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ECONOMIC AND SOCIAL CHANGES: FACTS, TRENDS, FORECAST

A peer-reviewed scientific journal that covers issues of analysis and forecast of changes in the economy and social spheres in various countries, regions, and local territories.

The main purpose of the journal is to provide the scientific community and practitioners with an opportunity to publish socio-economic research findings, review different viewpoints on the topical issues of economic and social development, and participate in the discussion of these issues. The remit of the journal comprises development strategies of the territories, regional and sectoral economy, social development, budget revenues, streamlining expenditures, innovative economy, and economic theory.

Founder: Vologda Research Center of the Russian Academy of Sciences

Federal State Budgetary Institution of Science Vologda Research Center of the Russian Academy of Sciences (VolRC RAS), which existed as Vologda Scientific Coordinating Center of Central Economic and Mathematical Institute of RAS until March 2009, is situated on the territory of the Vologda Oblast. V.A. Ilyin, Doctor of Economics, Professor, Honored Scientist of Russia, is the permanent director of the Institute. A lot of great scientists have played an important role in the formation and the development of ISEDT RAS as a scientific institution such as: academicians D.S. Lvov, V.L. Makarov, V.I. Mayevsky, A.D. Nekipelov, Y.S. Osipov. Everything that has been done before and is being done nowadays by the personnel of the Institute, it would be impossible without the constant support of the Vologda Oblast's Government and city leaders.

The formation of the scientific personnel with an active life position, a great demand for Institute's investigation, academic community's support of the new journal published by ISEDT RAS, which combined efforts of the economic institutes of RAS in the Northwestern Federal District, and furthermore development of international ties have become the main outcomes of the last years.

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Due to the Resolution № 96 by the Presidium of Russian Academy of Sciences dated from March 31, 2009 VolRC RAS carries out investigations in the following fields:

- problems of economic growth, scientific basis of regional policy, sustainable development of territories and municipalities, and transformations of socio-economic space;
- regional integration into global economic and political processes, problems of economic security and competitiveness of territorial socio-economic systems;
- territorial characteristics of living standards and lifestyle, behavioral strategies and world view of different groups of the Russian society;
- development of regional socio-economic systems, implementation of new forms and methods concerning territorial organization of society and economy, development of territories' recreational area;
- socio-economic problems regarding scientific and innovative transformation activities of territories;
- elaboration of society's informatization problems, development of intellectual technologies in information territorial systems, science and education.

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In order to integrate scientific activities of the Institute's scholars into global research area, international scientific conferences are held on a regular basis; they result in cooperation agreements with different scientific establishments:

2007 – Cooperation agreement is signed with Institute of Sociology, of the National Academy of Sciences of Belarus , Center for Sociological and Marketing Investigations at the "International Institute of Humanities and Economics" (Belarus, 2008).

2008 – Memorandum of agreement is signed with Alexander's Institute at the Helsinki University (Finland, 2008).

2009 – Cooperation agreement is signed with Center for System Analysis of Strategic Investigations of NAS (Belarus, 2009).

2010 – Cooperation agreement is signed with Institute of Economics of the National Academy of Sciences of Belarus (Minsk, 2010).

2011 – Cooperation agreements are signed with National Institute of Oriental Languages and Civilizations (Paris, 2011), Institute of Business Economy at Eszterhazy Karoly College (Hungary, 2011), Republican research and production unitary enterprise "Energy Institute of NAS" (Belarus, 2011). Protocol of intentions are signed with Jiangxi Academy of Social Sciences (China, 2011), Research and Development Center for Evaluation and Socio-Economic Development and the Science Foundation of Abruzzo region (Italy, 2011).

2012 – Cooperation agreement is signed with Center for Social Research at the Dortmund Technical University (Germany, 2012).

2013 – Cooperation agreement is signed with Jiangxi Academy of Social Sciences (China, 2013).

July 2013 – The application for research performance by international consortium involving ISEDT RAS within the 7th Framework Programme of European Community.

2014 – Cooperation agreement is signed with Jiangxi Academy of Social Sciences (China, 2014).

NEW PUBLICATIONS OF VolRC RAS

Ilyin V.A., Povarova A.I. *Public Administration Efficiency. 2000–2015. Contradictory Outcomes – an Expected Result: Monograph*.

While Analyzing the Past, to Think about the Future. Under the scientific supervision of Doctor of Economics, Professor V.A. Ilyin.

Ilyin V.A. *Public Administration Efficiency: Chief Editor's Point of View.*

Strategy and Tactics of Implementation of Socio-Economic Reforms: Regional Aspect: Proceedings of the Seventh Research-to-Practice Conference, Vologda, Russia, December 17–19, 2015.

Shabunova A.A., Guzhavina T.A., Dement'eva I.N., Kozhina T.P., Lastovkina D.A., Afanas'ev D.A. *Regional Civil Society: Development Dynamics: Monograph*.

Global Challenges and Regional Development in the Mirror of Sociological Measurement: Proceedings of the Online Research-to-Practice Conference. Vologda, March 14–18, 2016.

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"Russian Federation – a Welfare State?"

Assessing the Results of 25 years of Implementation of Article 7 of the Russian Constitution

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Abstract. December 12, 2018 marked the 25th anniversary of the adoption of the Constitution of the Russian Federation. The paper provides our own assessment of the implementation of one of the main provisions of the Constitution of the Russian Federation: "The Russian Federation is a social State whose policy is aimed at creating conditions for a worthy life and a free development of man" (Article 7). We define and substantiate the criteria of efficiency of implementation of this provision; we also provide the data of foreign, Russian and regional sociological studies that reflect a subjective assessment of the dynamics of living standards and quality of life by Russians. We pay special attention to public administration efficiency in overcoming social inequality and achieving social justice. Ultimately, we raise the questions whether Russia is a social state, how far it has advanced in this direction over the past 25 years, and what its prospects can be in the near future.

Key words: Constitution of the Russian Federation, welfare state, social justice, public administration efficiency, public opinion.

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On December 12, 1993, the Constitution of the Russian Federation was adopted. Of all the Russian constitutions, it was the first one to become the "main law of an independent and truly sovereign state"[1]. Over the 25 years that have passed since then, Russia has accumulated a lot of contradictions and many reasons to wonder how this document corresponds to the actual Russian reality, because all Russian laws are ultimately written in accordance with it. The economic situation in the country has changed, as well as its geopolitical status and the nature of public sentiment; the country is ruled by a new President who built a new hierarchical structure of public administration. The world itself has changed – it is facing an increasing amount of challenges associated with the tensions in geopolitical relations, achievements in scientific and technological progress and the growing number of information technologies affecting almost every citizen of any country.

The qualitative changes that have occurred in the country and in the world over the past quarter century, urge many experts to take a fresh look at the Constitution and find a lot of contradictions in it. For instance, S. Sulakshin draws attention to the need to consolidate the diversity of ideologies and rights of the opposition and to introduce the institution of "politically responsible government"[2]. N.V. Starikov points out that the lack of ideology enshrined in the Constitution of the Russian Federation in 1993 in fact means the lack of development goals, which is quite logically due to the fact that this document was prepared in the midst of the "turbulent" 1990s, that is, under the dictation of our "foreign partners", who obviously do not welcome the imminent return of Russia in the geopolitical race.

By the way, we find it of interest to note the statement of N.V. Starikov, who says that in order to revise any provisions of the Constitution it is necessary to convene the Constitutional Assembly, but there is no law on this convocation: "From 1993 to the present day, no law has been adopted on the procedure for convening the Constitutional Assembly – a special body designed under Article 135 of the Constitution to amend it. That is, if you want to change the basic principles of the Constitution, it is necessary, according to the Constitution, to convene the Constitutional Assembly. And there is no law on how to convene it; consequently, it is impossible to amend the Constitution"[4].

> The Constitution establishes an official ban on state ideology. What is ideology? It is a purpose. The state should have a purpose and the Russian people should have a purpose. And the Constitution officially prohibits it: there is no purpose.
>
> Accordingly, what does our state exist for? The Constitution doesn't contain this information. It says that Russia is a social state, but it is just a formal statement; but really, what does Russia exist for? To change phones every six months? To consume more yogurt today than yesterday...?
>
> There is no goal-setting and hence a very large number of problems arise: alcoholism, a sense of loss... Because the whole nation, the whole civilization has no purpose, and it is directly written in the Constitution[3].

Special attention should be paid to the implementation of, perhaps, the main principle, the spirit of which permeates the 1993 Constitution of the Russian Federation: "The Russian Federation is a social State whose policy is aimed at creating conditions for a worthy life and a free development of man" (Article 7)[5]. This principle has swept through all 25 years of Russian transformations and it still forms the basis for national security in our country. According to

[1] Tavadov G.T. *Ethnology. Modern Reference Dictionary*. Moscow, 2007. Pp. 157-159.

[2] Draft Russian Constitution. Sulakshin Center (Center for Scientific Political Thought and Ideology). Available at: http://rusrand.ru/dev/konstitutsija-rossii-proekt

[3] Starikov N. *We have to change the Constitution!: an interview with N. Starikov*. July 20, 2014. Available at: https://www.youtube.com/watch?v=ZSe6kFB-OQ8

[4] N. Starikov's official blog. Available at: https://nstarikov.ru/blog/76003?print=print

[5] Constitution of the Russian Federation (December 12, 1993). Available at: http://www.constitution.ru

the National Security Strategy approved by the President of the Russian Federation on December 31, 2015, "improving the quality of life" is "one of the national interests in the long term" (Section III, Paragraph 30); "the strategic objectives of national security in improving the quality of life of Russian citizens are the development of human potential, satisfaction of material, social and spiritual needs of citizens, **reducing the level of social and property inequality of the people primarily by increasing their incomes** (Section IV, Paragraph 50) ... In order to counter threats to the quality of life of citizens, public authorities and local authorities in cooperation with civil society institutions: **... contribute to the growth of welfare of citizens, reduce income differentiation of the population, reduce poverty..."**[6] (Section IV, Paragraph 53).

It is important to note that the National Security Strategy of the Russian Federation establishes personal responsibility of the head of state for the implementation of the state policy in the field of national security[7].

Does the real state of affairs in the country correspond to the key principles and criteria of the social state declared in the main and fundamental documents of Russia – in the Constitution of the Russian Federation, in the National Security Strategy, in the Presidential addresses to the Federal Assembly of the Russian Federation, in the "May decrees" of the head of state? To answer this question, it is necessary first of all to understand what the criteria of the social state are, because in fact it is largely a utopian concept, and the effectiveness of its implementation can be assessed only in the context of international comparisons; especially when we consider the fact that no state in the world is in a static condition; countries undergo continuous changes trying to find answers to new and more complex internal and external challenges.

The analysis of theoretical aspects and practical models of the social state allows us to distinguish three of its criteria:

1. Extent to which social justice in society is achieved. The German historian, philosopher and economist Lorenz von Stein – the author of the term "welfare state"[8] – pointed out that "the state must contribute to the economic and social progress of all its citizens, because ultimately the development of one is a condition for the development of the other, and it is in this sense that we refer to the welfare state ... **The function of the state is to maintain absolute equality of rights for all different social classes, for a private self-determined individual through its power"**[9].

Among the words most commonly used in everyday life, there are those whose meaning at first glance seems clear to everyone almost regardless of age, gender, nationality, social status and other characteristics...But "justice" is not just a word from the vocabulary of a particular language, but the main driving force of many human actions; without justice, a significant number of these actions can not only be justified, but understood. There are moments in history when, in the name of justice, huge masses of people are willing to sacrifice many of what they have, even their own life[10]...

[6] On the national security strategy of the Russian Federation: Presidential Decree No. 683 of December 31, 2015.

[7] "The implementation of the state policy of the Russian Federation in the field of national security is carried out by coordinated actions of all elements of its providing system **under the leadership of the President of the Russian Federation** and with the coordinating role of the Security Council of the Russian Federation" (source: on the national security strategy of the Russian Federation (Section 5, Paragraph 108): Decree of the President of the Russian Federation No. 683 of December 31, 2015).

[8] Major work of Lorenz von Stein:

1. Der Socialismus und Kommunismus des heutigen Frankreichs, 1842;

2. Geschichte der socialen Bewegung in Frankreich von 1789 bis auf unsere Tage, 1850;

3. Die Verwaltungslehre, 1865–1868;

4. Gegenwart und Zukunft der Rechts- und Staatswissenschaft Deutschlands, 1876.

[9] Roik V.D. Conceptual bases of formation of the social state in Russia: issues related to the income of the population and social budgeting. Available at: //http://viperson.ru/

[10] Epikhina Yu.B. (Ed.). *Social Justice in Russian Sociological Thought: Collective Monograph*. Moscow: RAS Institute of Sociology, 2016. 219 p.

Over the next almost 200 years, there emerged many different interpretations of the concept of the social state, but, by and large, the classical definition, in our opinion, still remains relevant.

In the development of Russian society, in all political, economic, cultural, religious and other processes taking place in our country, social justice has always been a cornerstone. This is due not only to the fact that Russia adopted the Greek (Byzantine) Christianity in 988, but also due to the fact that BEFORE this event justice had already been present in the language and customs of the Slavic tribes. The moral principle prevailed in the ancient pre-Christian worldview of Russians, so Christianity in Russia found fertile and receptive ground, having consolidated the ancient worldview of the Russian people, giving it a more refined and sublime character. O.A. Platonov wrote the following in this connection: "The old Russian views clearly show the idea of improvement, transformation of the soul of the Russian person on the basis of good and harmony. Ancient Rus adopted Christianity with these moral ideas, and this moral core of the old beliefs organically merged with Christianity, for it was largely in tune with it"[11].

> For the Russian people the truth-justice and the law coming from the state are not the same thing. Russians act rightly because they carry the truth in themselves, while people of the Western world, the heirs to the Roman state, believe something is true if it corresponds to the external law[12].

To date, the world has several models of social state: Nordic, Anglo-Saxon, Continental, Southern European... Each of the models has historically determined features; but the different way of their formation in Russia, the United States and Western Europe is united by the fact that **social justice is an integral need of society and individual; and (as von Stein noted) only the state can guarantee it"[13].** Understanding this thesis is extremely important for key participants of geopolitical competition, the participants on which the future of all mankind depends. It is important for Russia as well, since it rightly claims to be one of the centers of the multipolar world according to its objective features (historical traditions, natural resources, military-industrial complex, etc.).

2. Minimization of social inequality, and sustainable development of the standard of living and quality of life of the general population.

The history of the social state in the United States and Western Europe resembles **a kind of dialogue between society and government, the dialogue formed against the background of objective conditions of transition to post-industrial development. The degree of evolution of this process depended on how the participants of this dialogue were able to communicate with each other**. For Europe, the 19th century (when the idea of the welfare state was conceived) was a period of bourgeois revolutions, the century of industrialization and the time when new socio-political forces emerged. By the 1930s, most European countries were overcome by the consequences of the industrial revolution that began in England in the second half of the 18th century. However, the industrial revolution led to an increase in the number of representatives of the working class: most of the villagers moved to the city, and found themselves in extremely difficult life conditions, as they were forced to pay unfair taxes and penalties, and their labor rights were violated. As a consequence, in the mid-nineteenth century in many countries of Western Europe (France, Germany, Italy, and Austria; a little earlier, in the 1920s–1930s – in Spain, Portugal, and Greece) there was a powerful wave of revolutions known as the "Spring of Nations". Under the circumstances, the ruling elites were

[11] Platonov O.A. *Russian Civilization*. Moscow, 1995. Pp. 21-23.

[12] Kozlov M.I. *Social Justice in the Context of Russian Tradition*. Arkhangelsk, 2010. P. 66.

[13] Zakhar'yan D. Social state: the main stages of development and the current condition. *Bulletin of Peoples' Friendship University of Russia. Series: Sociology,* 2016, p. 651.

forced to make concessions and to declare a new mission of the state. Thus, ***Germany*** adopted the laws on accident insurance (1883), on disability and old age (1889). In the 1970s, ***England*** adopted regulations on compulsory insurance of certain categories of workers in case of disability in the workplace. The ***United States***, which embarked on the path of building the welfare state later than the countries of Western Europe, laid the fundamental basis of the welfare state after the great depression in the 1930s, when Franklin Roosevelt announced the "New Deal for the forgotten man".

Thus, based on the very nature of the emergence of the social state, we can say that its criteria are the standard of living and the quality of life, as well as the extent to which social inequality is reduced.

3. Goal-setting and evaluation reflection of public authorities, which is aimed at the priority implementation of public interests.

"Public administration without evaluation reflection has no chance of self-improvement and development. The quality, as well as the success of public administration, cannot be assessed without appealing to any value. The result of public administration outside the value context of the goals to be achieved is not in itself a characteristic of quality. Depending on the targets, the same result can be assessed in the opposite way. For example, Russian privatization as considered from the standpoint of material expectations and the interests of the majority of society is an absolute failure; whereas within the framework of the goal – rapid transition (at any cost) to a market economy – it is quite an effective management operation"[14].

Having defined the criteria, we can assess the effectiveness of the implementation of the social state in Russia.

The first criterion of the social state (social justice) is subjective in nature, so it can be estimated only by the results of sociological studies, which give a clear picture: **social justice is what Russian society needs the most**. So it was in 2012, when the all-Russian research conducted by the Institute of Sociology showed that "living in a more fair and more intelligently arranged society" is pointed out by 33% of Russians, and this need is among their top three dreams, along with "having good health" (33%) and "living in prosperity" (40%)[15].

So it is today as well... in 2015, scientists received "completely unexpected results" showing that "most respondents (51%) are concerned about social justice, in particular, combating corruption"[16].

M.K. Gorshkov: "We got **absolutely unexpected results**. It is clear that financial well-being comes first. It is clear that in the scale of values an important place is given to work, friendship and communication, health and beauty. This is typical for the Russian mentality. **But we did not expect that the second priority was to live in a more just society.** It means that the problem of social injustice has now become so acute that people in a crisis period, when there are so many serious economic problems, gave priority to the desire to live in a more just society. The Government ought to think about it"[17].

Our studies generally correlate with the nationwide data. According to more than 50% of the Vologda Oblast residents, **modern Russian society is unfairly organized, and the proportion of those who share this opinion is increasing** *(Fig. 1)*.

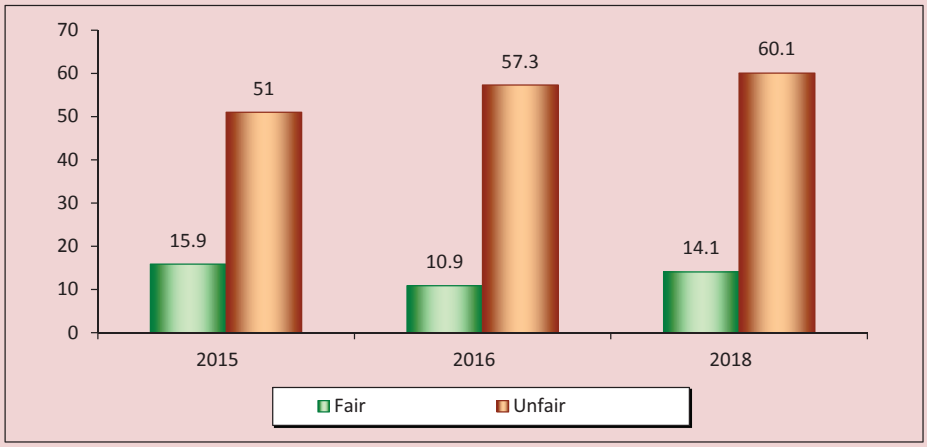
[14] Sulakshin S.S. The quality and success of public policies and management. In: *"Political Axiology" Series*. Moscow: Nauchnyi ekspert, 2012. P. 23.

[15] Gorshkov M.K., Krumm R., Tikhonova N.E. (Eds.). *What Russians Dream About: Ideal and Reality*. Moscow: Ves' mir, 2013. P. 11.

[16] Sociologists: results of the research "Russia in 2017" (V. Petukhov, head of the Center for Complex Social Research at the Institute of Sociology of the Federal Sociological Research Center of RAS). Available at:http://www.aif.ru/event/info/sociologi_rezultaty_issledovaniy_rossiya_v_2017_godu

[17] Gorshkov M.K. A new social resource has appeared in the society (an interview for the journal RF Segodnya dated June 1, 2015). Available at: https://vestirossii.com/obshhestvo/v-obshestve-voznik-novyi-socialnyi-resyrs.html

Figure 1. In your opinion, is modern Russian society fair or unfair?



Source: VolRC RAS survey data.

The second criterion of the social state (sustainable development of the standard of living and quality of life, overcoming social inequality) is closely connected with the dynamics of the sense of social justice; and according to this criterion, we cannot say that the principles of the social state in Russia are implemented effectively.

Table 1. Dynamics of income shares in Russia[18]

Income group	1905	1990	2015
Top 10%	45	25	45
Middle 40%	35	45	40
Bottom 50%	15	30	18

Distribution of pretax national income (before taxes and transfers, except pensions and unemployment insurance) among adults. Corrected estimates combine survey, fiscal, wealth and national accounts data. Approximate estimates rely only on independent survey data. Income of married couples is divided by two.

Authoritative international studies show that "the situation concerning the problem of social inequality in the Russian Federation in 2015 is similar to that in 1905" *(Tab. 1)*[19]. Russian experts state that "Russians' high assessments of the acuteness of different types of inequalities that exist in Russian society today are not detached from reality, but are dictated by it"[20].

> Russians are acutely aware of the inequalities they face personally or observe in their society. At the same time, income inequality is most acutely perceived today, and the severity of this inequality for the population has increased significantly during the crisis (which is not surprising, since income inequality in modern Russia determines a number of non-monetary inequalities, from which the population suffers today, including the opportunity to receive the necessary medical care)[21].

The data in *Table 2* show that income inequality is perceived by Russians most acutely, but it is not the only problem that worries them: among others, they consider inequalities in access to healthcare, housing and good jobs as very acute, too. From 50 to 80% of Russians consider these problems as "acute for society".

[18] Our own compilation based on: Novokmet F., Piketty T., Zucman G. *From Soviets to Oligarchs: Inequality and Property in Russia, 1905–2016.* National Bureau of Economic Research. Cambridge: MA. August, 2017. P. 4.

