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COMPOSITE INDICES OF LIFE QUALITY FOR MONITORING OF SUSTAINABLE DEVELOPMENT GOALS

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Abstract

To facilitate the implementation of the Sustainable Development Goals, it is necessary to establish mechanisms for monitoring progress in the implementation of these Goals. For this, first of all, it is necessary to ensure the collection of high-quality, affordable and relevant data and develop a tool for analyzing a large data pool. International and national groups of experts on indicators of achievement of the Sustainable Development Goals so far only form indicator systems for monitoring the implementation of these goals at the global and national levels. Success in achieving the Sustainable Development Goals can be assessed based on statistics using an objective composite index. The tool for constructing such a composite index is the principal component analysis, which determines the weights of indicators as a characteristic of the structure of the system according to a series of observations. This method takes into account the presence of fatal errors in the data. The priority for sustainable development in Russia today is to improve the quality of life of the population. The definition of quality of life as a composite index uses many parameters that measure the solution of tasks set by the social Goals of sustainable development. The proposed index of the quality of life of the population provides objective results of monitoring changes in the quality of life of the population of the subjects of the Russian Federation. Improving the quality of life and reducing inequalities within the country indicate the country's progress towards the Sustainable Development Goals.

Keywords: Composite index, data errors, life quality of the population, principal component analysis, sustainable development goals.

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1. Introduction

Today, the concept of sustainable development is understood as achieving a sustainable balance between the economic, environmental and social dimensions of human development. It is this interpretation of the concept of sustainable development that served as the ideological basis for the adoption in 2015 of the "Agenda for Sustainable Development". This document was developed under the auspices of the UN and was adopted on September 25, 2015 by 193 states (resolution of the UN General Assembly - A/70/L.1). The document names 17 Sustainable Development Goals for the period from 2015 to 2030, which specify 169 goals and 244 indicators.

The stated goals and objectives are comprehensive and should ensure the balance of sustainable development components. They must be achieved within 15 years. Of the 17 goals listed, 11 can be attributed to social development, 3 to economic development and 3 to environmental one. Social goals include the "universal elimination of poverty", improving nutrition, ensuring a healthy lifestyle and quality education, ensuring security and a solid infrastructure in human settlements, decent work for all and promoting well-being. A separate line spelled out the goal – "Reducing inequality within and between countries".

Sustainable Development Goals (SDGs) are not legally binding on governments of signatory countries. However, it is supposed that governments will establish national mechanisms to help achieve the stated goals and monitor progress towards the goals. In June 2017, by order of the Government of the Russian Federation, Federal State Statistics Service (Rosstat) was entrusted with the task of coordinating the activities of subjects of official statistics on the generation and submission to international organizations of official statistical information on indicators of achievement of the Sustainable Development Goals of the Russian Federation in accordance with accepted international standards for the exchange of statistical data. As of 2019, on the Rosstat Web portal, in the section "On Sustainable Development Goals", out of 244 global indicators, 19 are under development (7%), 156 are not being developed (64%), 69 are being developed (28%), i.e. today, more than half of global indicators for achieving goals and objectives in the field of sustainable development are not considered by Rosstat.

The Sustainable Development Goals (SDGs) and related challenges are global in nature, but at the same time they take into account different national circumstances and respect national priorities. The system of global indicators for achieving the goals and objectives in the field of sustainable development should be supplemented by indicators of regional and national levels. Rosstat proposed 364 indicators to the national set of indicators for the Sustainable Development Goals, in which the emphasis is made on 12 areas from the Decree of the President of the Russian Federation of May 7, 2018 "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024". The section on the Rosstat Web portal "On Sustainable Development Goals" is also under development and invites all interested parties to discuss the draft list of national SDG indicators.

2. Problem Statement

The concept of sustainable development in its current form is largely a reflection of the complexity of the functioning of the human community of society as a whole. Therefore, the dynamics of sustainable

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development is difficult to unambiguously translate into specific numerical values. However, there are various composite indicators that allow measuring complex social phenomena. When solving the problems of managing social systems, composite indices characterizing the quality of managed systems are widely used.

