frac{Aij}{maxAij} \quad (1)$$

where Xij = standardized indicator of th MF.

4) For each analyzed MF, the value of its integral assessment is determined by the formula:

$$Rj = \sqrt[n]{X1 * X2 * X3 * ... * Xn} \quad (2)$$

where Rj = the integral estimate for the th MF, Xn are the standardized indicators of the jth MF, n is the number of indicators.

5) MFs are ordered (ranked) in descending order of the integral score. (Table 3)

The highest rating is MF with a maximum value of R.

III. Results of the Research

According to the research methodology proposed by the authors, based on the processing of the available data sets submitted by the Federal State Statistics Service, municipal statistics, reports of the Heads of municipalities, budgets of municipalities, indicators were calculated that characterize the quality of life of the population in dynamics for 2017-2018 (Table 2). $\alpha + \beta = \chi.$ (1) (1)

In accordance with the methodology, the authors calculated an integral assessment of the quality of life of the population and conducted a ranking of the studied objects (Table 3).

The results of this analysis can be presented in Table 4:

$\alpha + \beta = \chi.$ (1) (1)

TABLE II. Socio-economic indicators of the quality of life of the population of urban areas of The Arctic zone NWFD per capita for 2017-2018*

Indicators	Period	Murmansk	Apatites	Arkhangelsk	Severodvinsk	Novodvinsk	Vorkuta	max
Number of employees of organizations per 1000 inhabitants, people.	2017	304.0	248.2	247.7	378.0	278.4	329.8	378.0
	2018	305.0	247.3	245.6	385.1	281.7	331.8	385.0
Average monthly salary of employees, RUB.	2017	61261	41115	45098	54680	37377	62214	62214
	2018	68497	52350	50420	59153	41477	69572	69572
The volume of investments in fixed capital per 1 resident, thousand rubles.	2017	185.7	35.4	48.3	50.3	140.5	65.4	185.7
	2018	246.3	66.7	44.0	57.1	254.9	113.6	254.9
Budget revenues, per 1 resident, thousand rubles.	2017	40.3	36.5	23.2	34.4	21.9	43.6	43.6
	2018	48.5	41.0	25.7	35.0	26.1	52.3	52.3
Tax income per 1 resident, thousand rubles.	2017	21.7	12.1	10.3	15.3	7.8	9,4	21.7
	2018	27.7	13.1	11.0	16.4	9.0	10.4	27.7

*Compiled by the authors according to municipal statistics

TABLE III. Standardized socio-economic indicators of the life quality of the urban areas population of The Arctic zone in the NWFD for 2017-2018.

Indicators	Period	Murmansk	Apatites	Arkhangelsk	Severodvinsk	Novodvinsk	Vorkuta
Number of employees of organizations per 1000 inhabitants	2017	0.80	0.66	0.66	1.00	0.74	0.87
	2018	0.79	0.64	0.64	1.00	0.73	0.86
Average monthly salary of employees of organizations	2017	0.98	0.66	0.72	0.88	0.60	1.00
	2018	0.98	0.75	0.72	0.85	0.60	1.00
Volume of investments in fixed capital per 1 resident	2017	1.00	0.19	0.26	0.27	0.76	0,35
	2018	0.97	0.26	0.17	0.22	1.00	0.45
Budget revenues-total, per 1 resident	2017	0.92	0.84	0.53	0.79	0.50	1.00
	2018	0.93	0.78	0.49	0.67	0.50	1.00
Budget revenues-total, per 1	2017	1.00	0.56	0.47	0.70	0.36	0.43

resident	2018	1.00	0.47	0.40	0.59	0.33	0.37
X1 * X2 * X3 * X4 * X5	2017	0.73	0.04	0,03	0.13	0.06	0.13
	2018	0.70	0.05	0.02	0.08	0.07	0.14
Integral estimation	2017	0.94	0.52	0.50	0.67	0.57	0.67
	2018	0.93	0.54	0.44	0.60	0.59	0.68
Ranking	2017	1	4	5	2	3	2
	2018	1	5	6	3	4	2

TABLE IV. INTEGRATED ASSESSMENT OF THE LIFE QUALITY OF THEURBAN AREAS POPULATION OF THE ARCTIC ZONE NWFD FOR 2017-2018

Indicators	Period	**Highest value**	**Lowest value**	
			Lowest value	***% of MAX***
Number of employees of organizations per 1000 inhabitants	2017	Severodvinsk	Apatites Arkhangelsk	66
	2018	Severodvinsk	Apatites Arkhangelsk	64
Average monthly salary of employees of organizations	2017	Vorkuta	Novodvinsk	60
	2018	Vorkuta	Novodvinsk	60
Volume of investments in fixed capital per 1 resident	2017	Murmansk	Apatites	19
	2018	Novodvinsk	Arkhangelsk	17
Budget revenues-total, per 1 resident	2017	Vorkuta	Novodvinsk	50
	2018	Vorkuta	Arkhangelsk	49
Tax income per 1 resident	2017	Murmansk	Novodvinsk	36
	2018	Murmansk	Novodvinsk	33
Integral estimation	2017	Murmansk 0.94	Arkhangelsk 0.50	53
	2018	Murmansk 0.93	Arkhangelsk 0.44	47

These indicators have the greatest difference in values:

1) The volume of investment in fixed assets per 1 resident is about 20% of the maximum value. These are the cities - Apatity, Severodvinsk and Arkhangelsk.