[19] Novokmet F., Piketty T., Zucman G. *From Soviets to Oligarchs: Inequality and Property in Russia, 1905–2016.* National Bureau of Economic Research. Cambridge: MA. August, 2017.

[20] *Ibidem*. Pp. 30-31.

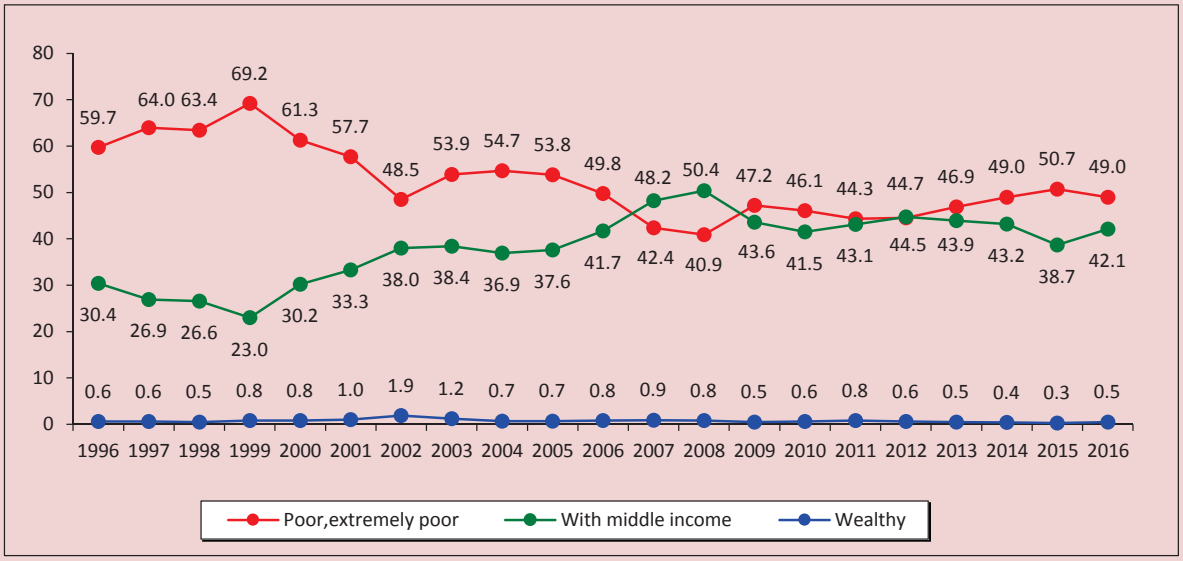
[21] Russian society: a year in the crisis and under the sanctions: information and analytical material on the results of the all-Russian sociological research. IS RAS. Moscow, 2015. P. 32.

Table 2. Degree of acuteness with which Russians perceive various inequalities, October 2015, %*
(ranked by the inequalities that respondents find acute to themselves personally)

Inequalities	Most acute for society as a whole	Most acute for oneself (one's family)
Income	82	66
Access to health care	59	39
Housing	61	30
Access to good jobs	50	23
Opportunities for children from different social strata	31	18

* The data on working Russians. The question featured 12 answer options; the table presents the first five of them.
Source: *Russian society: a year in the crisis and under the sanctions: information and analytical material on the results of the all-Russian sociological research*. RAS Institute of Sociology. Moscow, 2015. P. 31.

Figure 2. Dynamics of Russians' social self-identification (% of respondents; wording of the question: "What category do you belong to, in your opinion?")



Long-term monitoring of public sentiment carried out by VolRC RAS on the territory of the Vologda Oblast also shows that over the decades of market transformations there have been no qualitative changes in the subjective perception of one's financial position in society: despite the fact that the share of the "poor and extremely poor" has decreased by 10 percentage points over the past 20 years (from 59 to 49%), it still prevails over the share of people who consider themselves to be of "average income" (49% vs. 42%; *Fig. 2*). In addition, during all of Vladimir Putin's presidential terms (since 2000 and up to now) we can distinguish two time periods: if the share of the "poor and extremely poor" decreased from 69 to 41% in 1999–2008, then there have been no significant changes since 2009 (the share of the "poor and extremely poor" remains stable at 45–50%).

Table 3. Structure of the problems that Russians find most acute

Problems	1999		2007		2012		2017	
	%	Rank	%	Rank	%	Rank	%	Rank
Inflation	54.5	*2*	43.8	*1*	55.3	*1*	56.5	*1*
Low standard of living, poverty	57.1	*1*	40.4	*2*	43.2	*2*	54.2	*2*
Population stratification into the "poor" and the "rich"	21.3	*9*	31.0	*4*	37.5	*3*	39.0	*3*
Corruption and bribery	14.8	*11*	15.0	*12*	19.8	*9*	23.9	*4*
Economic instability, shutdown of enterprises	39.6	*4*	14.5	*13*	16.5	*11*	23.5	*5*
Social insecurity of citizens	32.5	*6*	26.7	*7*	22.3	*8*	21.5	*6*
Housing problem, low availability of housing	11.8	*14*	31.8	*3*	28.6	*4*	21.5	*7*
Poor quality of engineering infrastructure (utilities, roads, transport, etc.)	n/a	*n/a*	n/a	*n/a*	25.3	*7*	19.3	*8*
Political instability	21.9	*8*	7.9	*15*	11.2	*16*	18.9	*9*
Growth of alcoholism	15.8	*10*	30.9	*5*	27.3	*5*	17.3	*10*

* Ranked according to the data for 2017, the question has 23 answer options; the table presents only the top ten.
Source: VoIRC RAS public opinion monitoring.

In the structure of the issues that people find most pressing, the three leading ones are "inflation", "poverty" and "stratification of the population into the rich and the poor"; it is worth mentioning that the latter problem moved **from 9th to 3rd place** in the rating for the period from 1999 to 2017 *(Tab. 3)*.

It is important to note that experts, describing the causes of inequality in modern Russia, argue that it was formed in the 1990–2000s[22]... "In post-Soviet Russia, the economy experienced a rapid financialization focused on the export of capital that had been generated in Russia, and on placing it in the most profitable nodes of the financial flows of the world community. According to the competent national assessment, over the past 30 years more than one trillion US dollars have been exported from Russia, of which about half circulates between the offshores and the Russian economy"[23]. At the same time, according to experts, we should not expect any positive changes in the search for a solution to this acute issue in the coming years: "Social differentiation in 2018 is growing compared to 2017. Taking into account the fact that the lower rates of growth of wages in the public sector are expected in 2019 in comparison with 2018, this may mean that **Russia has passed the lowest level of social differentiation in the last 12 years, and social inequality will grow again"**[24].

The third criterion of the social state (setting the goals by public authorities) is the most important one, since it is the source of both the first and the second criteria. To evaluate it, we should again refer to the Constitution of the Russian Federation, which states that "...the only source of power in the Russian Federation shall be its multinational people" (Article 3). Nevertheless, there are great doubts that this constitutional norm is actually implemented in real life.

[22] Bobylev S.N., Grigoriev L.M. (Eds.). *UN Sustainable Development Goals and Russia: a Report on Human Development in the Russian Federation*. Analytical center for the Government of the Russian Federation. 2016. P. 55.

[23] Lapin N.I Formation of the social state – a way of successful evolution of society. *Sotsiologicheskie issledovaniya*, 2018, no. 8, p.7.

[24] Bashkatova A. A new social stratification is in store for Russians. *Nezavisimaya gazeta,* 2018, November 7. Available at: http://www.ng.ru/economics/2018-11-07/1_4_7347_russian.html?utm_referrer=https%3A%2F%2Fzen.yandex.com

Insert 1

Excerpts from the speeches of Russian President Vladimir Putin at the sessions of the Russian Popular Front

Excerpt	Date
Now we must make the next, a bigger and much more responsible and hence much more difficult step. We must do in the civilian sectors – the industry, science, education, healthcare and infrastructure – what we have accomplished in the sphere of national defense. We need breakthrough achievements in all of the above sectors. Yes, much has been accomplished in the past few years, but this is not enough. People are expecting major changes.	November 29, 2018
The essence and the main mission of the Popular Front is to help people, to uphold the truth and justice and to protect our people. The aspiration to work for the common good and to care for the country's destiny and future is the most reliable foundation for successfully solving the tasks we have now ... I repeat: there is still much that needs to be done. Above all, for the sake of people's wellbeing and in order to overcome poverty and inequality. So far, the level of these problems remains, unfortunately, too high.	December 19, 2017
We must focus first, of course, on the most pressing issues for the people here, problems such as modernizing social infrastructure, upgrading the transport sector, and creating new jobs. At the same time, we must ensure competent distribution of financial resources and make sure that the money invested brings maximum returns... It is also extremely important to listen to people's views, understand which issues are of greatest concern in their eyes and obtain feedback.	October 26, 2016
Your support base is our people, our citizens, and this is certainly the best support base one could have. If everyone is busy divvying things up amongst 'their own mates and buddies', we will never get anywhere in terms of efficiency. In the consciousness of any responsible person, now I don't want to say the word "official" because it becomes some nominal word, there should be an understanding that there are certain rules which people should adhere to if they come to public or municipal service, and there is no need to think anything up and play cunning. You just have to live by those rules or quit the job. That's it.	November 27, 2015
Our program is outlined in the 2012 May Decrees and in the President's addresses to the Federal Assembly, and we will certainly move forward to implement all our plans and achieve our goals. Officials at all levels of government should work rather than look for excuses for their passivity. It is important that the Russian Popular Front ensure people's and civil control and monitor the implementation of all our tasks and decisions that were previously formulated.	November 18, 2014
The people of Russia are the true masters of their land. The interests of the people are national interests. The right of the people is to demand and to make sure that the power at all levels – from the head of state to the head of a rural settlement – felt and knew that people want. The Russian Popular Front should actually become a broad social movement, so that all citizens of the country have the opportunity to set their own goals, to achieve their implementation, to promote the implementation of those issues that sometimes sink in the bureaucratic swamp, to make their proposals, which will then become laws and state decisions...the most important thing is that this work should be alive, it should be directly connected with people, with their interests and with finding solutions to their problems.	June 12, 2013
Source: transcripts of Russian President Vladimir Putin's speeches at the meetings of the Russian Popular Front. Available at: www.kremlin.ru.	

Insert 2

Information on the results of the work of the Russian Popular Front for the period from August to November 2018

Information	Date
ONF activists in Kaluga prevented inefficient spending of budget funds in the amount of 2.2 million rubles in Lyudinovsky District ONF activists made sure that hot water supply of apartment houses was restored in the town of Lytkarino (Moscow Oblast) ONF activists in Moscow ensured that heating was turned on in two apartment buildings in the city After the intervention of the ONF, the sugar factory in Livny reimbursed the damage caused to the environment in the amount of 1.9 million rubles After the intervention of the ONF, an organization that organized a dump in the city of Lyubertsy (Moscow Oblast) was brought to justice After the intervention of the Murmansk branch of the ONF, the certificate for maternity capital was returned to a resident of Monchegorsk Activists of the ONF achieved the elimination of piles of debris in the floodplain of the Moskva River in the town of Dzerzhinsky At the request of Amur ONF activists, the Prosecutor's office restored the violated rights of employees of a local hospital After the intervention of Kaluga activists of the ONF, sewage treatment facilities were built at a plant in Lyudinovsky District Thanks to the ONF in Arkhangelsk, the unperformed works worth 2.3 million rubles were excluded from the acts of acceptance ONF experts have achieved the elimination of two landfills in Novaya Moskva ONF activists achieved suspension of work of the enterprise which is illegally burning garbage in the Tula Oblast After the signal of the ONF, the office of the Federal Antimonopoly Service in the Tyumen Oblast revealed a case of price fixing After the intervention of ONF activists, a large-scale illegal dumping in the Kurgan Oblast was eliminated After the intervention of the ONF, a landfill in the area of Boynya railway station in Moscow was eliminated	November
In the Murmansk Oblast, the ONF eliminated a dump of construction waste Tomsk activists of the ONF ensured that 115 land plots were returned to state ownership Volunteers of the ONF project "Equal opportunities for children" opened more than 700 free hobby groups and clubs for children The ONF in Irkutsk promoted the creation of the largest "green shield" in Russia Due to the efforts of ONF experts in Moscow, a landfill in the area of Ochakovskoye highway was eliminated The ONF found a scheme of price fixing in the supply of food to social institutions of Saint Petersburg	October
After the intervention of the ONF, criminal proceedings were launched concerning the violations revealed in the course of area improvement in Chita The ONF helped journalists from Michurinsk to prove in court the invalidity of the claims of the municipality on the protection of business reputation On the initiative of the ONF, a scientific and educational center for the textile industry will be established in Ivanovo	September
After the intervention of ONF activists in the Kaluga Oblast, the material and technical condition of schools in the region was improved After the appeal of ONF activists, the purchase price of medical equipment in Norilsk was reduced five-fold After the intervention of ONF experts, Muscovites received an opportunity to move the terms of capital repairs In Kirov, a free workout section was opened in the framework of the ONF project "Equal opportunities for children"	August
Source: Official website of the Russian Popular Front, "Results" section. Available at" https://onf.ru/results/?page=4.	

In his regular public speeches, Russian President Vladimir Putin stresses the importance of the role of public initiatives in addressing practical issues to improve life in each locality[25] *(Insert 1)*. At the latest congress of the Russian Popular Front (ONF), which was held in Moscow on November 29, 2018, the President once again called on public figures to "actively engage" in the work on "control, support and participation" in solving urgent problems and summed up: "If this is the case – and I hope it will be – then we will really build the country we dream of"[26].

However, first, the range of issues addressed by the ONF (despite their high significance for specific people) is far from the key problems of society associated with high levels of poverty, inflation and income-based stratification of the population *(Insert 2)*. The elimination of illegal dumps, installation of wheelchair ramps, return of the maternity capital certificate to a particular person, arrangement of playgrounds...all this is important, but **all these problems would not exist if the domestic policy were organized effectively; and, most importantly, this does not solve the issues of raising the standard of living and improving the quality of life: the problem of social inequality, decent pensions and salaries, increasing the moral responsibility of officials, means of social mobility...**

> In order to compensate for the shortage of efficient decisions on the part of the State Duma, whose deputies, according to sociological surveys, are known to very few people, the Public Chamber and the Russian Popular Front were created. These organizations united all the authoritative, smart and strong people. But they have no actual power[27].

> The President should be engaged in the strategy, the government should be engaged in the economy, and the Bank of Russia – in the financial system. But the fact that the President, having delegated his duties, does not control their implementation to the proper extent and even puts up with the chronic sabotage of his own "May Decrees" is not so much a manifestation of humanity as a profound flaw of our entire system of governance. This is where the threat to our entire future comes from[28].

Second, regular inspections that the ONF carries out concerning the implementation of the "May decrees" remain without attention, in particular, of the President. Otherwise, how can we explain the fact that even with the ineffective implementation of the May 2012 decrees *(Tab. 4)*,

[25] See, for example:

1. "Personally, I attach great importance to the establishment of partnerships between the executive power and civil society, to the development of institutions and structures of the latter, to the deployment of an active and tough fight against corruption" (source: Putin V.V. Russia at the turn of the Millennium (program article, 1999).

2. "It is necessary that all leaders of any rank, both in the presidential structures and in the Government, feel and understand that ordinary citizens closely monitor the results of our work and give their assessments. It is necessary to focus on the opinion of citizens... How much our society trusts the actions of the authorities, of course, determines on our overall efficiency and competitiveness" (source: Live TV phone-in session with Russian President Vladimir Putin from April 25, 2013).

3. "Initially, we planned the Civic Chamber of Russia, the principles of its formation and fields of its work in order to expand the base of democracy in the truest sense of the word, without any loud statements... It should not replace the Government or the parliament. It should have a niche of its own, which it has. It includes public oversight over executive and representative bodies of authority, expert analysis of immediate and more distant plans, assessing how these plans are implemented, and directly communicating with the people who are on the receiving end of the authorities' efforts to improve life in our country" (source: V. Putin's speech at the meeting with Civic Chamber members, June 20, 2017).

[26] Transcript of Vladimir Putin's speech at the Congress of the Russian Popular Front on November 29, 2018. *Official Website of the President of the Russian Federation*. Available at: http://www.kremlin.ru/events/president/news/59260

[27] Will there be the next anniversary of the Constitution of Russia? (an interview with Professor S. Shakhray). *Argumenty nedeli*, 2018, no. 49 (642), December 13. Available at: http://argumenti.ru/society/2018/12/595669?typelink=openlink

[28] Delyagin M. The liberals treat Russia like it were a cutlet – an object of consumption. *Electronic Newspaper "Biznes-onlain"*, 2016, November 9. Available at: https://www.business-gazeta.ru/article/327971

Table 4. Information on achievement of indicators on some orders established in the "May decrees" of the Russian President

Presidential Decree of May 7, 2012	President's instruction	Fact*	Deviation
No. 596 "On long-term state economic policy"	"Improving the position of the Russian Federation in the World Bank's Doing Business ranking from 120th in 2011 to 50th in 2015 and 20th in 2018"	35th place** (2018)	-15 units
	"Increasing the share of high-tech and science-intensive industries in gross domestic product by 2018 in 1.3 times compared to the level of 2011"	22.1% (2017)***	-3.5%
	"Creating and upgrading 25 million high-performance jobs by 2020"	15983.279 thousand units (2016)	-9.02 million
No. 597 "On measures to implement state social policy"	"Raising real wages in 1.4–1.5 times by 2018"	100.8% (2016)****	-56%
No. 598 "On improvement of state policy in the field of healthcare"	"Reducing mortality from neoplasms (including malignant neoplasms) to 192.8 cases per 100 thousand population"	196.9 per 100 thousand population (2017)	-4.1 per 100 thousand population
	"Reducing mortality from road accidents to 10.6 cases per 100 thousand population"	13.6 per 100 thousand population (2017)	-3 per 100 thousand population
No. 599 "On the measures to implement state policy in the field of education and science"	"Increasing expenditures on domestic research and development up to 1.77% of gross domestic product by 2015"	1.10% (2016)	-0.67%
No. 600 "On the measures to provide citizens of the Russian Federation with affordable and comfortable housing and to improve the quality of housing and utilities services"	"Until 2020 – providing affordable and comfortable housing to 60% of Russian families in need of improving their living conditions"	5% (2016)	-55%
No. 606 "On the measures to implement the demographic policy of the Russian Federation"	"To ensure an increase in life expectancy in the Russian Federation to 74 years by 2018"	72.7 years (2017)	-1.3 years

* Data of the Federal State Statistics Service. Available at: www.gks.ru.
** Source: Doing Business 2018. The World Bank has published a ranking of countries on the ease of doing business. Available at: http://novorusmir.ru/archives/31784.
*** In 2011, the share of high-tech and science-intensive industries in gross domestic product was 19.7%. According to the President's instruction, it is necessary to reach the level of 25.6% by 2018.
**** In 2012, the real accrued wage was 108.4% compared to the previous year.

and despite the flaws that ONF experts revealed[29], the execution of the next "May decrees" was entrusted to the same people – the Cabinet of Ministers, whose composition in 2018 has not actually changed?

"Experts note that the competence of the political elite – agents and leaders of change – is determined by the class of tasks and the horizon of planning; and this competence is confirmed by the significance of the result. The problem of the limit of competence of the ruling class in different political systems is solved in different ways: the composition of the elite varies, new people are admitted into it, the codes of action and ideas about reality are complicated. Or, in contrast,

[29] In mid-2016, the Government reported on the implementation of the "May Decrees" of the President: "About 70% of the total number of orders was executed and 88% – of the number of orders that had to be executed to date". The assessment of the Russian Popular Front was as follows: "**Out of 162 of our conclusions on the Government's reports on the removal of the relevant orders from control, we confirmed the expediency of removing only 24 orders from control. The numbers are such: we believe that 24 orders were actually executed, the rest were not, in varying degrees"** (source: Volkova O., Nikol'skaya P., Tkachev I., Mogilevskaya A. The promises of the third term: how the May Decrees of the President are being executed. *RBK Website*. Available at: http://www.rbc.ru/economics/17/05/2016/573a034a9a7947d18967193a).

certain measures are taken to simplify it. **Lack of diversity reduces the chances of development**. When suppressing the differences in opinions, the range of possibilities is narrowed, the quality of solutions is reduced, defects accumulate, and control dominates over management... Social deprivation results in an evolutionary impasse: vagueness of programs, degradation of management; society becomes archaic and is plunged into uncontrolled chaos"[30].

...How can we characterize the reaction of officials to the decrease in turnout? E. Pamfilova commented on the situation with the turnout at a particular polling station in the Moscow region in Istra: "There is a certain amount of people who shall definitely come and vote. We will deal with that. It means these are active and responsible citizens who do care about what is happening in the country and the region[31]. Such a statement can be called at least strange; after all, when the opinion of 60% of citizens (who did not vote in the election on September 9) is ignored, then it is difficult to talk about any kind of orientation of the government toward national interests (the situation was the same when the opinion of 90% of Russians concerning the pension reform was ignored, too)[32].

The same line can be traced in the relations between the authorities and the wider layers of Russian society. For example, on the eve of the 2018 gubernatorial elections, the Government rejected the proposal of the Just Russia party "to postpone a Single day of voting from September to October due to the fact that "September is an extremely unfavorable month for voting. Many Russians at this time have not yet returned from vacation. In addition, gardeners and growers are working at their private subsidiary plots and do not think about the elections"[33].

The initiative of the Communist Party to hold a referendum on the pension reform (perhaps the most outstanding event of the outgoing year, affecting almost all citizens of our country) was rejected with the wording: "Citizens need to have special knowledge to understand the content of this issue"[34], in spite of the fact that the question planned for voting at the referendum was, in our opinion, absolutely clear: "Do you agree that the Russian Federation should not raise the age at which an individual is granted the right to receive old-age pension?".

Recently, we have seen how two camps are formed and distanced; they declare different views on the life of the country. In one camp there is the elite. In the other – civil society. When Prime Minister Dmitry Medvedev talks about our "strong economy of a rapidly developing country" and the growing real incomes of the population for the second year, and people try to figure out how much is left to live on after they have paid their loans and housing payments, the distance between these camps is growing. When officials say that the state does not owe anything to the people, call to pay for the repair of toilets in schools and sit on a diet and eat cheap pasta, and the taxes and the retirement age go up, the remnants of understanding between the parties vanish. Finally, if TV programs try to convince us that because of the workings of the evil West we need to tighten our belts, and the team of negotiators has long taken roots in this West, there emerges a misunderstanding between the government and the people, the misunderstanding that can be dangerous for the life of the country[35]...