According to UN data, 290 composite indices for ranking or a comprehensive assessment of countries according to various parameters existed by 2011 (Bandura, 2011). The Organization for Economic Co-operation and Development (OECD), the European Union, the World Economic Forum, the International Monetary Fund and other international organizations are constructing composite indicators in various fields (Bandura, 2011; Nardo, Saisana, Saltelli, & Tarantola, 2005). The main goal of most of the indicators used is the ranking and comparative analysis of objects for some aggregate measure (Bandura, 2011; Foa & Tanner, 2012; Saltelli, 2007; Sharpe, 2004). For example, the Human Development Index (HDI), until 2013 the "Human Potential Development Index" (HPDI), is an integral indicator calculated annually to compare and measure the standard of living, literacy, education and longevity in different countries as the main characteristics of the human potential of the territory under study. The Human Development Index is a standard tool when comparing the living standards of different countries and regions.

The creators of composite indices believe that the integral characteristic adequately describes reality, and this characteristic is extremely useful for attracting the interest of the public, the media and the attention of governing structures. From the point of view of opponents of integral characteristics, to assess a complex phenomenon, it is enough to form a set of suitable indicators. The main argument of opponents of composite indices is the arbitrariness of the choice of determining weights when calculating a composite indicator, with the help of them the variables being combined into a single characteristic. A discussion of different points of view is given in works (Nardo, Saisana, Saltelli, Tarantola, Hoffmann, & Giovannini, 2008; Foa & Tanner, 2012).

The use of composite indices using objective (formal) methods to track the dynamics of processes taking place in society will give fairly objective assessments of success or failure in achieving the Sustainable Development Goals. While a pool of indicators that describe the solution of the tasks defined by the Sustainable Development Goals is being formed at the international and national levels, sustainable development can be measured using available data and tools.

3. Research Questions

Figure 01 shows the parameters of global indicators for achieving the Sustainable Development Goals and objectives proposed by the UN and the parameters developed or being developed by Rosstat. The largest number of parameters is presented by Goal number 3 – "Good health and well-being". According to the UN version, 27 parameters describe it, according to the Rosstat version – 17 parameters. A significant number of Rosstat's parameters describe Goal 8 – "Decent Work and Economic Growth", and Goal 9 – "Industrialization, Innovations and Infrastructure". The parameters characterizing these three Goals reflect the quality of life and make up more than 60% of 88 parameters provided by Rosstat to describe the achievement of the Goals and objectives in the field of sustainable development. Therefore, the priority for sustainable development in Russia today is to improve the quality of life of the population.

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The quality of life as the target criterion for the socio-economic development of Russia was first identified by the President of the Russian Federation in 2004 in his Address to the Federal Assembly. In subsequent years, senior officials of the state in their speeches repeatedly emphasized the importance of orienting socio-economic policies towards improving the quality of life of the population. The Decree of the President of the Russian Federation of May 7, 2018 "On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024" is a decisive breakthrough plan to improve the living standards of the Russian population. In his subsequent speeches, the President of Russia repeatedly emphasized that improving the quality of life of the Russian population, reducing the number of people living below the poverty line, is Russia's national interest. It can be stated that after the "May Decrees" of the President of the Russian Federation Vladimir Putin, the problem of measuring and assessing the quality of life of the population of Russia moved into the plane of practical tasks. It can be stated that after the "May Decrees" of the President of the Russian Federation Vladimir Putin, the problem of measuring and assessing the quality of life of the population of Russia moved into the plane of practical tasks. Consequently, the need to obtain objective results of monitoring changes in the quality of life becomes more urgent.

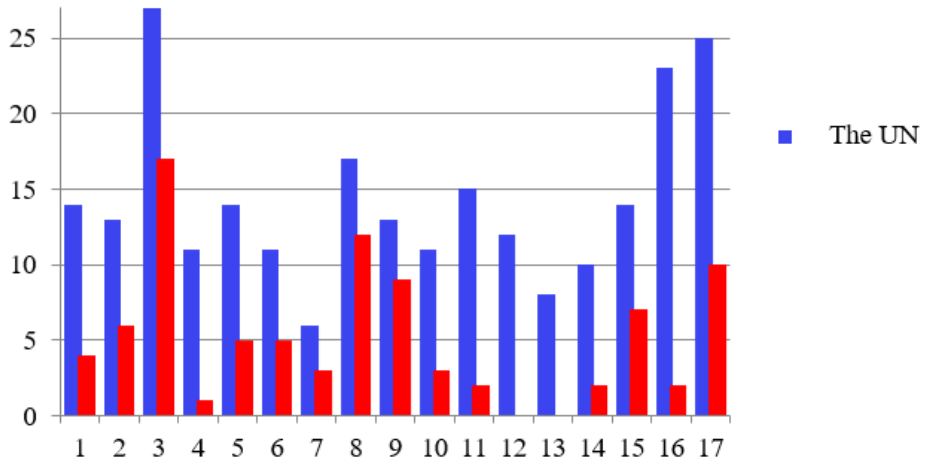

Figure 01. The number of global indicators describing the Sustainable Development Goals developed by the UN and the number of indicators describing the Sustainable Development Goals developed by Rosstat