2) Tax income per 1 resident is a little more than 30% of the maximum value. These are the cities - Novodvinsk, Vorkuta and Arkhangelsk.

According to Table 4, it can be seen that in 2018, compared to 2017, in terms of indicators - the number of employees of organizations per 1 resident, average monthly wage, tax income per 1 resident - the situation did not change. The volume of investments in fixed assets per 1 inhabitant - the indicator of Novodvinsk has become a little more than the Murmansk one. Budget revenues per inhabitant - Arkhangelsk is slightly worse than Novodvinsk.

Thus, the rating of municipalities and their integral ratings have not changed. Thus, in the group of analyzed municipal formations, the Murmansk municipal district has the highest integral rating, and the Arkhangelsk municipal district has the lowest.

IV. DISCUSSION OF RESULTS

Summarizing the above, it can be stated that the quality of life is the most important characteristic of the socio-economic system of any country as a whole and the region separately.

Currently, there are no unified approaches to assessing the quality of life, taking into account socio-economic indicators that consider the spatial factor of living. The methodology proposed by the authors made it possible to assess the quality of life of the population of various municipalities.

The life quality of the population is the ultimate criterion for the effectiveness of the ongoing socio-economic policy, which is especially important for the population living in extreme climatic and geographical conditions. A comprehensive analysis of the life quality of the population of Russian regions in dynamics and in mutual comparison gives additional arguments to the regional authorities when developing strategic programs for the development of territories and determining the level of digitalization of the economy.

V. CONCLUSIONS

As a result of digitalization, public authorities will be able to make effective decisions based on the analysis of existing data arrays. We believe that for an objective assessment of the quality of life of the population in various municipalities, it is necessary to create a common information platform.

This is a fundamentally different experience, which will allow taking into account the interests of various market participants, but above all, improve the quality of life of the population as a result of increasing the efficiency of the socio-economic policy.

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References

[1] Emmanouil Tranos, Aura Reggiani, Peter Nijkamp Accessibility of cities in the digital economy Cities 30 (2013) 59–67

[2] A. Zatsarinnyy, A. Shabanov Model of a Prospective Digital Platform to Consolidate the Resources of Economic Activity in the Digital Economy Procedia Computer Science 150 (2019) 552–557

[3] Jason C. Young Rural digital geographies and new landscapes of social resilience Journal of Rural Studies, https://doi.org/10.1016/j.jrurstud.2019.07.001

[4] Lorna Philip, Fiona Williams Remote rural home based businesses and digital inequalities: Understanding needs and expectations in a digitally underserved community Journal of Rural Studies, 68 (2019) 306–318

[5] Regiony Rossii. Osnovnye social'no - ekonomicheskie pokazateli gorodov . 2018: Stat. sb. / Rosstat . − M., 2018. − 443 s .

[6] Ukaz Prezidenta RF ot 02.05.2014 N 296 "O suhoputnyh territoriyah Arkticheskoj zony Rossijskoj Federacii" (redakciya ot 27.06.2017).

[7] Zaklyuchenie Kontrol'no-schetnoj palaty goroda Apatity na godovoj otchet ob ispolnenii gorodskogo byudzheta za 2018 god https://apatity.gov-murman.ru/city/city-budget/ispolnenie/2018.php

[8] Zaklyuchenie kontrol'no-schetnoj palaty MO "GOROD ARHANGEL'SK" na otchet ob ispolnenii gorodskogo byudzheta za 2018 god http://www.arhcity.ru/?page=1185/12

[9] Zaklyuchenie na godovoj otchet ob ispolnenii byudzheta gorodskogo okruga Vorkuta za 2018 god https://kskvork.ru/data/documents/Zaklyuchenie-2018-g..pdf

[10] Informaciya o rezul'tatah vneshnej proverki godovogo otcheta ob ispolnenii byudzheta municipal'nogo obrazovaniya gorod Murmansk za 2018 god http://kspmurman.ru/getfile.php?fileid=274

[11] Otchet ob ispolnenii byudzheta municipal'nogo obrazovaniya \"Gorod Novodvinsk\" za 2018 god Ispolnenie byudzheta za 2018 god http://www.novadmin.ru/official/budget%20i%20vinansi/byudzhet-dlya-grazhdan/index.php

[12] Social'no-ekonomicheskoe polozhenie goroda Murmanska za 2018 god https://www.citymurmansk.ru/strukturnye_podr?itemid=28#descr

[13] Territorial'nyj organ Federal'noj sluzhby gosudarstvennoj statistiki v RF / Arhangel'skstat http://arhangelskstat.gks.ru/wps/wcm/connect/rosstat_ts/arhangelskstat/ru/municipal_statistics/