[30] Neklessa A. Corrosion of the future. *Nezavisimaya gazeta*, 2018, November 27. Available at:http://www.ng.ru/nauka/2018-11-27/9_7449_future.html

[31] Head of the Central Election Commission Ella Pamfilova voted at the gubernatorial election in Istra. *Nedelya v okruge,* 2018, September 9. Available at: http://nedelya-v-okruge.ru/index.php/nedelya-v-okruge/4048-glava-tsika-ella-pamfilova-progolosovala-na-vyborakh-gubernatora-v-podmoskove-v-istre

[32] *Raising the Retirement Age: the Reaction of Citizens*. FOM Press Release of June 29, 2018. Available at: http://fom.ru/Ekonomika/14057

[33] Zayakin A. The Cabinet of Ministers did not approve the transfer of a Single day of voting to October. *Ekspress-gazeta*, 2018, August 1. Available at: https://www.eg.ru/politics/588579-kabmin-ne-odobril-perenos-edinogo-dnya-golosovaniya-na-oktyabr-062299/

[34] The CEC explained the refusal to hold a referendum on amending the pension legislation. *RIA novosti*, 2018, July 27. Available at: https://ria.ru/20180727/cik-objasnil-otkaz-v-referendume-po-izmenenijam-pensionnogo-zakonodatelstva-1525496602.html

[35] Skorobogatyi P. The price of second citizenship. *Ekspert,* 2018, no. 50 (1101), December 10, p. 2.

This very revealing episode from the life of society and power in Russia, for obvious reasons, was not widely covered in the media, although in the middle of the year it seemed that **nothing could be more important than this referendum, which is, in fact, the only legal and legitimate opportunity of society to influence the Government's decision, which was opposed by almost 80% of Russians**[36]. But over the past months, the media regularly covers the course of public voting for the choice of new names for Russian airports – a question that apparently does not require the population to have "special knowledge"...

In addition, in 2018, cases of openly disparaging statements and actions toward people by officials at all levels of government have become more frequent. These are, for example, officials who "illegally award themselves 39 times for a total of more than 108 thousand rubles and appoint themselves advisers to the municipal service of the 2nd, and then the 1st class"[37]. In addition, there are civil servants who "transfer municipal property to a private company, violating all applicable requirements and procedures"[38]. There are representatives of the authorities who suggest that mothers with many children should take their children to an orphanage for the period of mortgage payment"[39]. There are leaders of the so-called "elite youth" and "management reserve", who at the age of 27 become the head of the Department of Youth Policy, and having achieved this, lose a sense of control, saying: "The state does not owe you anything at all – your parents owe you. They gave birth to you, the state did not ask them to give birth to you"[40].

> Why the authorities say such things more often now, in 2018? The reason lies in the economic crisis, which has not ended. There is less money in the country, real incomes do not grow (and most often, they decrease). And here the question arises: should incomes fall in the whole society or only in certain groups (strata)? And it turns out that representatives of the ruling class, all sorts of "sovereign people", do not agree that their income can fall. They are not ready to give up the level of consumption they have achieved. But, as already mentioned, the amount of money in the country has decreased and therefore the means to maintain their well-being can be taken only from ordinary people (taxable strata)... Of course, some officials will be punished, fired and ridiculed for such statements they say. But they will not stop saying this, because their task is to accustom people to the idea that "the state does not owe people anything". If this idea is repeated a thousand times from different lips, then sooner or later people will get used to it. In any case, the government hopes for this very much[41].

Such careless statements of officials at least show an elementary loss of self-control, obviously, against the background of long-term impunity from the punishment for the policy they conduct corresponding to the degree of their moral responsibility (or rather-irresponsibility) before

[36] *Raising the retirement age: the reaction of citizens*. FOM press release of June 29, 2018. Available at: http://fom.ru/Ekonomika/14057

[37] News of the Information Agency Ura.ru on November 15, 2018. Available at: https://ura.news/news / 1052359490 (talking about the head of the financial department of the Administration of Novocheboksarsk, Chuvash Republic).

[38] News "Moscow region today", 2016, December 30. Available at: https://mosregtoday.ru/sec/v-krasnodare-arestovali-chinovnitsu-podozrevaemuyu-v-prevyshenii-dolzhnostnykh-polnomochiy/ (about Deputy Head of Krasnodar O. Yakovleva).

[39] News of the network edition *Inkazan.ru*, 2017, December 19. Available at: https://inkazan.ru/news/society/19-12-2017/sdat-detey-v-priyut-na-vremya-vyplaty-ipoteki-posovetovala-udachina-mnogodetnaya-mat (about Children's Rights Commissioner in Tatarstan G. Udachina).

[40] Glatskikh O. Sverdlovsk Oblast (source: *Pionerskaya pravda*, 2018, November 8. Available at: https://zen.yandex.ru/media/pioner/kak-chinovnica-olga-glackih-zaiavivshaia-chto-gosudarstvo-nikogo-ne-prosilo-rojat-detei-stala-direktorom-departamenta-molodejnoi-5be3eaed1c705900-a9fce9e6?&from=feed).

[41] Shaburov A. "The state does not owe you anything". Why officials changed their tone in communicating with the people. *Information portal of the town of Bakal,* 2018, November 22. Available at: http://vbakale74.ru/power/5223-gosudarstvo-vam-ne-dolzhno-pochemu-chinovniki-smenili-ton-v-obschenii-s-narodom.html

society. In other cases, such things are "revealed" due to the activity of public figures and law enforcement agencies. For example, after the mass investigative measures carried out in April and October 2018, large corruption networks were identified in the Sochi city administration; developers and officials were arrested, including vice-mayors, heads of departments...

However, all this is the "tip of the iceberg", indicating only how deeply the private interests are rooted in the system of public administration designed (in theory) to serve the people and protect the interests of society. This is not surprising, because the "patterns" of such behavior are set at the top, at the federal level.

Here we can recall a notorious statement "There's no money, but you hang in there!" by Prime Minister Dmitry Medvedev himself[42] or German Gref's suggestions to "send parents to assisted-living facilities"[43]... We can add to this a situation when on a wave of large-scale discussion of the pension reform, deputies of the State Duma decide to "start with themselves and to make amendments to the law on the status of the member of the Federation Council and the Deputy of the State Duma by abolishing pension preferences they have the right to receive"[44], especially focusing on the fact that **"this draft law satisfies one of the main demands of modern Russians – the demand for justice"**[45]. However, after the official adoption of the law on raising the retirement age[46] the deputies decide they may give up preferences voluntarily, that is if they want to[47]. Such cases, arising at all levels of government, lead to an appropriate response from society: thus, according to our research, for the period from 2011 to 2018, the proportion of residents of the Vologda Oblast who believe that they can not affect the situation in the country increased from 67 to 73%.

> The problem of the economy does not consist in cheap oil or sanctions, but in the fact that all the activities of liberals in key positions in Medvedev's government and Nabiullina's Bank of Russia, as far as we can judge by their actions, is subordinated to the task of blocking the development of our country. And in general, because we tolerate them, they succeed ... Our "offshore aristocracy" includes the people who have all their assets and all their life in the West, and they govern Russia, if not like an occupied territory, then in the regime of external management, on a rotational basis. But this does not apply to the entire ruling party, but only to the liberal part of it, i.e. to the liberals in the opposition and in the government, who sincerely believe that the state should serve not the people, but the global business, and they want full subordination of Russia to the West[48]...

[42] A short expression derived from the phrase "... There is no indexation anywhere. It's just that there is no money now. If we find the money, we'll carry out indexation. You hold on there, I wish you all the luck, good mood and health", which D. Medvedev said in May 2016 during a visit to Crimea in response to the complaint of a pensioner about the small amount of pension (source: information portal *Gazeta. Ru*, 2016, May 24. Available at: https://www.gazeta.ru/comments/2016/05/24_e_8262629.shtml).

[43] Interview with G. Gref on TV channel "Russia 24" on August 31, 2018 (source: news of Borisoglebsk, 2018, September 3. Available at: http://bsk-news.ru/4742-german-gref-prizval-rossiyan-massovo-otdavat-svoih-roditeley-v-doma-prestarelyh.html)

[44] It is proposed to abolish pension benefits for the deputies and senators (Secretary of the General Council of the United Russia party A. Turchak). News Agency "SaratovBiznesKonsalting", 2018, August 21. Available at: https://news.sarbc.ru/main/2018/08/21/221339.html

[45] Zamakhina T. They started with themselves: State Duma deputies approved their own refusal to receive allowances to pensions. *Rossiiskaya gazeta,* 2018, no. 7698 (235), October 18. Available at: https://rg.ru/2018/10/18/deputaty-odobrili-sobstvennyj-otkaz-ot-nadbavok-k-pensiiam.html

[46] On amending separate legal acts of the Russian Federation concerning the establishment and payment of pensions: Federal Law 350 of October 3, 2018.

[47] "A citizen who is entitled to a monthly supplement to the pension may refuse to receive it by submitting an application to the head of the federal executive authority. In case of voluntary refusal of the citizen to receive a monthly supplement to the pension, such supplements are not provided further" (source: On amending Articles 2 and 29 of Federal Law "On the status of the member of the Council of Federation and the status of the Deputy of the State Duma of the Federal Assembly of the Russian Federation": FL of November 12, 2018 No. 408. Available at: http://publication.pravo.gov.ru/Document/View/0001201811120024?index=1&rangeSize=1).

[48] Delyagin M. The liberals treat Russia like it were a cutlet – an object of consumption. *Electronic Newspaper "Biznes-onlain",* 2016, November 9. Available at: https://www.business-gazeta.ru/article/327971

Thus, the evaluation of the effectiveness of implementation of the key criteria of the social state shows that this provision of the Constitution of the Russian Federation is implemented imitatively rather than effectively. "The social state is a half-forgotten constitutional principle of the Russian Federation"[49]. "The people of Russia, as before, do not live under the Constitution, but near it"[50].

However, this does not mean that in the quarter of a century since the adoption of the Constitution it has exhausted its validity and requires a radical revision. On the contrary, building a social state is a matter of the future, and so far we are only at the beginning of this path. "If social and income inequality is preserved, then it may in the near future lead to a significant decrease in the trust in all the highest authorities and in the level of self-sufficiency of Russian society. Neither authorities, nor business, including corporate-oligarchic business, are interested in it. For the sake of self-preservation they have to compromise with the majority of the population. **The main way to find such a compromise may be to form a social state based on Russian (general and regional) forms and methods taking into account its historically approved foreign forms and methods"[51].**

"Ignoring the norms of the Constitution is a question addressed exclusively to the representatives of the comprador elite, who consciously give priority to their private interests to the detriment of the interests of Russian society. And the question is also addressed to the "central government – the President and Parliament, who possess the appropriate powers"[52].

> ...We in Russia often suffer from bifurcation, parallelism, duplication. We have only one state position that is not divided – it is the President... Neither efficiency, nor poor pensioners, not bad education will change the Constitution, because if we want it changed, then it is necessary to change the policy of the government[53].

The historical task that the President has to deal with today is to create conditions for the country's effective transition to a new stage of development, which is certainly linked to the basic principles of the social state. To do this, it is necessary to show political will and make difficult, but long overdue decisions – about the law governing the convening of the Constitutional Assembly, about the responsibility of officials for actions that restrict the constitutional rights and freedoms of citizens, about the mechanisms of public control over the adoption of administrative decisions at all levels of government.

While such decisions have not been taken by the President, we cannot say that Russia has or at least plans to have a stable vector of moving toward the social state. And as long as domestic, including social and economic, politics is in the hands of those who view society solely as a source of replenishment of their own pockets rather than as "the only source of power in the country" (according to the Constitution), the future of the social state in Russia and the future of Russia itself will remain uncertain.

[49] Lapin N.I. The formation of the social state – a way of successful evolution of society. *Sotsiologicheskie issledovaniya,* 2018, no. 8, p. 6.

[50] Sheinis V. The Constitution-93: the way, results, and prospects. *Nezavisimaya gazeta,* 2018, December 11. Available at: http://www.ng.ru/ideas/2018-12-11/6_7460_ideas.html

[51] Lapin N.I. The formation of the social state – a way of successful evolution of society. *Sotsiologicheskie issledovaniya*, 2018, no. 8, p. 7.

[52] Boldyrev Yu.Yu. How the liberals were selling Russia: "A rat will eat three beans and smell out a million". *Moskovskiy komsomolets*, 2016, December 8. Available at: http://www.mk.ru/politics/2016/12/08/kak-liberaly-prodavali-rossiyu-krysa-sest-tri-zernyshka-million-provonyaet.html

[53] Will there be the next anniversary of the Constitution of Russia? (an interview with Professor S. Shakhray). *Argumenty nedeli*, 2018, no. 49 (642), December 13. Available at: http://argumenti.ru/society/2018/12/595669?typelink=openlink

References

1. Tavadov G.T. *Etnologiya. Sovremennyi slovar'-spravochnik* [Ethnology. Modern Reference Dictionary]. Moscow, 2007. 704 p.
2. *Konstitutsiya Rossiiskoi Federatsii (12 dekabrya 1993 g.)* [The Constitution of the Russian Federation (December 12, 1993)]. Available at: http://www.constitution.ru.
3. *O strategii natsional'noi bezopasnosti Rossiiskoi Federatsii: Ukaz Prezidenta RF ot 31.12.2015 №683* [On the national security strategy of the Russian Federation: Presidential Decree No. 683 of December 31, 2015].
4. Epikhina Yu.B. (Ed.). *Sotsial'naya spravedlivost' v russkoi obshchestvennoi mysli: koll. monogr.* [Social Justice in Russian Sociological Thought: Collective Monograph]. Moscow: Institut sotsiologii RAN, 2016. 219 pp.
5. Kozlov M.I. *Sotsial'naya spravedlivost' v kontekste russkoi traditsii* [Social Justice in the Context of Russian Tradition]. Arkhangelsk, 2010 (KIRA). 202 p.
6. Platonov O.A. *Russkaya tsivilizatsiya* [Russian Civilization]. Moscow. 1995.
7. Zakhar'yan D.A. Social state: the main stages of development and the current condition. *Vestnik Rossiiskogo universiteta druzhby narodov. Seriya: Sotsiologiya=Bulletin of Peoples' Friendship University of Russia. Series: Sociology*, 2016, pp. 649-658. (In Russian).
8. Sulakshin S.S. The quality and success of public policies and management. In: *Seriya "Politicheskaya aksiologiya"* ["Political Axiology" Series]. Moscow: Nauchnyi ekspert, 2012. 496 p. (In Russian).
9. Gorshkov M.K., Krumm R., Tikhonova N.E. (Eds.). *O chem mechtayut rossiyane: ideal i real'nost'* [What Russians Dream About: Ideal and Reality]. Moscow: Ves' mir, 2013. 400 p.
10. Novokmet F., Piketty T., Zucman G. *From Soviets to Oligarchs: Inequality and Property in Russia, 1905–2016.* National Bureau of Economic Research. Cambridge: MA. August, 2017.
11. *Rossiiskoe obshchestvo: god v usloviyakh krizisa i sanktsii: informatsionno-analiticheskii material po itogam obshcherossiiskogo sotsiologicheskogo issledovaniya* [Russian Society: a Year in the Crisis and under the Sanctions: Information and Analytical Material on the Results of the All-Russian Sociological Research]. Moscow, 2015. 48 p.
12. Bobylev S.N., Grigoriev L.M. (Eds.). *Tseli ustoichivogo razvitiya OON i Rossiya: doklad o chelovecheskom razvitii v Rossiiskoi Federatsii* [UN Sustainable Development Goals and Russia: a Report on Human Development in the Russian Federation]. 2016. 293 p.
13. Lapin N.I. Formation of the social state – a way of successful evolution of society. *Sotsiologicheskie issledovaniya=Sociological Studies*, 2018, no. 8, pp. 3-11. (In Russian).
14. *O vnesenii izmenenii v otdel'nye zakonodatel'nye akty Rossiiskoi Fe-deratsii po voprosam naznacheniya i vyplaty pensii: FZ ot 03.10.2018. №350* [On amending separate legal acts of the Russian Federation concerning the appointment and payment of pensions: Federal Law 350 of October 3, 2018].
15. *O vnesenii izmenenii v stat'i 2 i 29 Federal'nogo zakona "O statuse chlena Soveta Federatsii i statuse deputata Gosudarstvennoi Dumy Federal'nogo Sobraniya Rossiiskoi Federatsii": FZ ot 12.11.2018 no. 408-FZ* [On amending Articles 2 and 29 of Federal Law "On the status of the member of the Council of Federation and the status of the Deputy of the State Duma of the Federal Assembly of the Russian Federation": FL of November 12, 2018 No. 408].

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Structural Transformation Issues in Regional Economy*

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Abstract. The paper systematizes areas of structural research in economic theory. We analyze structural shifts and proportions in regional economy using the data on the Vologda Oblast for 1995–2016. We consider regularities in the Oblast's socio-economic development at the level of the economy as a whole and its sectoral structure at all the key stages of the reproduction process: production, formation and use of income. We reveal the presence of significant transformation in the structure of output of products, expressed in the reducing share of commodity production and growing share of services production. We register a decrease in the overall efficiency of the Oblast's economy caused by the increase in the intensity of the output of goods and services. We highlight the trend of raising the wages of employees and reducing business income in the structure of the economy. We conclude that social reproduction in the Vologda Oblast is managed poorly, and there remain certain problems in the sectoral and reproduction structure of GRP, in the structure of investments, final consumption and savings; these problems

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constrain modernization processes and do not contribute to the improvement of the quality of life. We propose the following directions for structural economic policy to improve the quality of economic growth in the region: to stimulate the modernization of production in order to increase the income of all economic agents and their further use to diversify the structure of the economy; to promote domestic consumer demand; to stimulate investment activity and increase fixed capital accumulation rate. The theory of national accounting is used as a methodological basis for our research. In the course of our analysis, we use classical procedures of macroeconomic and macrostructural analysis, and mathematical statistics techniques. Reliability of our conclusions is ensured by the use of general scientific methods (system approach, data analysis and synthesis, induction and deduction, analogy) and special methods of economic research (generalization of economic facts, grouping, comparison, structural analysis of economic indicators).

Key words: region, structural transformation, structural economic policy.

1. Introduction

Market reforms that have been implemented in recent decades, and the dynamically changing external environment are radically changing the economic structure of Russia and its regions. The structure of production, accumulation, distribution and use of income is changing. It is impossible to improve the quality of management decisions without an in-depth analysis of the volume, structure and dynamics of the resources that regional socio-economic systems have, the sources of their formation and directions for their use. One of the possible ways to improve decision-making mechanisms in the field regional economy management is to substantiate economic policy on the basis of comprehensive structural studies that reflect economic processes at the level of the economy as a whole and its sectoral structure. This makes it possible to describe in detail the ongoing economic processes and assess the effectiveness of economic policy.

The fact that the structural factor is now taken into account in the management of the economy can be considered a consensus reached by the expert community and political circles in discussing the ways to promote economic growth in Russia. The need to implement structural reforms has been repeatedly stated by representatives of the economic authorities of the country such as Minister of Economy M.S. Oreshkin[1], Chairman of the Government D.A. Medvedev[2], Chairman of the Central Bank E.S. Nabiullina[3], Chairman of the Board of Sberbank of Russia G.O. Gref[4], etc. The issues of economic restructuring are also discussed on the pages of leading

[1] "We focus on the structural limitations to economic growth and on measures that remove such limitations ... The Ministry of Economic Development should formulate the changes that will help overcome these structural limitations" (source: It is possible to make a serious step forward to the growth of the share of the formal economy. *Kommersant*, 2017, January 8. Available at: https://www.kommersant.ru/doc/3186798)

[2] "It will not be possible to restore normal growth rates only at the expense of monetary and budgetary policy; serious structural reforms are required, although we have been talking about this for the last 15 years" (source: Structural reforms are required to restore the growth of the Russian economy. *Komsomolskaya pravda,* 2017, January 12. Available at: https://www.kp.ru/online/news/2624661)

[3] "If the price of oil is higher, then we can grow a little faster, but nevertheless, at any price, our assessment is as follows: without structural reforms we will stabilize at the level of 1.5–2 percent" (source: Nabiullina called for structural reforms for the sake of economic growth. *Lenta.ru*, 2017, April 5. Available at: https://lenta.ru/news/2017/04/05/reform)

[4] "Everyone, in my opinion, came to the conclusion that the crisis in which we are now, is not cyclical, but structural. And in general, it is necessary to fight it with a completely standard set of measures. Today, there is no other means but to finally engage in structural reforms" (source: The rise of GDP is replaced by the talks about structural reforms. *Nezavisimaya gazeta*, 2017, April 5. Available at: http://www.ng.ru/economics/2017-04-05/1_6967_vvp.html)

scientific journals [1–9]. The challenges facing the Russian economy are discussed; scenarios and strategies for growth, opportunities for budget maneuver are put forward, etc. At the same time, the regional level remains virtually untouched. In this regard, the goal of our study is to analyze structural transformation of the regional economy and to work out the directions for structural economic policy on its basis.

2. Structural studies in the economic theory

The issues of studying structural characteristics of economic development in one form or another were reflected in the works of physiocrats and representatives of the classical political economy school. For example, F. Quesnay (mid-18th century) tried to describe the reproductive structure of the economy by establishing the balance between the natural and cost-related elements of production [10]. A. Smith (late 18th century) in the theory of absolute advantages showed that in terms of the overall effect on the economy, its sectoral structure should be built depending on the cost-effectiveness, i.e. goods should be produced where costs for their production are lower. When justifying the optimal specialization of countries in international trade, D. Ricardo (early 19th century) assumed that specialization in production was beneficial even to a country that did not have an absolute advantage in the production of a product, if the country had a comparative advantage, i.e., if it spent fewer resources on the production of one commodity than it does on the production of another. Structural parameters of the economy were considered in the works of J.S. Mill (mid-19th century) in the analysis of production of goods, their distribution and exchange.