The definition of quality of life as a composite index uses many parameters that measure the solution of the tasks set by the Sustainable Development Goals. Consequently, an increase in the quality of life will indicate a country's progress towards the Sustainable Development Goals.

4. Purpose of the Study

The data for calculating the composite index of life quality are statistics. But any measurement, including statistical, is determined by the accuracy of the measuring device, so the measurement result always contains an inevitable error.

It is impossible to obtain an accurate numerical characteristic of an object by a single measurement, which inevitably contains an error. However, in the presence of a series of measurements containing

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errors, the calculation of the unknown characteristics of the object is possible. Assuming the inevitable presence of errors in the data used, the construction of the integral characteristic of the system can be considered as the problem of extracting a useful signal against the noise background from a series of observations.

The aim of the work is to build an objective assessment of changes in the quality of life of the population of the constituent entities of the Russian Federation from a series of observations to monitor progress in the implementation of the Sustainable Development Goals.

5. Research Methods

Let us consider the construction of an integral estimate of a system consisting of m objects. Tables of descriptions of objects for a number of observations are known - matrices of dimension $m \times n$ $A^t = \left\{ a_{ij}{}^t \right\}_{i,j=1}^{n,m}$, $t = 1,\ldots, T$. Data matrix element $a_{ij}{}^t$ is the value of j indicator of i object at time t.

For each t, the vector of integral indicators has the form

$$q^t = A^t \cdot w^t, \tag{1}$$

or for object i at time t

$$q^t{}_i = \sum_{j=1}^{n} w^t{}_j \cdot a^t{}_{ij} \tag{2}$$

where $q^t = \left\langle q^t{}_1, q^t{}_2, \ldots, q^t{}_m \right\rangle^T$ is the vector of composite indicators for observation t,

$w^t = \left\langle w^t{}_1, w^t{}_2, \ldots, w^t{}_m \right\rangle^T$ is the vector of weights of indicators for observation t, A^t is the matrix of data for t.

The data are pre-converted: the values of the variables are given on the interval [0, 1] according to the principle: "the more, the better" as follows. If the initial indicator x_{ij} is related to the integral quality property by a monotonous dependence, then for each observation t the variables x_{ij} are transformed according to the rule:

$$a^t{}_{ij} = s_j + (-1)^{s_j} \cdot \frac{x^t{}_{ij} - m_j}{M_j - m_j}, \tag{3}$$

where the value $s_j = 0$, if the optimal value of j indicator is maximum, and $s_j = 1$, if the optimal value of j indicator is minimum, m_j is the lowest value of j indicator, M_j is the highest value of j indicator across the sample.

If within the range of the indicator there is a value x_j^{opt}, at which quality is maximized, then the conversion of the indicator is calculated by the formula:

$$a^t{}_{ij} = \left(1 - \frac{\left| x^t{}_{ij} - x_j{}^{opt} \right|}{\max\left((M_j - x_j{}^{opt}), (x_j{}^{opt} - m_j) \right)} \right). \tag{4}$$

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For each object it is required to give a motivated assessment over the entire observation interval, i.e. determine the integral characteristic of a change in system quality. This requires finding the weights of the indicators w^t for every moment in time.

Despite the simplicity of determining weight indicators using expert estimates, this method is far from objective. In 2008, the Organization for Economic Co-operation and Development (OECD), together with the Joint Research Center (Joint Research Centre European Commission), prepared a handbook (Handbook, 2008), which was the result of many years of research in this field (Nardo, Saisana, Saltelli, & Tarantola, 2005; Nicoletti, Scarpetta, & Boylaud, 2000; Saltelli, 2007; Tarantola, Saisana, & Saltelli, 2002). In this case, the linear convolution weights of the indicators are constructed using multivariate analysis.

Tools for multivariate analysis (factor analysis and principal component analysis) were used to combine indicators into a single index in the works (Hightower, 1978; McKenzie, 2005; Vyas & Kumaranayake, 2006; Somarriba & Pena, 2009; Ajvazjan, 2003). But the correlation matrices change over time, and the weights coefficients determined by the PCA and the structure of the main factors determined by factor analysis are different for different observations. Therefore, the results obtained for various observations using PCA and factor analysis are not comparable (Mazziotta & Pareto, 2016). It should be noted that this conclusion was made when constructing a composite index for one observation.

The author (Zhgun, 2017a; Zhgun, 2017b) proposed an algorithm that modifies the principal component analysis for a number of observations. The determined weights must reflect the ***structure*** of the system being evaluated. This interpretation of weight indicators eliminates one of the main uncertainties in the design of an integrated indicator (Becker, Saisana, Paruolo, & Vandecasteele, 2017; Becker, Saisana, Paruolo, & Vandecasteele, 2017). The space of the principal components is optimal for modeling the data internal structure. Free from random errors, the values of the eigenvalues and eigenvectors will characterize the structure of the system in question and will be the signal to be extracted from the data set with noise.

6. Findings

According to the proposed algorithm, complex indicators of changes in the quality of life of the subjects of the population of the Russian Federation for 2010-2017 were calculated. Variables were used from the study (Isakin, 2006). All variable values are taken from Rosstat open directories. Among the variables listed, variables 1, 2, 5, 7, 9, 10, 12, 21, 22, 23 are associated with the calculated characteristic by monotonously increasing dependence, when the optimal value of the variable is the maximum. For other indicators, except variable 27, the optimal index value is minimal. For variable 27 “net migration” the optimal value of x^j_{opt} is equal to the average value of the sample variable. The indicators used and the resulting vector of weights are presented in Table 1. The negative sign of variable 4 indicates that the dynamics of change of this variable is opposite to the expected.

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Table 01. Used indicators and their weights

Variable number	Variable Name	Variable weight
	Block 1: Population's welfare	
1	Per capita GDP–living wage ratio, units	0.333
2	Per capita income purchasing power relative to living wage, %	0.546
3	Share of people with incomes below living wage, %	0.926
4	The ratio of average income of the richest 20% to the poorest 20% (R\P 20)	-0.347
5	Number of cars per 1 000 people	1.340
6	Share of families on waiting lists for housing, %	0.962
7	Total area of housing resources per resident (m2/10 people)	1.817
8	Share of dilapidated housing, %	0.401
9	Public road density (km/10,000 km2)	0.318
	Block 2: Population quality	
10	Life expectancy at birth, years	1.302
11	Mortality rate, infant (per 1,000 live births)	1.029
12	Population growth rate, per 1,000 people	0.288
13	Deaths caused by communicable, parasitic diseases and TB per 100,000 people	1.055
14	Deaths caused by neoplasms per 100,000 people	0.335
15	Deaths caused by cardiovascular diseases per 100,000 people	0.008
16	Deaths caused by respiratory diseases per 100,000 people	1.336
17	Deaths caused by digestive system diseases per 100,000 people	0.665
18	Incidence of injuries, intoxication and other external causes per 100,000 people	1.434
19	Number of disabled people per 1,000 people	0.346
20	Incidence of congenital anomalies per 1,000 people	0.399
21	Specialists with higher education employed in economy, %	0.880
22	Labor force productivity (GRP per average annual number of employed in economy, thousand rubles/person)	0.133
23	Graduates from higher and vocational educational institutions per 1,000 people	0.522
	Block 3: Social quality	
24	Unemployment, %	0.161
25	Employers engaged in harmful and hazardous working conditions in the average annual number of employed in economy, %	0.436
26	Number of employees injured at work resulting in death or loss of earning capacity for 1 or more days per 1,000employees	0.478
27	Net migration per 10,000 people	0.139
28	Intentional homicides per 100,000 people	0.893
29	Incidence of intentional infliction of grievous bodily harm per 100,000 people	0.994
30	Incidence of rape per 100,000 people	0.748
31	Incidence of robbery and theft per 100,000 people	0.623
32	Incidence of larceny or embezzlement per 100,000 people	0.521
33	Number of registered with drug and substance abuse per 100,000 people	0.862
34	Number of registered with alcohol abuse per 100,000 people	0.875
35	Number of infected with TB per 100,000 people	0.810
36	Mortality from external causes per 100,000 people	0.000
37	Number of people with mental disorders per 100,000 people	1.120

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Results are given in Table 02. The obtained values of complex indices vary from 1 to 100 (in 2010). In 2010, the Republic of Tuva has a minimum value of the indicator – one, Moscow has a maximum value of 100.