However, the works of the founders of political economy did not take into account the dynamics of economic systems and their structural characteristics [11]. Economic science did not immediately realized the need and was able to study structural changes in the economy. A significant step was K. Marx's theory of expanded reproduction (second half of the 19th century), which represented the first attempt to describe dynamic structural interactions between the elements of the economic system and its agents.

Further development of structural studies took place against the background of world wars (1914–1918 and 1939–1945) and the global economic crisis (1929–1939), which required greater state participation in the regulation of the economy. The classical self-regulating economic model has actually stopped working. The growing need for an adequate assessment of the economy led to the development of appropriate *methodological support and methodological tools*. The beginning of the 20th century, witnessed the emergence of works that analyzed specific features of the formation of structural relationships in the economy. A great contribution to this direction of economic thought was made by Russian researchers. In 1904, V.K. Dmitriev's *Ekonomicheskie ocherki* (Economic essays) were published, in which he tried to formulate (both substantively and mathematically) the relationship between total labor costs and the system of inter-sectoral relations in the economy [12]. In 1923–1924, the Soviet Union developed and tested the input-output methodology of the national economy for the purposes of control and planning of production, distribution and consumption, and for studying inter-industry linkages. And although in the future those works in the Soviet Union were suspended (until the 1960s), the idea was picked up by W.W. Leontief who developed it in the United States and worked out the methodology of input-output models.

Since the 1930s, approaches and methods to the preparation of statistical information for the analysis of economic processes began to

develop. In the 1940s, under the leadership of R. Stone, a system of national accounts (SNA) was created, which linked all indicators of economic activity [13]. At about the same time, Leontief formulated basic requirements for the formation of national input-output tables, which combined the parameters of production and use of products and described the structure of final consumption and income generation [14]. In the 1950s, Leontief's input-output tables have been integrated into the SNA standard. In the future, the system of national accounting has been repeatedly improved (in 1968, 1993, and 2008); and since the 1960s, it has been recognized as an international standard for calculating economic activity indicators. Since the 1990s, regional studies have become one of the areas for application of the SNA methodology. The SNA-93 notes that regional accounts are particularly important for countries with significant interregional differences in economic and social development [15].

With the emergence of macroeconomics that studies the functioning of the economic system as a whole, and Keynesianism (1930s), *analysis of the structure of the economy is put in mathematical models*. There emerge one-factor models of economic growth by R. Harrod and E. Domar (1940s), multi-factor neoclassical models based on the apparatus of production functions by R. Solow (1950s). In the 1950s–1970s, input-output models that take into account the production of interaction became widespread. Since the mid-1950s, they began to be applied at the regional [16, 17, 18], interregional [19] and multi-regional [20, 21] levels, which made it possible to analyze intersectoral and interregional relationships in the economy and assess the impact of changes in the spatial structure on various macroeconomic indicators. Since the 1960s, input-output models have been able to take into account the institutional structure of the economy; the development of social account matrices (SAM-matrices) has begun [22]. This made it possible to study the interaction between economic agents (state, population and companies) in the process of income formation and distribution.

The formulation of theoretical ideas about *state regulation* through the formation of appropriate tools of economic policy became the logical development of structural studies [23]. For example, structural reforms were considered as a way out of the great depression (1930s–1940s) by representatives of the Harvard School of Economics (J. Schumpeter, A. Hansen, W.W. Leontief, E. Chamberlin, P. Samuelson, J.K. Galbraith, S. Kuznets). According to their "structure – behavior – result" paradigm, the sectoral structure of the economy determines the behavior of sellers and buyers and determines the result of development. It is possible to influence the structure by changing the operating parameters: improving technology, stimulating demand, etc. In the 1940s, in the development of economic policy, J.M. Keynes focused attention on the structure of final consumption, the ratio of investment and savings in it [24]. A great contribution to the study of structural transformations and the analysis of interdependence between economic, social and institutional processes was made by G. Myrdal (1950s–1960s). In the context of the development of structural economic policy, it is necessary to note the works of the following Soviet scientists (1950s–1980s) on the optimal allocation of resources and planning of economic development: L.V. Kantorovich, N.N. Kolosovsky, N.N. Nekrasov and B.I. Nemchinova (study of the rational organization of territorial economy), A.I. Notkin and Ya.A. Kronrod (research on the changes

in the structure of national wealth), A.I. Anchishkin and Yu.V. Yaremenko (development of the problems of scientific and technological progress and changes in the field of equipment and technology, as well as forecasting of socio-economic and technological development) [11].

In the 1990s, against the background of the growing income differentiation between developed and developing countries, the theoretical direction of "structuralism" (or "structuralist macroeconomics") was formed; it explained this inequality by the imperfection of the structure of economy in developing countries and proposed economic policy measures to change it (in particular, industrialization and import substitution) [25, 26]. In continuation of this trend, the concept of the new structural economy emerged in the 2000s [27]. According to its provisions, the structure of factors of production at each stage of economic development is different. This determines the differences in the parameters of capital intensity in industries, in the scale of production, market size, operating costs, etc. As a result, each industrial structure requires its own ratio of production and non-production spheres [27]. At that, the government should play an active role in promoting structural change, coordinating investment and mitigating external factors.

In general, we can say that the number of theoretical and empirical studies devoted to the analysis of the impact of structural processes on the development of the economy is growing. Representatives of various economic schools assessed the importance of multi-vector structural policy in economic systems. Economic crises constantly fueled interest in the issues of economic balance [28]. However, the whole concept of the significance of structural factors for economic dynamics has not been developed yet. Insufficient attention is paid, in particular, to the regional level and mechanisms of influence on the structure of the regional economy. This complicates the development of effective economic policies aimed at using structural factors to create sustainable economic dynamics and the overall growth of people's welfare.

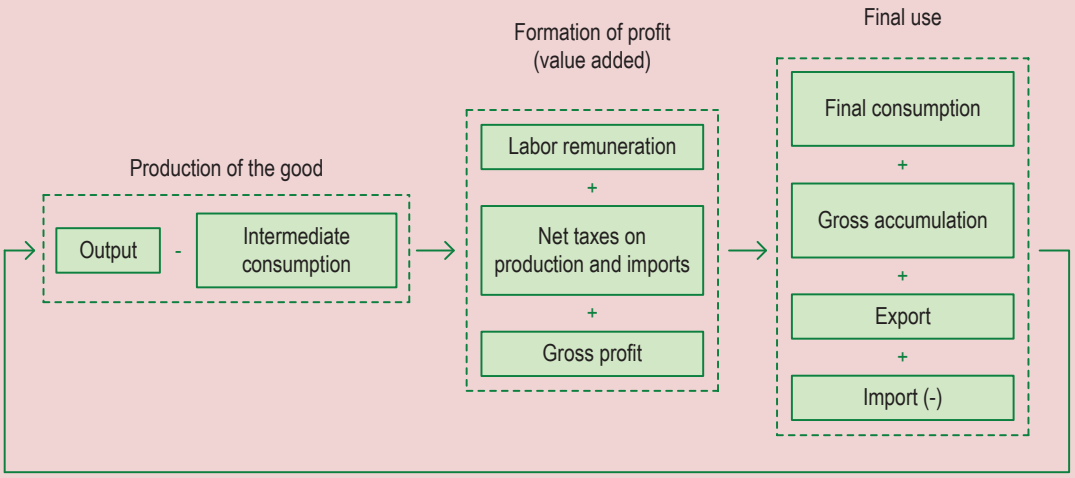
3. Research methodology

The methodological basis of the research is the theory of social reproduction and national accounting. According to these theories, production is the basis of economic resources *(Fig. 1)*. In the process of production, on the one hand, goods and services are created in their natural form, on the other hand – their value and added value are created, to which the primary incomes formed in production correspond. These primary incomes are as follows: wages of employees, net state taxes on products and the gross profit of the economy. Primary incomes after their distribution and redistribution form disposable incomes of economic entities (institutional units, economic agents) and are spent on final consumption and gross accumulation, forming final demand [29]. The difference between national production and final use in the economy as a whole, product groups and individual products is balanced by exports and imports.

Accordingly, we understand the structure of the economy as the functional relationships between individual elements of the national economy, which determine the quantitative and qualitative characteristics of its development at different stages of reproductive process.

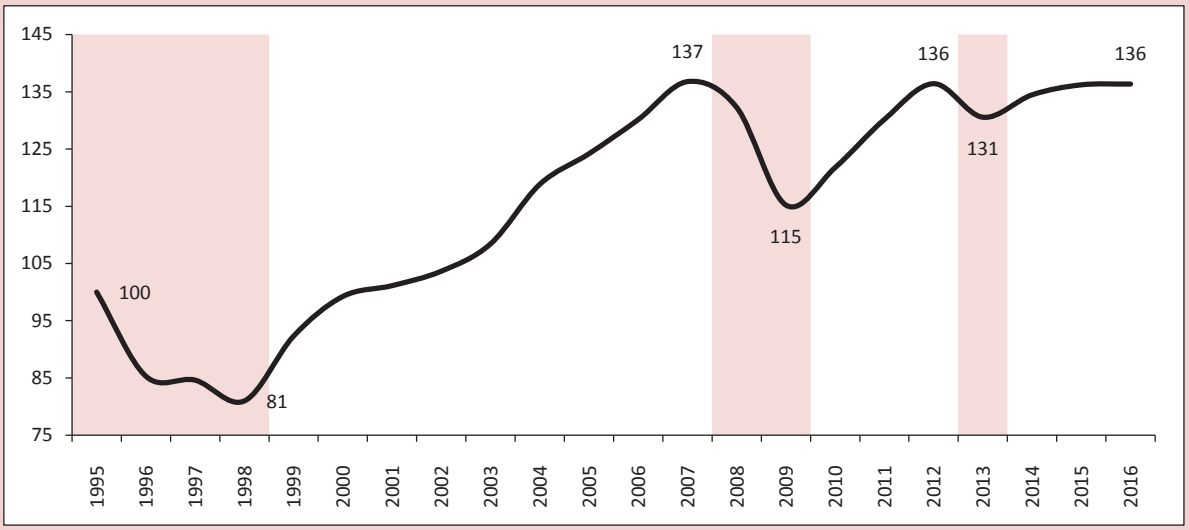
We use classical procedures of macro-economic and macrostructural analysis, and mathematical statistics methods to analyze the main structural shifts and proportions of the regional socio-economic system. The methodological approaches are based on the materials of the UN (1993 SNA Guide),

Figure 1. Simplified scheme of formation and use of gross value added in the economy



Source: based on the materials of Rosstat and [29].

Figure 2. Dynamics of GRP of the Vologda Oblast in 1995–2016, in % to 1995



Source: based on Vologdastat data.
Note: here and further, the periods with negative GRP dynamics are highlighted.

Rosstat, the Bank of Russia, as well as research works of the Institute for Macroeconomic Research, RAS Institute of Economic Forecasting and other leading research centers. Reliability of our conclusions is provided by application of general scientific methods (system approach, data analysis and synthesis, induction and deduction, analogy) and special methods of economic research (generalization of economic facts, grouping, comparison, structural analysis of economic indicators).

4. Structural deformations in the regional economy

The object of our analysis is the Vologda Oblast – an industrial export-oriented region of the European part of Russia. The dynamics of its economic development in 1995–2016 are shown in *Figure 2*.

The transition of the Vologda Oblast economy to a market economy in the 1990s was associated with crisis phenomena and decline of production. A positive trend in the development of the economy began only in 1999 and then it became stable. According to the Federal State Statistics Service, gross regional product grew by 69% between 1999 and 2007. However, the global financial and economic crisis, which affected the Vologda Oblast economy in the second half of 2008, lead to its sharp decline, aggravated social problems and made its prospects uncertain. By the beginning of 2009, the recession began, accompanied by the depreciation of the national currency, increasing unemployment, and suspension of a significant part of investment programs. The decline in economic activity was possible to overcome only in the first quarter of 2010. The post-crisis recovery took three years and ended with a new recession in 2013, after which the Oblast's economy is still in a state of stagnation. In fact, by 2016, it only reached the level of 2007; the average annual growth rate of GRP in 2014–2016 was 1.5%.

The dynamic processes we described were accompanied by significant structural changes, which largely determine the quantitative and qualitative characteristics of economic growth. Let us consider the structural deformations in the economy of the region that we find of major importance.

4.1. Reducing the role of commodity production in the economy

At the end of 2016, output[5] in the Vologda Oblast exceeded (in basic prices) one trillion rubles. Its structure is dominated by industries producing goods (primarily manufacturing and construction)[6]. They provide more than 2/3 of the output. The remaining third of the output is provided by the production of services (including market services – 26%, non-market services – 8%). During the period from 1995 to 2016, the output structure went through a significant transformation, which affected the structure of intermediate consumption[7] and, consequently, the sectoral redistribution of gross value added (GVA) *(Fig. 3)*. In the end, the share of manufacturing in GVA in the region fell by more than 21 percentage points – from 74 to 53% (including in the industry – by 16 percentage points – from 57 to 41%). The proportion of production services rose from 26 to 47%, respectively. Such structural disparities indicate the necessity to upgrade material production.

The change in the sectoral structure has a negative impact on the overall economic efficiency of the Oblast's economy. Under these conditions, we observe an increase in the resource intensity of output (for comparison: in Russia as a whole, there is a slight decrease in this indicator; *Fig. 4*)[8].

Resource intensity of production characterizes the ability of the economy to increase the generation of income (value added) while reducing the consumption of resources per unit of output. The increase in resource intensity leads to a reduction in the production capacity of the economy and makes it difficult to

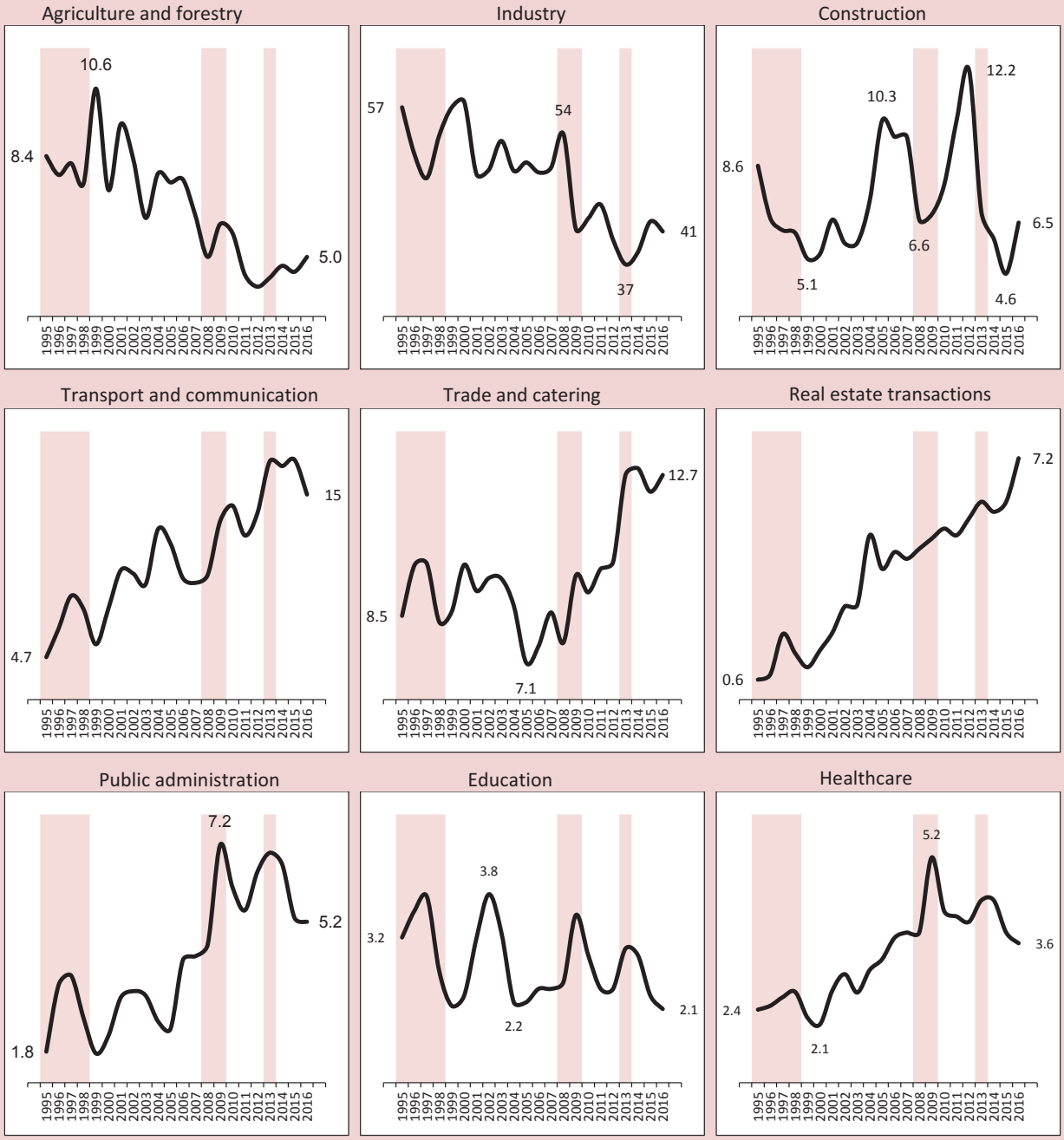
[5] Total cost of goods, works and services produced.

[6] We should note that the industries that produce goods can also produce services, but their share in the output is small. Thus, according to the input-output tables of the Russian economy, services account for only over 3% in the structure of industrial output.

[7] Expenses of economic entities on the acquisition of material resources and services for current production purposes.

[8] In [29] we analyzed the reasons for the high resource intensity of the economy of the Vologda Oblast and its negative dynamics.

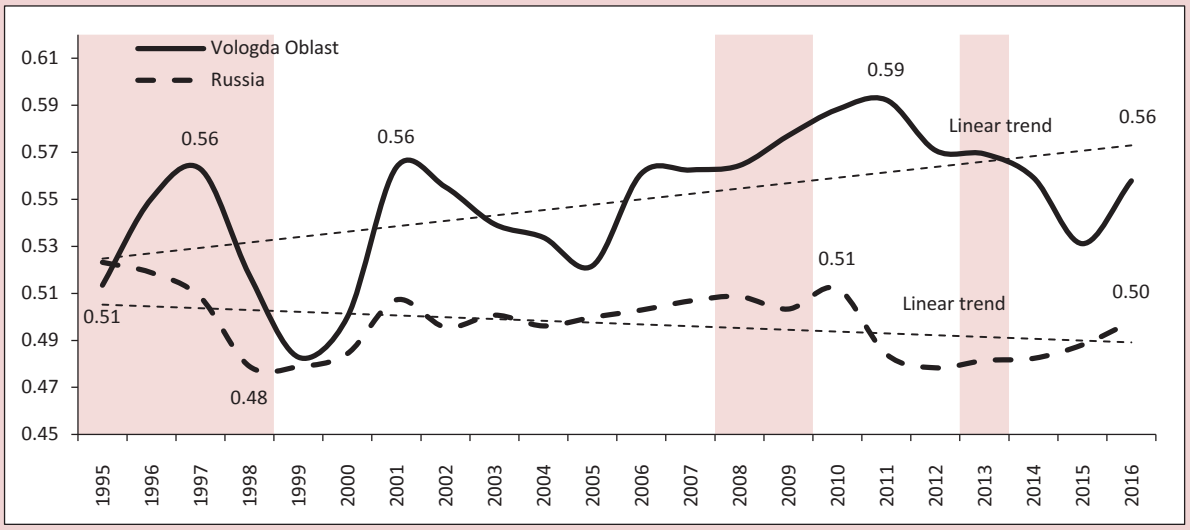
Figure 3. Dynamics of the sectoral structure of GVA in the Vologda Oblast in 1995–2016, in % to the resulting value



Source: based on Vologdastat data.

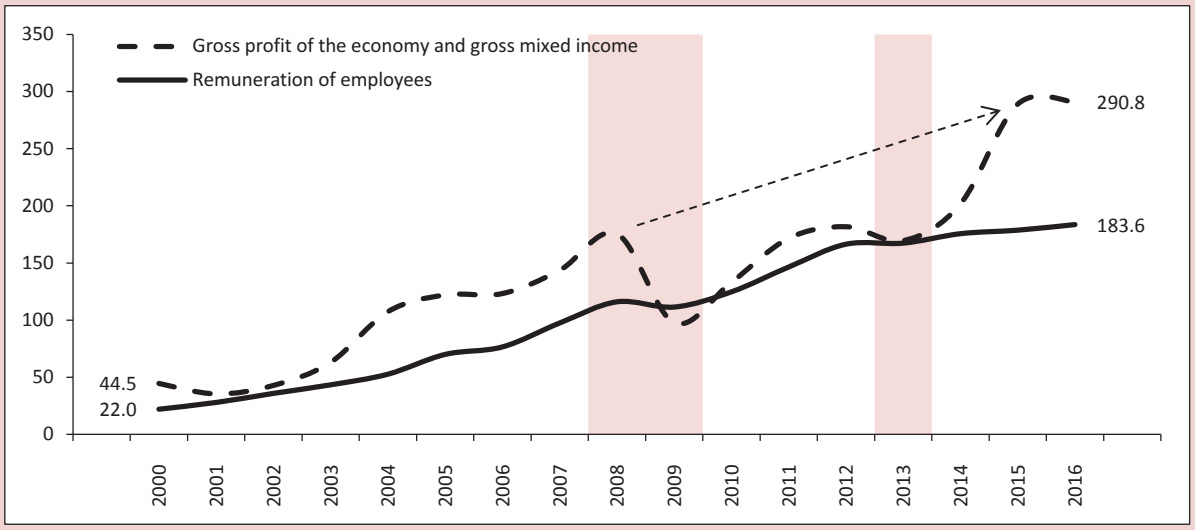
achieve its balance due to the greater demand for resources, raw materials, components and energy resources. The decline in the share of value added in output indicates the deterioration in the ability of the economy to generate income. The reduction of income, in turn, leads to a decrease in demand and hinders the development of production [30].