Table 02. Quality of life of the constituent entities of the Russian Federation for 2010-2017

Region of the RF	2010	2011	2012	2013	2014	2015	2016	2017
Belgorod reg.	86.7	88.8	90.9	93.5	96.4	97.6	99.5	102.1
Bryansk reg.	59.7	62.2	66.4	66.4	67.0	71.5	75.2	76.1
Vladimir reg..	64.7	68.2	71.2	70.6	69.2	72.9	75.6	78.5
Voronezh reg.	68.7	74.5	80.8	82.6	83.7	88.1	89.9	91.3
Ivanovo reg.	47.4	50.2	56.9	60.9	66.0	71.5	76.7	79.4
Kaluga reg.	67.4	73.0	76.6	77.5	79.7	81.4	85.9	89.3
Kostroma reg.	60.8	64.2	69.8	72.0	73.4	77.3	78.6	80.2
Kursk reg.	65.0	69.1	72.9	74.2	77.8	82.0	84.1	86.1
Lipetsk reg.	75.2	77.2	80.6	85.3	87.8	89.2	91.6	96.4
Moscow reg.	86.6	91.3	94.0	92.9	96.6	103.9	105.6	105.0
Oryol reg.	63.7	70.3	71.7	74.4	77.6	78.7	82.3	84.0
Ryazan reg.	67.2	72.1	75.0	77.7	80.9	79.6	79.6	81.3
Smolensk reg.	54.4	59.9	63.4	68.4	70.3	73.7	78.2	81.1
Tambov reg.	68.5	70.0	72.5	75.5	79.3	84.1	87.6	90.4
Tver reg.	53.1	59.2	65.2	68.0	70.1	70.6	73.9	77.1
Tula reg.	61.7	67.7	70.9	71.4	73.0	75.4	78.4	79.8
Yaroslavl reg.	66.2	70.9	72.2	73.7	77.1	79.8	83.4	84.4
Moscow	**100.0**	104.2	104.7	107.1	108.5	107.4	108.4	110.1
Rep. of Karelia	55.8	61.0	66.8	71.4	72.5	72.6	74.0	75.0
Rep. of Komi	59.1	65.0	69.0	71.3	73.4	76.1	74.6	77.5
Arkhangelsk reg.	62.1	66.7	72.5	73.3	75.5	76.2	78.7	80.1
Nenets Aut. Okrug	58.4	62.8	73.4	70.4	79.1	78.2	87.9	81.7
Vologda reg.	56.1	62.7	69.3	72.3	78.0	81.2	83.1	84.1
Kaliningrad reg.	70.0	77.6	81.6	80.9	81.2	84.9	91.8	92.7
Leningrad reg..	66.0	71.9	76.6	74.2	75.1	79.2	84.5	86.4
Murmansk reg.	81.8	81.7	85.7	90.9	89.7	91.1	94.1	94.4
Novgorod reg.	46.5	52.5	61.1	62.3	65.8	67.8	71.7	73.3
Pskov reg.	53.2	59.7	62.8	68.3	71.3	73.3	76.1	78.2
Saint Petersburg	82.4	87.5	91.0	93.9	93.6	94.8	97.5	98.7
Rep. of Adygeya	72.4	79.6	83.3	86.7	87.7	87.9	91.9	93.3
Rep. of Kalmykia	56.3	66.9	71.6	73.7	75.1	77.8	82.1	84.3
Crimea	67.2	67.2	67.2	67.2	65.5	62.2	67.3	72.5
Krasnodar reg.	80.0	82.4	85.3	88.9	90.7	94.0	98.0	99.5
Astrakhan reg.	58.6	65.0	68.1	72.5	74.2	79.6	83.7	84.1
Volgograd reg.	64.3	66.7	67.4	71.3	75.8	82.3	88.4	91.4
Rostov reg.	71.7	74.7	78.4	80.0	80.3	83.7	85.8	87.3
Sevastopol	81.5	81.5	81.5	81.5	80.6	80.5	83.3	92.5
Rep. of Dagestan	76.2	79.3	80.7	81.4	84.0	86.6	91.5	92.9
Rep. of Ingushetia	83.9	82.6	86.9	87.8	83.7	85.7	86.2	93.1
Kabardino-Balkar Rep.	79.8	82.8	84.9	86.5	87.6	89.6	89.8	94.1
Karachay-Cherkessia	73.7	78.3	78.5	82.2	85.4	87.5	89.9	91.1

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Rep. of North Ossetia	89.3	90.5	92.3	94.9	93.7	96.3	99.0	102.0
Chechen Rep.	80.4	77.3	75.0	80.4	87.1	89.2	94.5	97.4
Stavropol reg.	77.2	78.8	83.5	86.8	90.0	93.9	95.1	96.4
Rep. of Bashkortostan	67.7	69.8	73.5	74.2	77.2	76.9	80.1	82.1
Rep. Mary El	45.4	52.1	54.3	61.2	60.4	65.7	72.9	74.4
Rep. of Mordovia	66.5	70.4	70.8	73.3	75.6	80.5	84.1	85.6
Rep. of Tatarstan	76.0	77.7	82.8	83.5	87.9	90.0	94.6	95.6
Udmurt Rep.	53.8	58.8	64.0	64.4	64.3	70.9	74.7	76.8
Chuvash Rep..	45.8	52.3	57.5	60.3	61.8	66.0	70.7	72.3
Perm reg.	44.7	50.4	55.2	59.6	62.5	65.3	67.4	69.1
Kirov reg.	55.6	63.2	64.9	69.1	71.5	74.9	78.4	79.7
Nizhny Novgorod reg.	60.3	66.0	70.5	74.3	78.3	81.4	84.2	86.0
Orenburg reg.	57.5	60.8	62.1	63.4	63.2	70.6	76.2	76.6
Penza reg.	71.1	77.9	83.3	83.6	85.2	87.5	87.5	90.3
Samara reg.	62.3	67.3	70.0	71.4	73.2	78.7	82.6	84.1
Saratov reg.	67.6	70.3	72.3	76.1	78.4	80.2	82.9	84.3
Ulyanovsk reg.	63.0	66.1	73.6	72.6	75.3	76.4	77.6	81.3
Kurgan reg.	48.0	52.2	55.7	57.9	56.7	59.4	60.7	62.8
Sverdlovsk reg..	63.3	67.5	68.7	73.4	73.9	76.2	78.1	80.7
Tyumen reg.	67.8	74.7	77.8	75.3	74.0	76.8	82.2	84.2
Khanty-Mansiysk. A.O.	81.1	85.1	90.8	91.2	94.0	97.2	100.1	101.2
Yamalo-Nenets A.O.	82.5	83.2	87.7	91.1	97.5	98.4	101.4	103.2
Chelyabinsk reg.	56.6	58.5	61.8	63.4	68.7	71.2	73.6	74.2
Rep. of Altai	33.5	41.5	44.4	45.2	46.8	55.3	63.8	64.3
Rep. of Buryatia	40.4	41.5	47.5	51.8	57.8	60.9	65.5	65.4
Resp. Tuva	**1.0**	11.7	6.3	17.7	13.7	17.8	20.2	24.7
Resp.Khakassia	49.0	51.0	50.9	58.2	58.0	63.1	65.7	68.6
Altai reg.	46.7	49.3	54.0	56.0	61.1	65.1	67.9	69.3
Transbaikal reg.	36.6	44.2	47.4	51.1	53.8	54.7	58.2	60.6
Krasnoyarsk reg.	53.1	58.2	60.7	62.9	64.7	67.3	69.7	70.4
Irkutsk reg.	32.1	35.5	41.2	42.0	45.0	49.7	54.6	55.9
Kemerovo reg..	35.6	44.8	46.6	52.0	52.3	54.0	56.5	58.5
Novosibirsk reg.	58.6	63.4	66.9	70.4	72.0	73.8	76.1	78.6
Omsk reg.	59.2	65.1	66.4	65.3	63.6	66.5	70.7	71.3
Tomsk reg.	59.7	63.1	68.2	70.6	72.1	74.1	75.7	77.3
Yakutia	57.0	63.9	66.9	73.0	76.0	77.9	79.6	81.6
Kamchatka Krai	65.0	67.6	73.0	77.3	79.2	81.0	80.0	84.5
Primorsky Krai	47.5	49.3	56.2	56.4	64.7	68.6	71.9	74.4
Khabarovsk reg.	48.7	51.2	57.6	58.7	63.3	68.0	70.3	74.9
Amur reg.	32.0	38.4	41.6	50.4	55.8	59.3	62.7	64.4
Magadan reg.	49.9	56.9	61.3	65.8	69.7	75.8	81.3	81.7
Sakhalin reg.	49.9	55.7	57.9	61.8	66.4	65.5	68.4	69.0
Jewish Authon. reg.	29.0	29.1	34.6	34.9	39.2	40.7	36.9	45.1
Chukchi Aut.county	30.6	47.5	47.3	42.4	45.8	45.8	53.2	58.3