Figure 4. Dynamics of resource intensity* of the economy of the Vologda Oblast and Russia in 1995–2016



* Ratio of intermediate consumption to output.
Source: based on Vologdastat data

Figure 5. Dynamics of income sources of the Vologda Oblast economy in 2000–2016, billion rubles (in current prices)



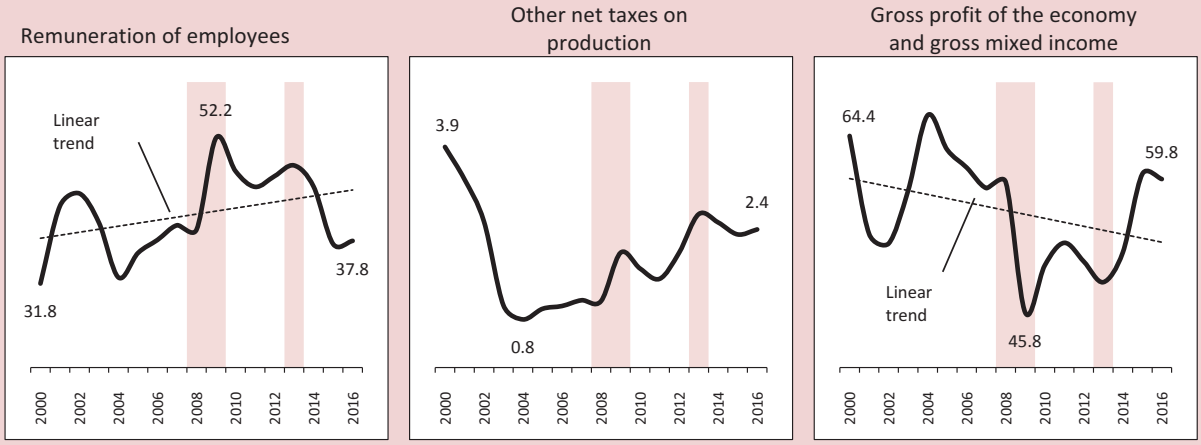
Source: based on Vologdastat data.

4.2. Instability of the structure of education income

The structure of formation of income in the Vologda Oblast economy is dominated by two elements: 1) gross profit of the economy and gross mixed income (so-called entrepreneurial income); 2) remuneration of employees. In the ratio of these two elements, the main structural changes are caused mostly by the decline in entrepreneurial income in crisis periods *(Fig. 5)*.

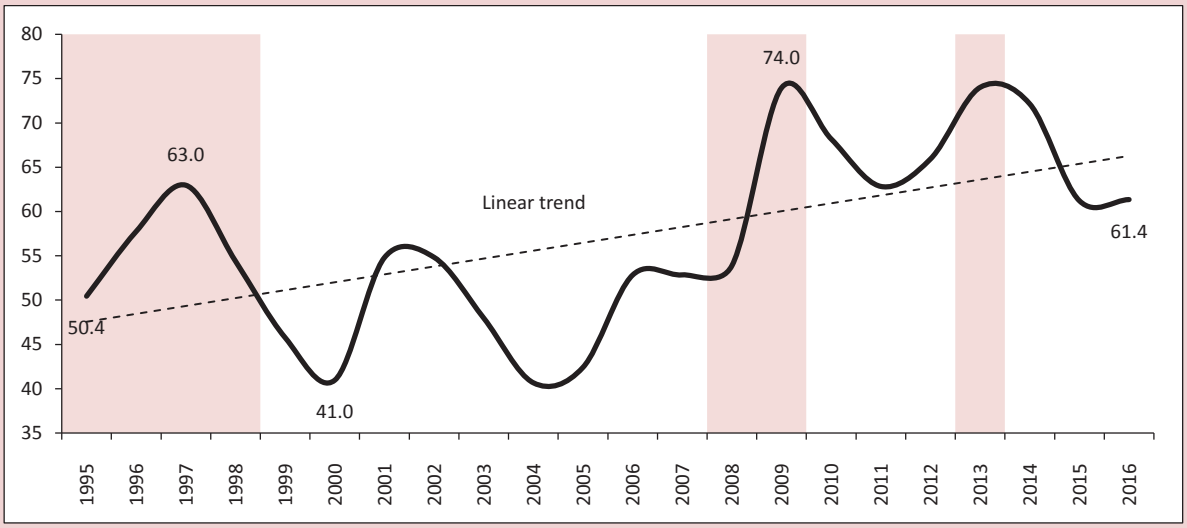
The general trend in the changes in the structure of income sources of the region's economy in 2000–2010 is the reduction in the share of entrepreneurial income, which

Figure 6. Dynamics of the structure of income generation in the Vologda Oblast in 2000–2016, % to the resulting data



Source: based on Vologdastat data.

Figure 7. Dynamics of the share of expenditure on final consumption in the economy of the Vologda Oblast in 1995–2016, % to GRP



Source: based on Vologdastat data.

increased in 2009–2014 as a result of the impact of crisis phenomena *(Fig. 6)*. In general, for the period from 2000 to 2016, the value of this indicator decreased from 64.4 to 59.8%. The share of employees' wages increased by about the same amount.

Due to the fact that the source of income in the economy is shifting from entrepreneurial income (i.e., income of organizations and entrepreneurs) to the labor remuneration of hired workers (that is, household income), the structure of the use of these incomes is also changing. In 1995–2016 the trend of growth of the share of final consumption in the structure of GRP use became dominant *(Fig. 7)*. In 2016, it exceeded 61% of GRP.

On the one hand, such a structural shift can be regarded as positive, especially if we take into account the extremely low volume of consumer spending in the region[9] and the drop in real wages of workers by almost 13% in 2014–2016. However, on the other hand, this structural transformation reduces the share of gross savings, which, coupled with a decrease in the share of profits of organizations in the income of the economy leads to a decrease in opportunities for accumulation (i.e. for investment in the development of production).

4.3. The rate of accumulation lagging behind the savings rate

The low level of the accumulation rate (i.e. the share of gross savings in GRP) in the Vologda Oblast economy is also due to the weak development of mechanisms for transforming savings into investments (in the current conditions, it is not profitable to direct savings to investments). According to Vologdastat data, the rate of fixed capital accumulation in the region lags far behind the rate of savings *(Fig. 8)*. In the period under consideration, the gap between savings and accumulation reached almost 50% of GRP[10].

One of the reasons for this lies in the significant withdrawal of funds from the reproductive process; this withdrawal is associated with the withdrawal of capital; such a situation hinders the growth of production and, accordingly, the growth of income and investment in the economy. A significant impact on the formation of the accumulation fund is caused by the deterioration of the global situation, as well as the growth of prices for raw materials within the country; such a growth reduces the profit of organizations and, as a result, the amount of funds potentially used for investment [29].

In general, the analysis of the main structural deformations leads to the conclusion about the weak regulation of the sphere of social reproduction of the Vologda Oblast. There exist certain difficulties in the sectoral and reproductive structure of GRP, in the structure of investments, final consumption and savings.

5. Directions of structural economic policy

The economy of the Vologda Oblast is in a state of structural and technological imbalance, which restrains stable economic dynamics. The imbalance is characterized by a disproportionate distribution of financial resources and factors of production. In this regard, an important element of economic policy is its component – structural policy. This policy contributes to improving the quality of economic growth and serves as a mechanism for the transition from maintaining economic growth to achieving sustainable economic dynamics and improving the quality of life [2].

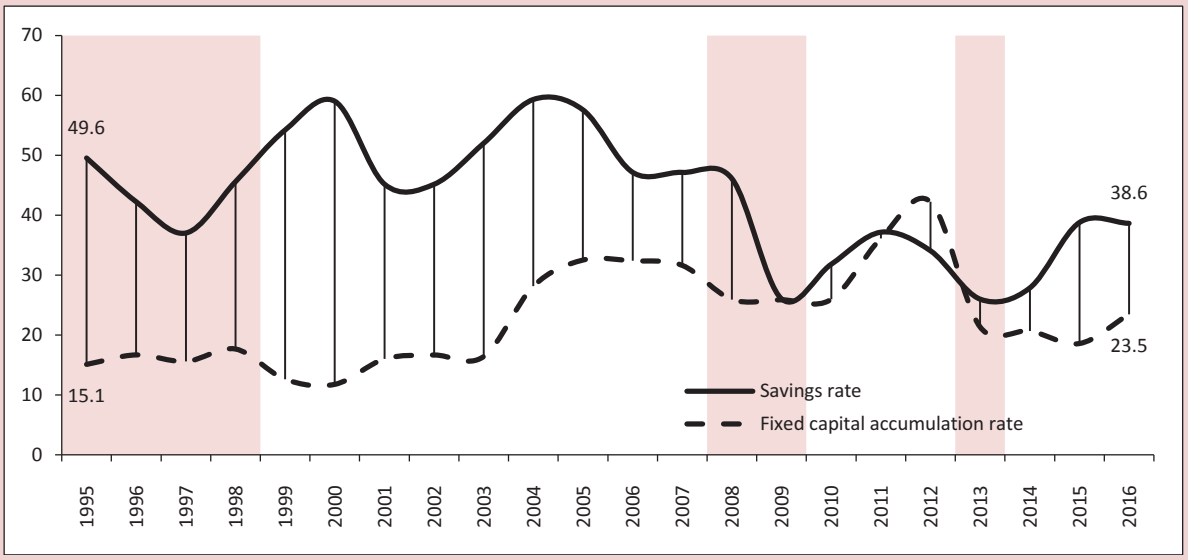
Economic science has proved that the targeted impact of the government on the structure of the economy can affect economic dynamics. Thus, the change in the GVA of the economy turns out to be non-zero even with zero change in output (i.e. only with the transformation of its structure) [23]. It is empirically substantiated (on the basis of the data from 26 countries with economies in transition over an 11-year period) that structural policy can even increase economic growth rates in the short term [31].

Finding a solution to the problem of improving the quality of economic growth in the Vologda Oblast is impossible without increasing the accumulation and increasing the final consumption while reducing its growth rate. Technological development

[9] In terms of consumer spending, the Vologda Oblast ranks last in the Northwestern Federal District and is 1.7 times behind the national average level according to this indicator

[10] It should be noted that the convergence of savings and accumulation rates observed during the crisis years is mainly due to a decrease in savings, rather than an increase in capital accumulation. The dynamics of investments in fixed capital and the rate of accumulation are considered in more detail in [29].

Figure 8. Dynamics of the savings rate and the rate of fixed capital accumulation in the economy of the Vologda Oblast in 1995–2016, % to GRP



Source: compiled with the use of Vologdastat data.

of the economy, which the Vologda Oblast needs, requires managing the key parameters of the circulation of industrial capital (rate, proportions), providing the necessary size, technological and product structure of investment and maintaining the proper levels of renewal of fixed assets.

The set of structural economic policy directions, in our opinion, should include the following:

1. Promoting the modernization of production in order to increase the income of all economic agents and their further use to make the structure of the economy more complex.

An important condition for the resolution of existing structural deformations is the accelerated reduction of unit costs in the real sector of the economy – agriculture, industry, transport. The development of production and the increase in its efficiency will reduce the resource intensity of production, which will increase the gross profit of the economy, largely due to which the gross accumulation is carried out. This can be done through technological and organizational modernization, which reduces costs, increases productivity of labor and capital. The solution to these problems requires the development of economic mechanisms that would help entrepreneurs develop real production, reduce costs and payback periods. The most important condition for the development and modernization of the economy can be formulated as follows: in the Vologda Oblast it should be profitable to produce goods and make a profit on the basis of production development. The commissioning and use of new facilities should be more profitable than the operation of old equipment introduced in the Soviet years. Investments in these sectors can be formed through the development of the mechanisms for redistribution of surplus financial resources generated in the raw materials exporting sphere and in the financial sphere.

2. Promoting domestic consumer demand

A large reserve of economic growth in the Vologda Oblast can be found in promoting solvent consumer demand. The increase in people's incomes and, as a result, the increase in consumer spending also provides an increase in resources for investment, in addition to the increase in profits of enterprises serving the consumer sector (and this comprises more than a third of the output of goods and services).

In this regard, it is important to maintain the level of income of the population and social expenditures of the budget, ensuring at least the growth of wages in the public sector. Another direction of increasing people's incomes is to improve the efficiency and productivity of labor. This task can be solved by promoting social innovation, implementing advanced management and production technologies, improving working conditions at the enterprises, implementing the policy on prevention of emigration of qualified personnel, reduction of diseases and early mortality [32].

3. Promoting investment activity and increasing fixed capital accumulation rate

High-quality economic growth should be provided with the necessary level of investment and the choice of sectoral priorities of investment policy. From the standpoint of the reproduction process and optimization of the volume of goods and services used for final consumption and gross capital formation, the sources of increase in accumulation funds can be as follows [29]: 1) production growth, providing an increase in resources for economic development and final consumption; 2) reduction in the rate of growth of final consumption and increase in the rate of accumulation; 3) reorientation of investments of residents toward national production; 4) attraction of foreign investments; 5) external loans of the state and the private sector, provided that they are used for the development of production.

Imbalances in the income structure of the Vologda Oblast economy do not contribute to the increase in the volume and share of profits of enterprises, which can be potentially allocated to investment. In this regard, in our opinion, the development of mechanisms for attracting public and budget funds for these purposes is a promising direction to stimulate investment activity. According to the Central Bank of the Russian Federation, as of August 1, 2018, bank deposits of physical persons in the Vologda Oblast contained 146.6 billion rubles. In the neighboring regions of the Oblast, there are nearly 1.2 trillion rubles on the deposits. Perhaps, in the context of declining rates on deposits, it is worth trying to implement the policy of increasing the attractiveness of investment financial instruments for the population. As for budgetary funds, the possible directions of such policy may be the following: attracting federal co-financing for the implementation of large investment projects; improving the mechanisms of tax, financial and economic incentives to attract investment to the territory of the Oblast; reducing interest rates; budget incentives.

It should be noted that the regional government undertakes certain management actions in these fields of structural economic policy. In particular, much attention is rightly paid to the diversification of the regional economy. This problem began to be discussed in 1998, when an integrated package of the vision for the future development of the regional economy was formed, which included the mission, doctrine and a draft concept. In the future, the idea of diversification was reflected in the concept of the strategy (2004) and in the strategy for socio-economic development of the Oblast (2010 and 2016). An investment strategy

has been developed. Population preservation has been chosen as the goal of development of the Oblast; priorities in the sphere of family policy, public health protection, development of physical culture, sports, education, etc. are implemented. The problem lies in the fact that all these measures are not mutually linked; the ongoing and planned structural changes are not taken into account. As we see it, taking into account the structural factor will improve the quality of economic policy.

The novelty of our study, which determines its contribution to the development of science, consists in the disclosure of modern laws of the processes of socio-economic development in the territory under consideration at the level of the economy as a whole and its sectoral structure at all key stages of the reproductive process – production, formation and use of income. The materials of the paper can be useful for decision-makers in the substantiation of economic policy at the regional level.

References

1. Kudrin A., Sokolov I. Budget maneuver and structural transformation of the Russian economy. *Voprosy ekonomiki=Economic Issues*, 2017, no. 9, pp. 5-27. (In Russian).
2. Ivanter V., Porfir'ev B., Shirov A. Structural aspects of long-term economic policy. *Problemy teorii i praktiki upravleniya=Issues of Management Theory and Practice,* 2018, no. 3, pp. 27-34. (In Russian).
3. Mirkin Ya. Russian economy: challenges, scenarios, growth strategy. *Problemy teorii i praktiki upravleniya=Issues of Management Theory and Practice,* 2018, no. 3, pp. 67-74. (In Russian).
4. Aganbegyan A. Why is the Russian economy not moving forward? *Problemy teorii i praktiki upravleniya=Issues of Management Theory and Practice,* 2018, no. 3, pp. 11-27. (In Russian).
5. Ilyin V.A., Morev M.V. The disturbing future of 2024. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast,* 2018, vol. 11, no. 3, pp. 9-24. DOI: 10.15838/esc.2018.3.57.1. (In Russian).
6. Sukharev O. Changing the macroeconomic policy to ensure economic growth in 2018–2024. *Problemy teorii i praktiki upravleniya=Issues of Management Theory and Practice,* 2018, no. 3, pp. 113-119. (In Russian).
7. Sukharev O. Structural constraints and approaches to overcome them. *Ekonomist=Economist,* 2014, no. 1, pp. 50-55. (In Russian).
8. Structural policy in Russia: new conditions and possible agenda (HSE report). *Voprosy ekonomiki=Economic Issues,* 2018, no. 6, pp. 5-28. (In Russian).
9. Sukharev O.S. Sukharev O. S. Regional economic policy: structural approach and tools (theoretical formulation). *Ekonomika regiona=Economy of Region,* 2015, no. 2, pp 9-22. DOI: 10.17059/2015-2-1. (In Russian).
10. Blaug M. *Ekonomicheskaya mysl' v retrospektive* [Economic Theory in Retrospect]. Translated from English. Moscow: Delo, 1994. 627 p.
11. Sukharev O.S., Malyavina A.V. Structural changes and methods of their studying in economic theory. *Zhurnal ekonomicheskoi teorii=Journal of Economic Theory,* 2008, no. 2, pp. 119-135. (In Russian).
12. Dmitriev V.K. *Ekonomicheskie ocherki* [Economic Essays]. Moscow: Direktmediya Pablishing, 2008. 470 p.
13. Stone R. *Metod zatraty – vypusk i natsional'nye scheta* [Input-Output and National Accounts]. Translated from English. Moscow: Statistika, 1964. 204 p.
14. Leontief W.W. Quantitative input and output relations in the economic systems of the United States. *The Review of Economic Statistics*, 1936, vol. 5, pp. 105-125.
15. Tatarinov A. *Subnatsional'nye scheta: problemy razrabotki i ispol'zovanie v regio-nal'nom analize* [Subnational Accounts: Problems of Development and Use in Regional Analysis]. Moscow: IEPP, 2005. 163 p.
16. Isard W., Kuenne R.E. The impact of steel upon the Greater New York – Philadelphia Industrial Region. *Review of Economics and Statistics*, 1953, vol. 35, pp. 289-301.

17. Moore F.T., Petersen J.W. Regional analysis: an interindustry model of Utah. *Review of Economics and Statistics*, 1955, vol. 37, pp. 368-383.
18. Miller R.E. The impact of the aluminum industry on the Pacific Northwest: a regional input-output analysis. *Review of Economics and Statistics*, 1957, vol. 39, pp. 200-209.
19. Isard W. Interregional and regional input-output analysis: a model of a space-economy. *Review of Economic Statistics*, 1951, vol. 33, no. 4, pp. 318-328.
20. Moses L.N. The stability of interregional trading patterns and input-output analysis. *American Economic Review*, 1955, vol. 45, no. 5, pp. 803-832.
21. Chenery H.B., Clark P.G., Cao Pinna V. (Eds.). *The Structure and Growth of the Italian Economy*. Rome: U.S. Mutual Security Agency, 1953. Pp. 97-129.
22. Stone R. *A Social Accounting Matrix for 1960*. Cambridge: Chapman and Hall, 1962. 69 p.
23. Shirov A.A. *Mnogourovnevye strukturnye issledovaniya kak instrument obosnovaniya ekonomicheskoi politiki: dis. ... dokt. ekon. nauk: 08.00.01.* [Multilevel Structural Studies as a Tool for Economic Policy Substantiation: Doctor of Sciences (Economics) Dissertation]. Moscow, 2015. 335 p.
24. Blaug M. *100 velikikh ekonomistov do Keinsa* [Great Economists Before Keynes: An Introduction to the Lives & Works of One Hundred Great Economists of the Past]. Translated from English. Saint Petersburg: Ekonomikus, 2008. 352 p.
25. Taylor L. *Structuralist Macroeconomics: Applicable Models for the Third World*. New York: Basic Books, 1983. Pp. 25-27.
26. Prebisch R. *Periferiinyi kapitalizm: est' li emu al'ternativa* [A Critique of Peripheral Capitalism]. Moscow: ILA RAN. 1992. 76 p.
27. Lin J.Y. *The Quest for Prosperity: How Developing Economies Can Take Off*. Princeton University Press, 2012. 344 p.
28. Gizatullin Kh.N., Garipov F.N., Garipova Z.F. Problems of management of structural transformations in the regional economy. *Ekonomika regiona=Economy of Region,* 2018, vol. 14, no. 1, pp. 43-52. DOI: 10.17059/2018-1-4. (In Russian).
29. Uskova T.V., Lukin E.V., Leonidova E.G. Formation and use of resources in the region: the balance sheet approach. *Voprosy territorial'nogo razvitiya=Territorial Development Issues,* 2017, no. 3, pp. 1-16. (In Russian).
30. Pogosov I.A. Balance of resources and use of products in Russia in the early 21st century. *Problemy prognozirovaniya=Studies on Russian Economic Development,* 2014, no. 6, pp. 16-30. (In Russian).
31. Eicher T.S., Schreiber T. Structural policies and growth: time series evidence from a natural experiment. *Journal of Development Economics*, 2010, vol. 91, pp. 169-179. DOI: 10.1016/j.jdeveco.2009.05.003.
32. Ivanter V.V. Strategy of transition to economic growth. *Problemy prognozirovaniya=Studies on Russian Economic Development,* 2016, no. 1, pp. 3-8. (In Russian).
33. Lukin E.V. Variants of adjustments to Russian economic policy. *Voprosy territorial'nogo razvitiya=Territorial Development Issues,* 2016, no. 5 (35), pp. 1-11. (In Russian).

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Approaches to the Assessment of the Natural Capital of Forests and the Prospects for Modernization of Forest Management in the Context of Green Economy

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Abstract. The goal of the paper is to study approaches to the assessment of natural capital of forests, especially forest resources, and the prospects for modernization of forest management in the context of green economy. We show that current socio-economic development strategies in most countries encourage rapid accumulation of physical, financial and human capital through excessive depletion and degradation of natural capital, which includes natural resources and ecosystems. In order to prevent this threat, it is necessary to move to the concept of green economy that involves effective use of natural resources, ensuring the sustainability of natural ecosystems and reducing the use of resources in production and consumption. In this regard, we study indicators and methodological approaches used for measuring and assessing forest resources in the global and domestic practice. We reveal the shortcomings and limitations of their application, which are associated with the quantitative assessment of the state of

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forests, without taking into account qualitative and structural changes. On this basis, we develop our own original methodology for assessing forest resources and in the future – assessing their depletion on the basis of comparing the current state with the "reference" state. An important point in this technique is the account of fragmentation in the assessment of forest resources, implemented through the analysis of spatial distribution of the sections of raw materials bases. The results of our assessment confirm a significant depletion of forest resources throughout the Komi Republic. In order to restore and preserve them, we substantiate the combined use of three basic directions: forest management activities corresponding to the potential of reforestation; rehabilitation modernization of forest management, involving the organization of forest management in the form of recurrent cycle of selective cutting; and compensatory strategies of timber processing. The prospects for further research are related to the task of developing a model for the use of forest resources in the region, ensuring the sustainability of supply of timber processing industries with raw wood.