The change in the quality of life of the population of some constituent entities of the Russian Federation is shown in Figure 02. It is interesting to trace the reflection of recent political events on the values of the

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calculated composite index. The impact of the events of 2014 most affected the quality of life in the coastal regions - Kaliningrad and Murmansk - and the financial capitals Moscow and St. Petersburg. In other regions, the life quality index is less prone to fluctuations in changing political situations.

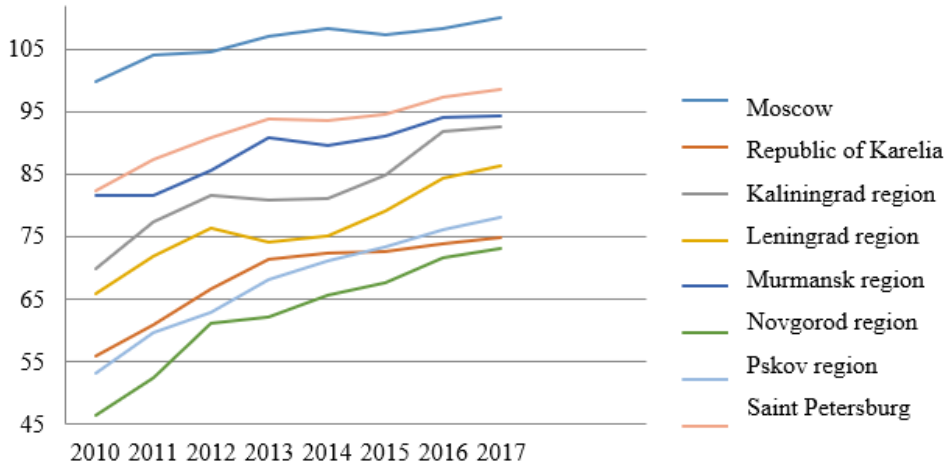

Figure 02. The change in the quality of life for some of Russia's constituent entities for 2010-2017

The highest composite indicators of quality of life for the entire observation period are demonstrated by Moscow, the Moscow region, St. Petersburg, oil producing regions (Khanty-Mansiysk and Yamalo-Nenets districts), as well as subjects of the North Caucasus Federal District. Of the 37 indicators in the calculation of complex indicators of quality of life, 20 reflect the physiological well-being of a person. It is this circumstance (as well as the peculiarities of national statistics) that explains the high indicators of the quality of life of the population of the republics of the North Caucasus Federal District. In North Ossetia, Ingushetia, Chechnya, Dagestan, the likelihood of getting sick, dying and experiencing criminal violence is much lower than in the whole country. For example, life expectancy in Ingushetia is the highest in Russia and exceeds this parameter for the Novgorod region by 10 years.

For each of the subjects of Russia, the quality of life is growing. The average value of this indicator for the country in 2010 was 60.9, and in 2017 – 81.3. The gap in the quality of life of the regions with leaders remains significant, however, this difference is noticeably narrowing and we can talk about a decrease in inequality within the country.

7. Conclusion

The priority for sustainable development in Russia today is to improve the quality of life of the population. The calculated index of the quality of life of the population of the constituent entities of the Russian Federation provides objective results of monitoring changes in the quality of life of the population of Russia. The definition of quality of life as a composite index uses many parameters that measure the solution of tasks set by the social Goals of sustainable development. Consequently, improving the quality of life and reducing inequality within the country testifies to the country's progress towards the Sustainable Development Goals.

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