Key words: natural capital of forests, forest resources, forest management, modernization, green economy.

Introduction

The natural capital of forests in a broad sense includes not only forest (primarily wood) resources, but also the whole range of ecosystem services related to a healthy environment, the quality of water ecosystems, the opportunities of using non-wood forest products, as well as recreation and aesthetic and spiritual values of nature. This approach is reflected in many publications by foreign (R. Contanza, D. Alkamo, etc.) and domestic researchers (S.V. Bobylev, I.P. Glazyrina, G.D. Titova, D.E. Konyushkov et al.) [1–7].

Therefore, when we talk about the natural capital of forests and its preservation we emphasize not only its economic component but also its environmental and social value for the population of traditional "forest" regions of Russia, in particular the Komi Republic. This approach underlies the global trend towards economic "greening" in order to ensure the long-term sustainability of natural ecosystems and prevent their degradation [8].

The concept of "green" economy involves efficient use of natural resources, ensuring the sustainability of natural ecosystems and reducing the use of resources in production and consumption (resource efficiency). In the late 1980s–early 1990s, when considering the approaches to the "green" economy the leading Western researchers [9, 10, 11] paid attention to preservation of natural forest capital for future generations. Preserving the natural capital of forests based on the principles of "green" economy is fundamental for ensuring the long-term sustainability of the entire forest sector of economy.

The wish to assess the state of forest resources and propose approaches to their measurement, conservation and sustainable use is reflected in the documents of international organizations. One of them is the Rovaniemi Action Plan for the forest sector adopted by the UNECE and FAO in 2013. The document affects 56 countries in Europe, the Caucasus, Central Asia, and North America [12]. The main lines of this Plan implies rational use of forest resources, minimization of waste, and maximum possible reuse (recovery); replacement of non-renewable materials and fuels with renewable materials and wood fuels; supply of goods and services with great value to their consumers.

Developed OECD member states see the main objective of the forest sector in providing the required volume of wood of appropriate quality with optimal cutting standards that preserve forest capability.

When implementing the Declaration on Green Growth (2009) OECD countries called for the promotion of economic growth and development to preserve national wealth. "The main problem is the anthropogenic load affecting the natural growth and restoration of forests and its impact on the economic, environmental, and social functions of the forest. Anthropogenic load includes the unsustainable exploitation of forest lands, their segmentation, degradation of environmental quality of forests, deforestation ..." [13, p. 89]. OECD forest indicators include timber resources and forest areas; the depletion of forest resources can be assessed indirectly using the indicator of forest resource exploitation calculated as a ratio of felling volume to gross growth, which roughly corresponds to domestic utilization of calculated felling rate.

An important global document regulating the preservation of natural capital is the 2030 Agenda for Sustainable Development [14]. One of the 17 sustainable development goals (SDG–15) focuses on protection and restoration of terrestrial ecosystems and promotion of their sustainable use and sustainable forest management. The preservation of natural capital of forests as an economic resource is considered in Goal 15.1 which declares promotion of methods of rational use of all types of forests, restoration of degraded forests and a significant expansion of forest restoration, action against deforestation and forest degradation. The indicators of its implementation are the areas of certified forests and intact forest landscape which need to be doubled by 2030.

Countries' global studies on "green" economy of the forest sector demonstrate that Russia is in a relatively favorable situation. The environmental impact of economic activity on natural ecosystems is 30–40% lower compared to EU member states, which is explained by higher bio-intensity, while the global consumption of resources is 1.5 times higher than the planet's ability to restore them [15].

In order to assess sustainability at the level of macro-regions the ECE Committee on Forests and the Forest Industry (COFFI) together with the European Forestry Commission (EFC) established by FAO developed a System for the Evaluation of the Management of Forests (SEMAFOR) [16] which includes 20 evaluation, 27 contextual and 5 reference parameters. In order to preserve the natural capital of forests it is proposed to take into account the resources per hectare and the area of forests suitable for timber harvesting by quality characteristics.

Forest indicators included in reviewed and other international policy documents reflect the green course of the forest economy and can be used for regional studies. It is important to take into account that general characteristics of wood resources and forest areas in relatively forest-sufficient regions, which include the Komi Republic, will not give an accurate idea about forest resources. At the same time, specific SEMAFOR indicators can be applied for the development of new tools to assess forest resources and their application structure in production and consumption [17].

Thus, the purpose of the present paper is to study approaches to assessing forest resources and prospects for modernizing forest management in the context of the global trend in economic "greening".

Approaches to assessing natural capital of forests at the national and local system level

Basic indicators of forest resources are widely used to compare countries by level of development. These include: area of land covered with forest (thousand ha), area of forest land (thousand ha); forest cover – the ratio of area covered with forest to the total country's or region's area, %; protected areas (thousand ha); age structure of forest land (mature, overmature, etc.); distribution of forest

resources according to the pedigree structure (coniferous, deciduous); total wood reserve (including mature and overmature species), thousand m^3.

However, these indicators, being able to reflect the quantitative state of forests, do not assess their qualitative and structural changes. In the past 20–30 years, developed countries have begun to develop methods to directly or indirectly assess the degradation of forest ecosystems (forest depletion). The emphasis is put on aggregates based on many data that can be used to judge the degree of resource and environmental sustainability of the socio-economic development.

Examples of this approach include the following methods:

– net present value (NPV) proposed by the World Bank. It assesses capital as a value that generates income over time, except for the value of protected areas [18];

– economic assessment of natural resources and negative impact on the environment in the system of environmental and economic accounting, where environment is considered as a reserved natural capital, and its anthropogenic use – as services provided by this capital [19];

– Index of Sustainable Economic Welfare – ISEW [20]. Here, the depletion of natural resources is measured as the amount of investment needed to create a resource equivalent;

– measuring environmentally sustainable national income – eSNI [21] defined as the maximum achievable level of production, in which environmental functions are maintained at the expense of technological development of the society.

In general, Western authors' methods for assessing the rational use of forest resources pay more attention to environmental risks, often leaving out the economic component of forestry and forest management. The disadvantages of these approaches in terms of application for the Komi Republic include a very large amount of necessary and inaccessible (especially cost) information for calculating indicators. The advantage of the approaches is the methodological focus not only on preserving natural capital, but also on restoring it to its initial state, which was the starting point for the development of the author's methodology for assessing forest depletion.

Domestic approaches to measuring natural capital of forests

The traditional approach to assessing the depletion of natural capital of forests in Russia is based on the size of the estimated felling rate which determines the allowable annual volume of timber removal in exploitable and shelter forests, providing a multi-purpose, rational, continuous, and sustainable forest utilization based on the established felling age. Under this scheme, it is conventionally believed that if the forest stand is cut down less than the annual estimated felling rate, such ecosystems are sustainable and, therefore, natural capital is preserved. These provisions are recorded both in normative documents [22] and in separate author's publications on this issue [23–25].

However, not all researchers believe that approaches to assessing forest depletion can be objectively evaluated using a traditional approach based on the calculated felling rate, so options for we offer options for its adjustment, taking into account additional indicators or factors. Such "adjusted" felling rate can be calculated using Formula 1 [26]:

$$V_{t+1} = V_t(1 + q) - Q - D, \qquad (1)$$

where V_{t+1} – a physical value of forest resources in a certain period of time (t +1), m^3;

q – natural growth rate of forest resources, m^3/year;

Q – amount of harvested wood in the period, m^3;

D – damage caused to forests, m^3.

To assess the "adjusted" felling rate to calculate the depletion or, vice versa, the increment of forest resources, additional indicators of damage caused to forests (from pests, fires, drying of plantations for a variety of reasons, etc.) are used.

Analysis of approaches to assessing natural capital demonstrates that their depletion is determined through the impact of mainly environmental factors, rather than structural changes in the composition of forest stand after cutting. However, Western approaches, unlike domestic ones, to some extent connect the assessment of natural capital with the efficiency of further processing in the chain of "harvesting–processing–consumption", while, as already noted, the efficiency of reforestation is at a high level.

Therefore, it is advisable to form two complementary approaches to the development of the national or regional forest industry in terms of preserving the natural capital of forests. The resource-based approach focuses on the conservation and restoration of forest ecosystems with estimating the level of forest depletion. The technological approach implies the assessment of natural capital by cost of the final product. At the same time, the efficiency of timber processing and output of products with high value added due to technological development is of fundamental importance. Both approaches are important and should be applied together. Enterprises modernize production facilities, generating value added of raw materials of smaller volume and worse quality, which preserves natural capital and compensates for its depletion. On the other hand, the state, as the owner of forests, through the forestry system ensures the preservation of productivity of forests, their species-quality characteristics through reforestation regulations and forest management regimes (harvesting rules, etc.).

Changing the potential of forest resources in the Komi Republic

In Russia, it is traditionally believed that the country has innumerable forest resources and that the objective of preserving and increasing forest capital is not relevant for us. Since the beginning of the 2000s, leading researchers, especially N.P. Chuprov, S.V. Pochinkov, A.P. Petrov, N.A. Moiseev and other experts in the forest sector and forestry, have written about the fact that inefficient forest management leads in particular to significant depletion of forests in traditional "forest" regions [27–32].

Let us single out a group of indicators of declining natural capital of forests:

1. Exhaustion of forest resources (quantitative): shortage of forest raw materials, especially lumber log; lower standing volume per hectare; decreasing economically accessible forest resources; continuous overcutting of forest resources in areas available for transportation (in areas of higher soil productivity, in areas suitable for summer harvesting, close to main consumers).

2. Exhaustion of forest resources (qualitative): change of species – pine, spruce, fir forests are replaced by birch, aspen forests, as well as coniferous monocultures of low productivity; segmentation of forest stands at felling; significant predominance of natural regeneration over artificial without subsequent timber stand improvement and lack of measures for future stand formation.

A key indicator of forest depletion is the performance of changes in average forest yield per hectare in developed forests, especially in coniferous forests. The Honored Forester of the Russian Federation, Professor V.F. Tsvetkov noted that the yield of forest stands in the Arkhangelsk Oblast and the Komi Republic decreased from 200–250 to 110–120 cubic meters per hectare [33] compared to the middle of the previous century.

The system of concentrated felling that has existed since the mid-1940s and is still being implemented with minor changes, has led to the fact that the concepts of "forest" and "forest resources" are no longer identical. This fact was pointed out in the early 2000s by well-known Swedish economists (Lars Karlsson et al.) who were dealing with forest management issues. Assessing the state of the Russian forest sector, they rightly noted that it does not have huge forest resources; the volume of forests is huge, yet it is not the same [34]. Such pessimistic estimates are explained by the fact that by maturity age forest stands differ significantly from first growth (virgin, "normal") forests in species and commodity structure.

The calculation of cost of forest depletion in the region carried out according to the developed original author's methodology, revealed negative trends that began with concentrated felling in the 1930–40s and still prevail (*Tab. 1*).

The data from the table help take into account the impact of negative trends:

– the range of hauling from the place of logging to lower standing significantly increased (now it is the main highway) due to the fact that available forests near traditional forest settlements are depleted and loggers "go deeper into the forest" to search for an acceptable quality of wood resources. The employment rate of people working in timber harvesting because they mostly work on a rotational basis, which reduces a city-forming role of settlements especially in rural areas;

– depletion of forests over the past 50–70 years has led to the fact that large and medium companies harvest timber on the periphery of the Komi Republic. Since the main centre of wood processing is located in Syktyvkar (pulp and paper, plywood and panel industry, wood-sawing), the hauling distance is increasing significantly; now contractor organizations harvest timber for OAO Mondi-SLPK (Syktyvkar timber processing complex) located 300–350 km away from the processing plant;

– all this leads to a significant increase in harvesting cost as transportation costs are increased and forest resources deteriorate because best resources are cut down and necessary forestry work on its reproduction is only carried out formally. The deteriorating quality of forest resources is illustrated by data on the reducing share of lumber log as the most valuable resource, which means a decrease in the weighted average price of round timber and a decreased profitability of logging.

Moreover, the current model of forestry development with a major processing centre does not increase the use of felling rate and, therefore, the felling volume because there is no additional sale for small wood and pulp wood. The deteriorating logging cost indicates the need for significant structural changes in the forest sector in the region.

Table 1. Calculation of forest depletion cost

Period	Lower standing hauling, km	Hauling distance, km	Hauling cost 3.5 RUB/m³ per km*	Share of lumber log, %	Weighted average price, RUB/м³*	City-forming role and impact on employment
1940s	Up to 10 km	50–100	350	Up to 60%	1600	Very significant
1980s	Up to 40 km	Up to 150	525	Up to 40%	1400	Significant
After 2000	Up to 80 km	150–200	700	15–25%	1200	Average
After 2015–2030	More than 100 km	Up to 300–350	1050	Up to 20%	1000	Not very significant

* Data on prices and costs are given in comparable prices. Calculated according to: data from the Forest Committee of the Komi Republic, Ministry for Investment, Industry and Transport of the Komi Republic.
Source: author's methodology.

Assessment of natural capital depletion in the forests of the Komi Republic

Based on methodological approaches and the current state of the forest complex of the Komi Republic economy, a methodology for assessing forest depletion has been developed which compares the current state of forest capital with the "reference" state of forests which could grow in natural conditions without human impact. Virgin or intact forests serve as a model for such a forest.

Forest resource depletion is defined as the difference between reference and actual forest (**ΔF**) according to the formula:

$$\Delta F = F(\text{reference}) - F(c), \qquad (2)$$

where ΔF – value of forest resource depletion; F(reference) – reference state of the forest; F(c) – the current state of forests (natural capital).

The reference state of forests was assessed for the Komi Republic based of expert assessments and data on typical conditions of intact forests in the northern and southern parts of the Republic. The main indicators of the quality of forest capital are: average volume of wood and assortment structure. Due to different natural and climatic conditions of forest growth, these indicators are differentiated by two zones (*Tab. 2*).

The parameters of the reference forest significantly exceed the actual indicators for raw materials supply of the Komi Republic, especially for sawn raw materials, the share of which in the assortment structure is on average 23–24%. Moreover, forest depletion led to a significant drop in the average supply per hectare, which in the Komi Republic (120–140 cubic meters according to various estimates) is lower than even benchmark indicators for forests in the North.

To assess the depletion of regional forest capital it is proposed to use natural and cost indicators characterizing the main parameters of forest resource quality – merchantability of stand, share of lumber log, and depletion of resources due to forest segmentation.

Physical indicators characterize: timber supply, its structure (assortment, species, and commodity structure), harvesting conditions (hauling distance to the consumer and/or to an all-weather road, level of forest segmentation (share of compartments exceeding the target indicator, for example, average stem volume on by raw materials supply). Cost indicators were used to determine merchantability of stand.

The information framework for assessing natural capital depletion of forests are data from the Forest Committee of the Komi Republic, the Komi Republic geoportal (on the quality of forests in the context of the net of rides), as well as the Federal State Statistics Service in the Komi Republic and Ministry for Investment, Industry and Transport of the Komi Republic (on the hauling distance, price of timber products). The assessment was carried out for raw material supplies distinguished when developing the General scheme of developing a network of forest roads in the Republic.

Results of merchantability assessment. The current state of natural capital is estimated through merchantability of stand, taking into

Table 2. Parameters of reference forest for the Northern and Southern zone of the Komi Republic

Forest zone	Average supply, m^3/ha	Assortment structure, %					Waste, %
		Coniferous lumber log	Coniferous roundwood	Leaf lumber log	Leaf roundwood	Fuelwood	
Reference (north)	160	45	30	5	6	6	8
Reference (south)	280	40	15	17	10	10	8

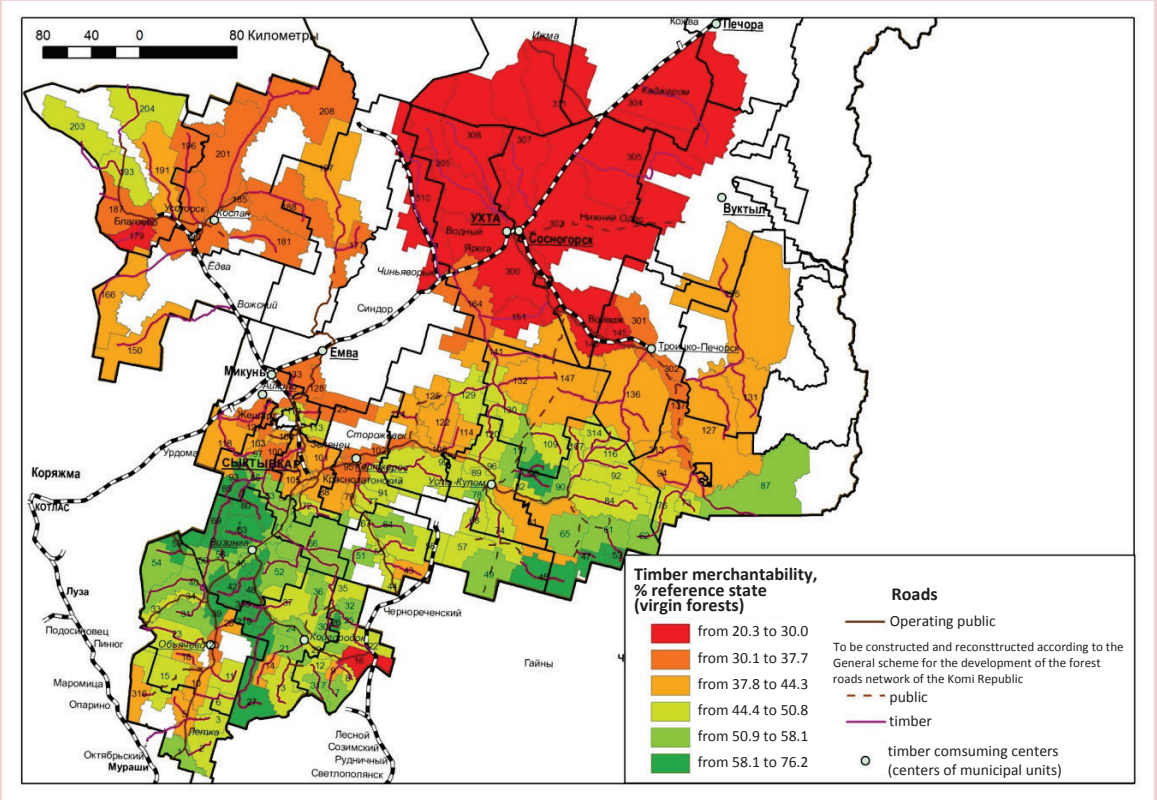
Source: author's methodology based on expert assessments of specialists of forestry universities of the Komi Republic, as well as data from the Forest Committee of the Komi Republic and Ministry for Investment, Industry and Transport of the Komi Republic

account both their structure and consumer value. The merchantability factor is calculated by multiplying the share of each element of the assortment structure of raw material supplies by the corresponding conditional cost of a cubic meter of this assortment. The unit value of assortment of round timber is defined as a ratio of its market value to the cost of fuelwood (the cheapest element of the structure). The merchantability indicator is adjusted by factor of supply per hectare, which is defined as a ratio of supply of a particular raw material to minimum supply for all raw materials. The final indicator of merchantability for determining the depletion is the product of factors of merchantability of a particular raw material supply and its supply factor.

To assess the depletion of natural capital in forests of the Komi Republic the indicators of merchantability for actual and reference forest are calculated. The ratio of these indicators shows the level of forest depletion (*Fig. 1*).

The level of real merchantability relative to the reference merchantability is inversely proportional to forest depletion. From data in the figure on a relatively high level of merchantability in the southern part of the Republic (from 44 to 76% of the reference value) we understand that the total forest depletion here comprises 25–55%. The situation is different in the northern part where levels of merchantability are low (20–44%) and levels of forest depletion are high – 50–80%. It is not by chance that in the northern

Figure 1. Merchantability of forest stand, % of the reference state



Source: calculated from data of the Forest Committee of the Komi Republic, Ministry for Investment, Industry and Transport of the Komi Republic, and the Komi Republic Geoportal. Map maker – V.A. Noskov.

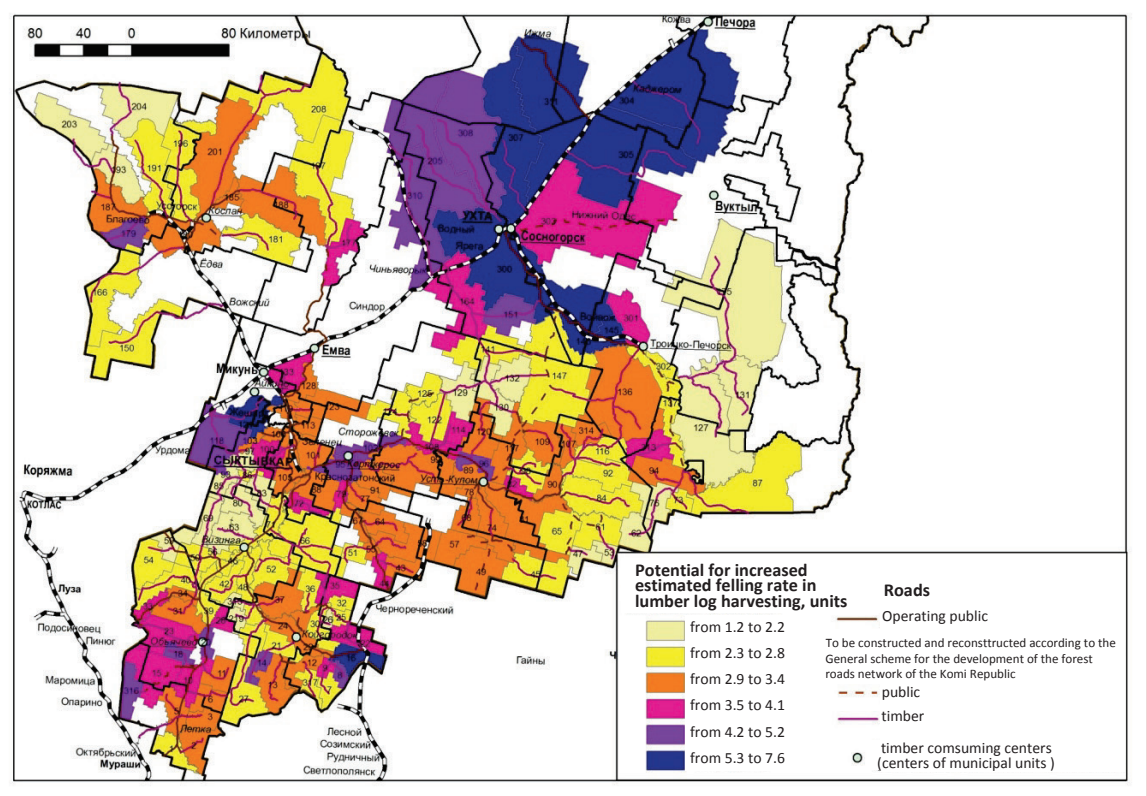
part there are many areas highlighted in white, where logging is practically not carried out due to significant forest depletion, which confirms the validity of calculations.

Results of assessing the quality of the assortment structure. In addition to general forest depletion, it is important to understand its depletion by key assortment of harvested timber – lumber log – the most valuable raw material for sawmilling and woodworking. The calculation is carried out through comparing the real and potential share of lumber log in the felling rate and demonstrates the excess of lumber log in the reference forest over the actual one (*Fig. 2*).

Analysis of the figure demonstrates that the depletion of the most valuable forests, especially for lumber log, is much higher than the average for stands, which is logical since loggers withdraw the most valuable merchantable wood from the forest – lumber log. The calculated total potential for increasing the estimated cutting area for lumber log was about 10 million cubic meters per year (while reducing the estimated cutting area for pulpwood), which is confirmed statistically.

Thus, the share of lumber log in the Komi Republic in the early 1980s, at the peak of timber harvesting in the amount of up to 25 million cubic meters, amounted to about 10–12 million cubic meters. Of course, the calculated value of increasing estimated cutting area for lumber log is a theoretical value and would be achievable with proper and adequate reforestation throughout the entire cutting cycle.

Figure 2. Potential increase in annual estimated cutting area for lumber log



Source: calculated from data of the Forest Committee of the Komi Republic, Ministry for Investment, Industry and Transport of the Komi Republic, and the Komi Republic Geoportal. Map maker – V.A. Noskov.

Results of evaluating the impact of segmentation on forest depletion.

Segmentation of forest stands after logging leads to violation of the spatial integrity of forests and formation of quite isolated forests. This problem is acute not only for our country, but also for the neighboring countries with developed methods of its assessment [35, 36].

Segmentation significantly affects the quality of forest resources, increasing their depletion. Moreover, it significantly increases the cost of logging due to the need for additional construction of hauling roads. The segmentation of forests does not help small and medium businesses select good forest areas for lease agreements because such areas are mainly leased by major loggers and are rarely located near highways.

To assess the segmentation of forests in the Komi Republic the average stem volume characterizing the quality of forest resources and maximum concentration of adjacent compartments were used as a characteristic of density if compartment groups with certain stem volume.

The assessment is carried out by raw material supplies identified when developing the General scheme of developing a network of forest roads in the Republic using the tools of the Komi Republic Geoportal which helps visualize the areas with the selected parameters on a compartment map. Since it is impossible to directly and automatically combine the net of rides at the website of the Geoportal and the map of raw materials, forest resource supplies with main types of woods in forest areas with considerable volume of logging were selected. These include resource supplies from the southern periphery (Letskoe forest area), southeastern periphery (Pruptskoe forest area), central (Kortkerosskoe forest area), northeastern (Troitsko-Pechorskoe forest area), and northwestern part (Udorskoe forest area). In order to assess the segmentation, we made a sample of compartments where the average stem volume is above average for the Republic (0.23 m). The assessment results are presented in *Table 3*.

The results of studying forest segmentation confirmed not only the general depletion of forests, but also the fact that the number of good dense forest areas is reducing. The best results are demonstrated in the southern periphery of the Komi Republic. For example, the Letskoe forest area formally possesses a large supply of wood with a great share of large timber – about 30–50% in specific supplies, but this is mostly wood from deciduous trees for pulp wood for pulp and paper. The presence of larger timber is also explained by better climatic conditions in the south, as well as by the total annual wood growth.

Forest resource supplies in the southeastern and eastern periphery are generally similar. In the Troitsko-Pechorskoe forest area, there are still separate good forestlands in a very large forest supply no. 321, where their share reaches a quarter, while they are quite dense. In the Pruptskoe forest area, intact forests still remain. These separate fragments are found only in hard-to-reach areas and are of interest only to major loggers and/or processors since road construction is required.

Forests of the western periphery are much more segmented, first of all, due to concentrated felling above estimated cutting area in the 1970–80s. In the Udorskoe forest area, forest depletion is much more noticeable. There are practically no untouched forests of high economic value, some fragments are found only in extremely remote places and are not of interest even for major loggers and/or processors.

In the central part of the Komi Republic, almost all forests have been cut down. For example, in Kortkerosskoe forest area, some areas of timber forest are found in raw material supply no. 79, 91, but their density

Table 3. Segmentation of forests in the Komi Republic

No. of compartment	Forest area	Total compartments, units	Compartments with stem volume ≥ 0.23 m³		
			Total, units	Share in supply compartments, %	Maximum concentration of adjacent compartments, units
Southern periphery					
3	Letskoe	144	90	62.5	61
6	Letskoe	83	38	45.8	30
1	Letskoe	85	34	40.0	25
2	Letskoe	141	53	37.6	23
5	Letskoe	91	21	23.1	12
Southeastern periphery					
48	Pruptskoe	121	59	48.8	39
45	Pruptskoe	71	38	53.5	31
57	Pruptskoe	61	0	0.0	0
Eastern periphery					
136	Troitsko-Pechorskoe	321	81	25.2	51
301	Troitsko-Pechorskoe	56	7	12.5	5
145	Troitsko-Pechorskoe	31	0	0.0	0
302	Troitsko-Pechorskoe	34	0	0.0	0
Western periphery					
208	Udorskoe	135	20	14.8	15
188	Udorskoe	122	5	4.1	2
201	Udorskoe	207	4	1.9	1
196	Udorskoe	105	1	1.0	1
181	Udorskoe	182	0	0.0	0
185	Udorskoe	21	0	0.0	0
Central part					
91	Kortkerosskoe	67	4	6.0	3
79	Kortkerosskoe	24	1	4.2	1
77	Kortkerosskoe	69	0	0.0	0
88	Kortkerosskoe	81	0	0.0	0
95	Kortkerosskoe	211	0	0.0	0
123	Kortkerosskoe	59	0	0.0	0
Total sample		2522	456	18,1	300

Source: author's methodology based on data from the Forest Committee of the Komi Republic, Ministry for Investment, Industry and Transport of the Komi Republic, and the Komi Republic Geoportal.

is extremely low. Selective studies on specific supplies in the center of the Komi Republic, in particular, in Syktyvdinsky, Kortkerossky, Ust-Vymsky, Sysolsky, and Koygorodsky districts demonstrate extremely low density of high-quality raw material supplies: forest are severely depleted, specific timber forests can only be found on the periphery of these areas in small volumes.

Practically, this means that any large-scale sawmill will require either construction of additional hauling roads, which is extremely burdensome, or supply of lumber log from other areas. It is no accident that new investment projects to create timber processing facilities in the central part of the Komi Republic face the problems of raw material supply: OOO Lesozavod no. 1 in the Ust-Vymsky district works on imported raw materials. OOO Promtekh-invest lumber factory, which started operating in 2017 in the Sysolsky district, also faces the problem with lumber log supplies.

The result of forest segmentation in the Komi Republic is limited large supplies of highly productive forests. Forests have been cut repeatedly, which leads to the fact that even major logging companies have dozens of cutting areas within one calendar year to be able to harvest affordable wood of a required assortment structure.

Recovery model to preserve natural capital of forests and modernization lines for regional forest management

Modernization of the bio-resource economy in terms of preserving natural capital of forests is possible under several scenarios, in which amid current conditions priority is given to increasing the share and depth of wood processing in order to compensate for forest depletion. However, this scenario is limited in the medium term as it potentially reduces the volume of wood processing with the processing limits being critical, which shows the importance of the second scenario which preserves the initial quality of forests with a tendency to improve it.

Attention should be paid to the restoration model of forest management which uses forest management measures, including the transition to intensive forest management, which will help completely restructure the system of forest management and reforestation within a decade and get noticeable results in 20–25 years.

A good example is Finland with a fundamentally different approach to reforestation [37]. In Russia, forestry-related jobs clearly reflect forestry goals, rather than economic ones. In Finland, reforestation is covered from the forestry, technological, and economic perspective: commercial improvement cutting is based on rarely repeated, intense, and economically feasible cutting. The volume of commercial cutting in 2004–2007 was up to 40% of the total harvesting volume compared to 5% in the North-West of Russia. This is largely due to the fact that continuous logging in Russia is carried out at about half of the estimated cutting area, while in Finland – only at a quarter.

The adoption of intensive forest management in Finland in the 1960s increased the total timber supply by 53% and the average current growth –by 77%. This suggests that the country was able not only to preserve the natural capital of forests, but also to significantly increase it, even though it produces up to 8–9 times more timber than Russia per unit of felling area. During 1960–2010, Finland harvested more than 2.2 billion cubic meters of wood, which corresponds to its current forest supplies. In fact, this means that with modern reforestation techniques Finland was able to double the average felling rotation of 100–120 years.

Thus, the experience of developed countries with similar climates shows that the restoration model of forest management can also work in Russia. The authors' studies of this issue have shown that intensive forest management in the Komi Republic is possible only in the southern part, especially in the Priluzsky, Sysolsky, Koigorodsky, and Syktyvdinsky districts, as well as in some forest areas of the Kortkerossky and Ust-Kulomsky districts.

The timber complex in the Komi Republic reached the point where forest raw material supply does not significantly increase the volume of harvesting and processing of most valuable lumber log.

Therefore, it is necessary not only to take measures to restore forests, including through transition to intensive methods of reforestation, which is primarily the objective for forestry, but also to change the rules and approaches to timber harvesting. The analysis helps identify several modernization lines.

1. The transition from pioneer forest development to multiple use within the framework of a specific rental base. Mass use of selective cutting should become the

mechanism of such a transition: with only economically valuable wood withdrawn from the plot (up to 10–30% of total supply), the rest of it remains for "nursing" and is withdrawn after 5–15 years as it becomes "commercially valuable". This system is widely used in European, especially Scandinavian, countries and is suitable for Russia, given that lease agreements are concluded for up to 49 years.

2. Lifting restrictions on timber procurement in the Forest code under purchase/sale agreements for small businesses, as it is forbidden to construct forest roads, wood depots, , other buildings and structures in forest areas provided to small businesses for timber harvesting, which significantly complicates work. The results of assessing the segmentation of forest stands reveal a large number of high-quality forest areas where timber supplies are insignificant and are not of interest to medium and large business. Small businesses, however, cannot exploit them due to the existing restrictions. A mechanism to solve this problem may be increased duration of contracts by up to 2–3 years instead of the existing period of one year with the option to build permanent facilities.

3. Creating a plan for future development of forest resources (possibly is the framework of adjusting of the Forest plan of the Komi Republic), where small forest business would have reserved forest areas unattractive for major forest enterprises, taking into account their segmentation. In turn, major forest enterprises could receive compensation for transfer of these lands to small businesses, receiving other areas for cutting. Strengthening the influence of small forest business would increase the use of estimated cutting area, and therefore – increase resource efficiency.

4. Permission to limit commercial cutting in protected forests to preserve and improve the protective functions of these stands through selective logging.

Summary

The case study of the Komi Republic has revealed that the principle of continuous, sustainable use of forests declared in forestry is not observed.

It was found that some indicators of forest supply assessment proposed at the global level are not able to determine the specific features of intraregional changes. The method for calculating the estimated cutting area does not take into account the current forest depletion and all possible losses of timber, includes economically inaccessible forest resources, and most importantly, helps manipulate the cutting age, overestimating the cutting area, which leads to overexploitation and a significant reduction in the exploitation volume in the medium term. The value of estimated cutting area is an administrative value used for calculating rent and for other purposes but it has nothing to do with continuous and sustainable use.

A method to estimate forest resources and their depletion is developed based on comparing their real and reference state through changes in basic quality parameters – the share of lumber log, merchantability of forest stands, and fragmentation of forests. Comparison of reference parameters of forests with the actual values of parameters of raw material supplies identified when developing the General scheme of developing a network of forest roads in the Komi Republic to determine the actual depletion of forest resources. The authors present maps of large-scale differentiation of declining quality of forest resources for the development and selection of appropriate schemes of reproduction and use of forest resources.

The practical value of the research lies in the fact that it helps, on the one hand, adjust the strategy of socio-economic development of the Komi Republic in terms of locating promising logging and timber processing facilities taking

into account the availability of necessary forest resources; on the other hand, it helps develop new approaches to preserving natural capital of forests in a broad sense, especially in rural areas, where forestry plays an important role and is socially important for the local population. Moreover, the role of forest ecosystems to produce the full range of ecosystem services remains.

An important provision of the forest depletion assessment methodology is the consideration of segmentation in assessment of forest resources. It is implemented through analysis of spatial distribution of compartments of raw material supplies where average stem volume directly correlated with the quality of stands is above a certain threshold; in this case – above the national average stem volume for all raw material supplies. The density of adjacency of such compartments was also estimated; it directly affects the supply of raw materials for large or medium sawmills with raw materials at an acceptable cost.

The assessment revealed a significant depletion of forest capital throughout the region. The merchantability of timber since the beginning of industrial development of forests decreased in the southern regions to 50%, in the northern part, taking into account more unfavorable rehabilitation conditions – up to 75%. The depletion of high-value timber (lumber log, veneer block) in the past decade is growing faster, threatening the supply of raw materials for sawing and woodworking. Analysis of depletion of raw material supplies reveals a correlation between the actual decline in the volume of lumber log harvesting (5–6 times over the past 30 years) and the estimated depletion of forest capital (4–9 times for specific raw material supplies).

The assessment results confirm that the supply of large timber processing plants in the medium term is potentially unsustainable due to the inability to ensure stable supply of lumber log, which limits the growth of wood processing.

For restoration and preservation of forest resources of the Republic, as well as replication of the model for other forest subjects of Russia the combined application of three lines is proved:

1) forest management activities corresponding to reforestation potential;

2) recovery modernization of forest management, involving forest management in the form of periodically repeated cycle of selective felling followed by replenishment of supply at the expense of a younger generation of trees to form plantations of high economic value;

3) compensating strategy of wood processing using the best technologies for processing wood of decreasing quality.

References

1. Costanza R. et al. The value of the world's ecosystem services and natural capital. *Nature*, 1997, vol. 387, pp. 253-260.
2. Alcamo J. et al. *Ecosystems and Human Well-Being: A Framework for Assessment*. Millennium Ecosystem Assessment. Washington, Covelo, London: Island Press, 2005. 268 p.
3. Bobylev S.V., Zakharov V.M. *Ekosistemnye uslugi i ekonomika* [Ecosystem services and economy]. Moscow: Institut ustoichivogo razvitiya; Tsentr ekologicheskoi politiki Rossii, 2009. 72 p.
4. Glazyrina I.P. *Prirodnyi kapital v ekonomike perekhodnogo perioda* [Natural capital in the transition economy]. Moscow: NIA-Priroda, REFIA, 2001. 204 p.
5. *Otsenka ekosistem na poroge tysyacheletiya. Ekosistemy i blagososto yanie lyudei: ramki otsenki* [Assessing ecosystems at the turn of the millennium. Ecosystems and people's well-being: assessment framework]. Vashington – Kovelo – London: World Resources Institute, 2005. 283 p.

6. Titova G.D. The term "natural capital", development of the methodology and methods of its economic assessment. *Vestnik Sankt-Peterburgskogo unstituta. Seriya 7. Geologiya= Vestnik of Saint Petersburg University. Earth Sciences*, 2014, no. 1, pp. 113-123. (In Russian).
7. Konyushkov D.E. The development of the concept of ecosystem services: a review of foreign publications. *Byulleten' Pochvennogo instituta im. V.V. Dokuchaeva=Bulletin of V.V. Dokuchaev Soil Science Institute*, 2015, no. 80, pp. 26-49. (In Russian).
8. Tikhonova T.V. Ecosystem services: the role in regional economy and the approaches to evaluation. *Izvestiya Komi NTs=Proceedings of the Komi Science Centre Ural Branch of the Russian Academy of Sciences,* 2016, no. 3 (27), pp. 134-143. (In Russian).
9. Pezzey J.C.V., Toman M.A. *The Economics of Sustainability: A Review of Journal Articles*. Washington, D.C., 2002. Available at: http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-02-03.pdf
10. Pearce D.W., Markandya A., Barbier E.B. *Blueprint for a Green Economy*. London: Earthscan, 1989. Available at: https://www.researchgate.net/publication/39015804_Blue-print_for_a_Green_Economy
11. Dasgupta P. Nature in economics. *Environmental and Resource Economics*, 2008, no. 39, pp. 1-7. Available at: http://paperity.org/p/6292007/nature-in-economics
12. *Rovaniemi Action Plan for the forest sector amid "green economy" development*. Geneva research into the forest sector no. 35. United Nations, Geneva, 2014. 58 p. Available at: http://www.nizrp.narod.ru/metod/kaftzkm/10.pdf. (In Russian).
13. *OECD green growth indicators 2014*. Available at: http://www.keepeek.com/Digital-Asset-Management/oecd/environment/green-growth-indicators-2014_9789264256767-ru#page1
14. *Transforming our world: the 2030 Agenda for Sustainable Development*. Resolution adopted by the General Assembly on 25 September 2015. Available at: http://unctad.org/meetings/en/SessionalDocuments/ares70d1_ru.pdf. (In Russian).
15. Boev P.A. (Ed.). *Ekologicheskii sled sub"ektov Rossiiskoi Federatsii; Vsemirnyi fond dikoi prirody* (WWF) [Environmental footprint of Russia's constituent entities. WWF]. Moscow: WWF Rossii, 2014. 88 p.
16. *System for the Evaluation of the Management of Forests (SEMAFOR)*, Untied Nations, July, 2017. Available at: http://www.fao.org/3/a-mu338r.pdf. (In Russian).
17. Zomonova E.M. *Strategiya perekhoda k «zelenoi» ekonomike: opyt i metody izmereniya* [The strategy of transition to green economy: experience and measuring methods]. Analytical review. State Public Library of Siberian Branch of the Russian Academy of Sciences, Baikal Institute of rational nature management SB RAS. Novosibirsk: GPNTBSORAN, 2015. 283 p. (Series Environmental Sciences, issue 104).
18. Lange G.M. et al. *The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium*. Washington, D.C.: World Bank, 2010. 221 p. Available at: https://siteresources.worldbank.org/ENVIRONMENT/Resources/ChangingWealthNations.pdf
19. Bartelmus P., Stahmer C., van Tongeren J. Integrated environmental and economic accounting: framework for a SNA Satellite System. *Review of Income and Wealth*, 1991, vol. 37, June, pp. 111-148. Available at: http://www.roiw.org/ 1991/111.pdf
20. Daly H.E., Cobb J.B. *For the Common Good: Redirecting the Economy Toward Community, the Environment, and a Sustainable Future*. 2nd edition. Boston: Beacon Press, 1994. 534 p. Available at: http://dlx.b-ok.org/genesis/492000/bf43bf58185d49b784810f6cff75f183/_as/ [Herman_E._Daly,_John_B._Cobb_Jr.]_For_the_Common_(b-ok.org).pdf
21. Hueting R. The future of the environmentally sustainable national income. Ökologisches *Wirtschaften*, 2011, no. 4. Available at: http://www.oekologischeswirtschaften.de/ index.php/oew/article/viewFile/1161/130
22. *Order of the Russian Federal Forestry Agency no. 191 "On Approval of Procedure for calculating felling rate"*, dated 27.05.2011. Available at: http://www.consultant.ru/document/ cons_doc_LAW_116416
23. Sheingauz A.S. Forest management: continuous and proportional or economically preconditioned? *Lesnaya taksatsiya i lesoustroistvo=Forest Taxation and Forest Management*, 2007, no. 1 (37), pp. 157-167. (In Russian).

24. Karakchieva I.V. Forest management issues in Russia – feling rate. *Sovremennye naukoemkie tekhnologii=Modern High Technologies*, 2010, no. 9, pp. 144-147. (In Russian).
25. Sokolov V.A. Osnovy organizatsii ustoichivogo lesopol'zovaniya. *Sibirskii lesnoi zhurnal=Siberian Journal of Forest Science*, 2014, no. 1, pp. 14-24. (In Russian).
26. Bol'shakov N.M., Zhideleva V.V. Difficulties assessing the cost of forest depletion in the system of national accounts. *Rol' gosudarstvennoi statistiki v sovremennom obshchestve: mater. Vseros. nauch.-prakt. Konf* [The role of state statistics in the modern society: proceedings of the all-Russian research-to-practice conference]. Syktyvkar, 2009. Pp. 58-65.
27. Chuprov N.P. K metodike ekonomicheskoi otsenki dostupnosti drevesnykh resursov lesa. *Izvestiya vuzov. Lesnoi zhurnal=Bulletin of higher educational institutions. Forestry Journal*, 2004, no. 6, pp. 103-108. (In Russian).
28. Pochinkov S.V. *Ekonomicheskie osnovy ustoichivogo lesopol'zovaniya: effektivnoe osvoenie i vosproizvodstvo lesnykh resursov* [The economic framework for sustainable forest management: efficient development and reproduction of forest resources]. Sankt-Peterburg: Profiks, 2007. 109 p.
29. Petrov A.P. Economic management of forest utilization in Russia amid market relations. *Vestnik MGUL– Lesnoi Vestnik=Forestry Bulletin*, 2013, no. 4 (96), pp. 42-45. (In Russian).
30. Petrov A.P., Morkovina S.S. Market management of forestry: experience of foreign countries and Russian regions. *Lesotekhnicheskii zhurnal=Forestry Engineering Journal*, 2016, no. 4 (24), pp. 250-258. (In Russian).
31. Moiseev N.A., Moiseeva T.I. The economic mechanism of sustainable forest utilization and management. *Vestnik MGUL– Lesnoi Vestnik=Forestry Bulletin*, 2011, no. 6, pp. 149-155. (In Russian).
32. Moiseev N.A. A crisis of forestry in Russia: origins and possible ways out of it. *Vestnik MGUL– Lesnoi Vestnik=Forestry Bulletin*, 2016, no. 3, pp. 116-125. (In Russian).
33. Yakubov I. Green board. *Rossiiskie lesnye vesti=New about Forestry in Russia*, 2011, no. 12(15), 18th April. (In Russian).
34. Carlsson L., Olsson M.-O., Lundgren N.-G. If money only grew on trees – The Russian forest sector in transition. *The Forestry Chronicle*, 2000, July/August, vol. 76, no. 4, pp. 605-610. Available at: http://www.didaktekon.se/mats/pdf-files/chronicle.pdf
35. Biatov A.P., Ukrainskii P.A., Narozhnyaya A.G. Comparative analysis of landscape segmentation in the Belgorod part of Vorskla and Merla river basins (Kharkiv Oblast, Ukraine). *Nauchnye vedomosti Belgorodskogo gosudarstvennogo universiteta. Seriya: Estestvennye nauki=Belgorod State University Scientific Bulletin. Natural Sciences*, 2014, vol. 26, no. 3 (174), pp. 157-165. (In Russian).
36. Usova I.P. *Otsenka fragmentatsii lesov s ispol'zovaniem landshaftnykh indeksov (na primere vostochno-belorusskoi landshaftnoi provintsii)* [Assessing forest segmentation using landscape indices (case stud of the East-Belgorod province)]. Relevant issues in geobotany. 3rd all-Russian workshop conference. Section 2. Petrozavodsk: Karel'skii NTs RAN. 2007. Pp. 250-253.
37. Vyal'kkyu E., Leinonen T. Forestry rules in Russia and Finland. *Lesprominform*, 2013, no. 1, pp. 66-70. Available at: http://www.lesprominform.ru/jarchive/ articles/itemshow/3001

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Territorial Differentiation and Mechanism for its Reduction

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Abstract. Interterritorial socio-economic differentiation is one of the main internal challenges that hamper sustainable development of Russian regions and impede the transition of the economy to a new techno-economic paradigm. The weakening of economic ties and the uneven distribution of resources have led to an increase not only in interregional, but also in intraregional inequality in the development of territories; this disrupts the cohesion of the common economic space. In this regard, it becomes necessary to substantiate scientifically the mechanism of territorial development regulation that can reduce the scale of intraregional differentiation and overcome its negative implications; this predetermined the goal of our study. We use the data on the Vologda Oblast to systematize and analyze factors that cause intraregional differentiation; we identify the most significant of them, assess the scale and depth of socio-economic differentiation, determine the trends of change in socio-economic development of municipal districts, and substantiate the use of methods that help decrease the inequality of territories. We use analysis, synthesis, comparison, generalization, as well as methodological tools based on economic-statistical and comparative analysis and expert survey, as a methodological basis of

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the study. Scientific novelty of our research findings consists in the fact that they help develop methods to analyze, evaluate and regulate intraregional differentiation. The findings of our study can be used by federal and regional authorities and serve as a basis for further research on this topic to facilitate a more detailed study of a differentiated approach to the implementation of state support measures provided to municipalities with different development levels and capacities.

Key words: intraregional differentiation, municipal entities, socio-economic development, regulation mechanism, Vologda Oblast.

Introduction

Russia, the largest country in the world, is characterized by significant differences in climatic conditions, in the availability and diversity of natural resources and national and cultural composition of its population. At the same time, about 2/3 of the country is located in the climatic zone of the North with unfavorable and severe natural and climatic conditions. Russia has more than 190 peoples and nationalities; they practice all the world religions and have their own historical, cultural, and national traditions and features. These and other factors determine the territorial heterogeneity of the country's economic space. At the same time, in the 1990s, during Russia's transition to a market economy, the role of the state in regulating spatial and territorial development decreased significantly; competition for human resources, investors' funds, federal support and production location increased between Russia's constituent entities and municipal entities in the process of territorial division of labor. As a result, there has been an increase in territorial and especially intraregional differentiation by which we mean the phenomenon caused by a variety of natural-geographical, economic, and political factors and expressed in significant differences between municipalities in the main parameters of socio-economic development. Increased differentiation leads to the weakening of the connectivity of economic space, the loss of control over territories due to the slowdown of development and "extinction" of entire settlements, to the emergence of problem areas that require special support measures (leveling mechanisms), significant differences in the standard of living and quality of life, and migration of residents to more favorable areas.

The relevance of research on territorial differentiation is confirmed by the fact that recently a number of important documents were adopted at the federal level; they should determine the vector of development of Russian regions. A special place among them belongs to the Decree of the President of the Russian Federation # 13 dated January 16, 2017 "On approval of the fundamentals of the state policy for regional development of the Russian Federation for the period up to 2025", which defines the following goals of the state policy: providing equal opportunities for the implementation of economic, political and social rights of citizens of the Russian Federation throughout the country granted by the Constitution of the Russian Federation and federal laws, improving the quality of life, ensuring sustainable economic growth and scientific and technological development in regions, improving the competitiveness of the economy of the Russian Federation in the world markets on the basis of balanced and sustainable socio-economic development of Russia's constituent entities and municipal entities, and full-fledged involvement of people in addressing regional and local issues. The

problems that require special attention and that are identified in the draft strategy for spatial development of the Russian Federation for the period up to 2025 prepared by the Ministry of Economic Development of the Russian Federation in 2018[1] include the necessity to reduce differences in the level of socio-economic development of Russia's constituent entities and municipal entities.

It should be noted that Russian and foreign regional science and practice do not overemphasize the task of equalizing the level of development of territories and reducing differentiation to a certain level. It is of fundamental importance to ensure equal conditions and relatively equal opportunities for the development of territories, to achieve decent social standards and the quality of life. Territorial differentiation issues remain in the focus of attention of foreign scientists [1,2, 3, 4, 5] and Russian researchers [6-18]. These works propose different approaches to the analysis and evaluation of intraregional differentiation, as well as the tools to overcome excessive inequality and its negative implications.

It should be noted that the Russian Federation as a whole has developed a mechanism for regulating and promoting the development of municipalities based on the application of a wide range of methods and tools both within the framework of regional policy and other types of national and local socio-economic policy. However, this mechanism is not fully aimed at addressing the problem of reducing intraregional differentiation and overcoming its negative implications. As a result, despite the efforts that are being made, the rate of reduction of socio-economic inequality remains insufficient, which poses a threat to sustainable development in regions. At the same time, there still remain the issues related to the comprehensive assessment of uneven socio-economic development in municipalities and the rationale for the choice of methods to regulate intraregional differentiation depending on the characteristics of different types of territories and the conditions in which their development is carried out.

Description of the research methodology and substantiation of its choice

The relevance of the issue of socio-economic differentiation of regions and municipalities makes it necessary to study the reasons for this phenomenon. Each territory has a certain set of resources: natural and geographical (natural conditions and resources), labor, economic (production assets and facilities), financial, infrastructure (transport, utilities, industrial and other infrastructure), scientific and innovative (applied technologies, organizations engaged in research and development, innovative infrastructure), management (qualification of management personnel, applied technologies in management), cultural and other resources. Quantitative and qualitative characteristics of resources, the degree of their involvement in reproductive processes, interaction with each other (within the system of the appropriate level and with the environment) not only determine the features of the territory, but also form territorial differentiation factors.

In the course of studying relevant scientific works we have found out that the work of the authors (S.N. Bolshakov, A.G. Granberg [6], A.A. Zhabrev [11], N.V. Zubarevich [7], E.A. Kolomak [8], V.A. Krivoshey, O.V. Kuznetsova [9], E.I. Kulikova, B.L. Lavrovsky [10], N.M. Mezhevich [11], T.G. Morozova, A.O. Polynyov [16], V.A. Sukhanova, E.V. Frolova,

[1] Draft strategy for spatial development of the Russian Federation for the period up to 2025. Ministry of Economic development of the Russian Federation. Available at: http://economy.gov.ru/minec/activity/sections/planning/sd/201817081

M.V. Shmakova, etc.) pay considerable attention to the factors that influence socio-economic development of territories and formation of regional inequality. Many authors focus mainly on the allocation of objective and subjective, internal and external factors, but some works do not classify the factors and only enumerate them.

Having analyzed the works mentioned above, we can say that the range of features is insufficient for assessing comprehensively the effects of the above factors and for using the classification for management purposes. In this regard, we propose the following grounds to classify the factors under consideration: 1) *place of origin*: internal, which arise and exist within Russia's constituent entities, and external, which exist outside the region; 2) *internal content*: economic, which are formed and operate in the processes of economic relations of various entities, and non-economic (natural, demographic, political, etc.), which are formed in the fields that are not directly related to economic development; 3) *possibility of managerial impact*: uncontrollable, which arise without direct dependence on the activities of the authorities, and they cannot have a direct impact on them, and controllable – the authorities of different levels can directly affect their change; 4) *duration of impact*: short-term (impact lasts 1–3 years), medium-term (3–6 years), long-term (more than 6 years); 5) *government levels (depending on the level of authorities that may affect the factor)*: federal, regional, municipal (local); 6) *impact on the development of municipal entities*: direct and indirect; 7) *possibility of forecasting* (predictable, unpredictable). A general representation of differentiation factors is given in *Table 1.*

The classification of factors expands the opportunities for a more in-depth study of the reasons for the changes in the uneven development of regions and for a more accurate assessment of the place and role of each of them in this process. At the same time, the understanding of the features (content, impact, nature, duration, causes and conditions of emergence) of various factors and the mechanism of their influence on the socio-economic development of the territory makes the process of regulation more orderly and systematic. At the same time, the use of different classification features makes it possible to make a more detailed description of each individual factor and to make the choice of methods of influence of the relevant authorities more reasonable. The national government and local governments as subjects of management of social and economic processes at the regional level find the greatest interest in internal factors, the impact on which can help regulate intraregional differentiation.

Recognizing the objective nature of intra-regional differentiation, we find it necessary to carry out its comprehensive assessment in order to study the real state of the processes of development of municipalities in the region, to identify the causes of differences in the level of socio-economic development of territories and to substantiate methods for overcoming excessive inequality and its negative consequences. Having reviewed the works of Russian scientists we find out that there are different approaches to address these problems. For instance, A.G. Granberg [6], A.O. Polynev [16], S.A. Suspitsin [17], and R.M. Mel'nikov [12] assess territorial differentiation on the basis of calculating the indicators of variation of the indicators of socio-economic development provided by official statistics: coefficient of variation, oscillation, magnitude of variation, Theil index, etc. A methodological approach suggested by A.A. Pobedin [15] and A.A. Mitroshin [13]

Table 1. Factors that influence differentiation of development of municipal entities

Factor	According to the place of their emergence	According to their inner content	According to the possibility of management impact	According to the duration of impact	According to the levels of management	According to the nature of impact	According to the possibility of forecasting
Economic and geographical position of municipal entity	In	NE	UC	LT	-	D	UP
Level of accumulated economic potential (natural resource potential, production and technological, etc.) of municipal entity	In	E	UC	LT	-	D	UP
Level of human capital development (abilities, knowledge, skills, health status, migration, mobility and adaptability of the population, monetary incomes of the population, etc.) in municipal entities	In	NE	C	LT	R, M	D	P
Agglomeration processes in the region	In	E	C	LT	R, M	D	P
Degree of development of market infrastructure and institutional environment in the region	In	E	C	LT	R, M	D	UP
Degree of development of production (transport, utilities, innovation, etc.) and social infrastructure in municipal entity	In	NE	C	LT	R, M	D	P
Macroeconomic situation in the world	Ex	E	UC	C	-	ID	P
Macroeconomic situation in the country	Ex	E	UC	C	F	ID	P
Position of the country in the system of world economic relations	Ex	E	UC	LT	F	ID	UP
Position of the country in the system of world political relations	Ex	NE	UC	LT	F	ID	UP
Activities of economic entities in municipal entity	In	E	C	C	R, M	D	P
Spatial and sectoral structure of regional economy	In	E	C	LT	R, M	D	P
Settlement system in the region	In	NE	C	LT	R, M	D	P
“Shadow sector” of regional economy	In	E	C	LT	R, M	ID	UP
Federal regulatory framework	Ex	NE	UC	ST	F	D	UP
Regional regulatory framework	In	NE	C	ST	R	D	UP
Regulatory and legal framework of municipal entities	In	NE	C	ST	M	D	UP
Current mechanism of state regulation of economy	Ex	NE	C	C	F, R	D	UP
System of inter-governmental fiscal relations in the country	Ex	E	C	ST	F	ID	P
System of inter-governmental fiscal relations in the constituent entity of the Russian Federation	In	E	C	ST	R, F	D	P
Socio-economic policy in the constituent entity of the Russian Federation	In	E	C	C	R	D	UP
Socio-economic policy of local self-government bodies	In	E	C	C	M	D	UP
Interaction between public authorities of the constituent entity of the Russian Federation and local authorities (formal and informal relations)	In	NE	C	ST	M, R	ID	UP
Inter-municipal (industrial, cultural, organizational and other) relations	In	NE	C	ST	M	ID	UP
Effectiveness of local self-government bodies	In	NE	C	C	M	ID	UP

Factors in the table are denoted as follows: In – internal, Ex – external; E – economic, NE – non-economic; C – controlled, UC – uncontrolled; ST – short-term, MT – medium-term, LT – long-term; F –Federal, R – regional, M – municipal (local); D – direct, ID – indirect; P– predictable, UP – unpredictable

is based on the assessment of intraregional inequality not only with the use of variation indicators, but also with the application of a comprehensive assessment of differences between municipalities in terms of the level of development based on the calculation of the integral indicator and the typology of territories. A.E. Chepik [18] uses indicators of structural changes to analyze uneven development of municipalities, carries out their multidimensional classification and assesses the impact of economic reproduction factors on uneven development of municipalities.

It should be noted that some methods contain complex calculations and use an excessively large number of indicators, some of which are absent in official statistics. Main features of the methodological approach to

Table 2. Algorithm for analyzing intraregional differentiation

Stage	Content and results
Preliminary	Selecting the indicators available in official statistical information and characterizing various aspects of socio-economic development of municipalities for the formation of the information base of the study
First	In order to assess the depth, scale and trends of differentiation, the dynamics of the indicators of variation selected for the analysis is calculated: 1) average value of the indicator; 2) scale of variation; 3) standard deviation; 4) coefficient of the range of variation (ratio between the maximum and minimum values of the indicator); 5) coefficient of variation; 6) Theil index of entropy; 7) share of the territory in the total value of the coefficient of variation, etc.
Second	In order to identify groups (types) of territories with similar parameters and features of socio-economic development, the level of socio-economic development of municipalities is assessed, the sequence of this assessment consists of the following actions: 1) Formation of the list (18 indicators) and blocks of indicators ("Demography", "Improvement"; "Standard of living", "Economy") that reflect the various aspects of development of territories [19; 20]. 2) Standardization of indicators relative to regional averages (by region): $k_i = x_i/x_{cpi}$ (1) $k_i = x_{cpi}/x_i$, (2) where k_i – a standardized coefficient, which is calculated according to formula 1 for the direct indicators, and according to formula 2 for reverse indicators; x_i –the value of the i-th indicator in the municipal entity; x_{avi} – average value of the i-th indicator for all municipal districts and urban districts of the region or for districts only. 3) Calculation of an aggregate indicator for each of the blocks (R_j) according to the formula: $R_j = (\sum_{i=1}^{n} k_i)/n$, (3) where n – number of indicators in the block; 4) Calculation of the integral indicator of the level of socio-economic development of the municipal entity ($I_{cap}j$): $I_{sed}j = (R1 + R2 + R3 + R4)/4$, (4) where R1, R2, R3, R4 – aggregate indicators of the corresponding blocks. 5) Grouping of municipalities by level of development based on the values of the integral indicator: high – $I_{sed}j$ over 1.1; average – $I_{sed}j$ from 0.9 to 1.1; low level – $I_{sed}j$ lower than 0.9.
Third	In order to identify differentiation factors and determine the priority areas of development of municipalities so that the government could implement regulatory measures, the analysis of trends and factors in intraregional differentiation is carried out. First, we analyze the possibility of reducing inequality (when testing the β-convergence concept) both with the help of existing objective processes and due to the action of various government regulation factors (the volume of financial support provided to municipalities from the budget of the RF subject, the volume of budget investments, etc.). Second, the relationships between the statistical indicators characterizing the scale and scope of intraregional differences (ratio between the maximum and minimum values of the indicator), and indicators reflecting the consequences of differentiation (mortality, migration outflow, population decline, etc.) are analyzed. The factors are also identified on the basis of expert assessments in the framework of a questionnaire survey of the heads of municipalities.

the assessment of intraregional differentiation proposed in this study are as follows: complex nature, universality and simplicity of calculations, and the use of expert assessments in addition to statistical data. On the basis of this approach it becomes possible to solve a set of interrelated tasks using the data of state statistics and expert assessments. The universal nature of the proposed approach makes it possible to use it in any constituent entity of the Russian Federation and apply it to any type of territories. The algorithm for analysis is presented in *Table 2*.

Research results, analysis and explanation of the results

As of the end of 2016, there were 218 municipalities in the Vologda Oblast, including two urban districts (Vologda and Cherepovets), 26 municipal districts, 22 urban settlements and 168 rural settlements. The general picture of development of municipal districts and urban districts for 1990–2016 is presented by the dynamics of key indicators of their socio-economic development *(Tab. 3)*.

According to Table 3, the development of the region's territories during the period under consideration was characterized by multidirectional trends: there was an increase in industrial production in some districts (in Kaduysky District – also an increase in investment), but most districts faced a decrease in the values of all presented indicators. In 2016 compared to 2000, the population in all districts of the Oblast was below the level of 2000; it declined more than 1.5-fold in 11 districts (Babushkinsky, Belozersky, Vashkinsky, Vytegorsky, Kichmengsko-Gorodetsky, Mezhdurechensky, Nikolsky, Nyuksensky,

Table 3. Dynamics of the main economic indicators in the districts and urban districts of the Vologda Oblast, times

District (urban district)	P	IP	AP	I	District (urban district)	P	IP	AP	I
	2016 to 1990	2015 to 1990	2016 to 1996	2013 to 1990		2016 to 1990	2015 to 1990	2016 to 1996	2013 to 1990
Babaevsky	↓1.45	↓3.8	↓3.9	↓5.5	Nyuksensky	↓1.58	↑1.7	↓3.2	↓11.8
Babushkinsky	↓1.50	↓4.6	↓3.7	↓26.5	Sokolsky	↓1.32	↓1.5	↓1.5	↓2.6
Belozersky	↓1.63	↑1.6	↓2.5	↓3.0	Syamzhensky	↓1.51	↓2.8	↓3.8	↓2.8
Vashkinsky	↓1.73	↑1.6	↓2.6	↓9.8	Tarnogsky	↓1.55	↑2.4	↓1.9	↓5.6
Velikoustyugsky	↓1.36	↓1.5	↓2.4	↓4.7	Totemsky	↓1.22	↓1.6	↓1.2	↓8.7
Verkhovazhsky	↓1.41	↓2.1	↓2.5	↓6.9	Ust-Kubinsky	↓1.42	↓5.9	↓2.3	↓2.4
Vozhegodsky	↓1.49	↓1.8	↓2.1	↓32.2	Ustyuzhensky	↓1.35	↓2.9	↑1.1	↓5.8
Vologodsky	↓1.10	↑2.2	↑1.2	↓7.1	Kharovsky	↓1.74	↓1.6	↓2.3	↓1.3
Vytegorsky	↓1.53	↑3.7	↓3.3	↓2.4	Chagodoshchensky	↓1.45	↓1.04	↓2.1	↓1.4
Gryazovetsky	↓1.40	↓2.0	↑1.1	↓1.8	Cherepovetsky	↓1.22	↑1.4	↓1.2	↓5.8
Kaduysky	↓1.18	↑2.8	↓2.0	↑7.0	Sheksninsky	↓1.03	↓1.7	↓1.1	↓5.0
Kirillovsky	↓1.44	↓6.7	↓1.2	↓4.1	City of Vologda	↑1.08	↑1.8	-	↓1.2
Kichmengsko-Gorodetsky	↓1.62	↓7.0	↓2.6	↓23.6	City of Cherepovets	↑1.01	↓1.1	-	↓1.3
Mezhdurechensky	↓1.68	↑1.2	↓1.6	↓18.5	*Vologda Oblast*	↓1.15	↑1.2	↓1.2	↓1.03
Nikolsky	↓1.54	↑1.1	↓2.2	↓5.7					

Legend: ↑ – indicator growth; ↓ – indicator decline; P – resident population at the end of the year; IP – physical volume of industrial production; AP – physical volume of agricultural production; I – physical volume of investment in fixed assets.
Note: due to the lack of statistical information on individual indicators and its non-comparability in individual years, the calculations are presented for different time periods.
Source: here and in Tables 4 and 5, calculated with the use of: *Municipal districts and urban districts of the Vologda Oblast. Socio-economic indicators 2000–2016: statistics collection*. Vologdastat. Vologda, 2017. 293 p.; *Districts of the Vologda Oblast in 1990–1999: statistics collection*. Vologdastat. Vologda, 2001. 384 p.

Syamzhensky, Tarnogsky, Kharovsky). In many ways, these facts determined the aggravation of differences between municipalities in key parameters of socio-economic development *(Tab. 4)*.

The greatest differences between districts of the Vologda Oblast are observed in the volume of production (shipment) of industrial products per inhabitant. Differentiation of districts in terms of agricultural output has increased almost twice as compared to 1996. The differences between districts of the Oblast in the size of average monthly wage in 2016 reached two times, having decreased compared to the level of 2005 (2.8 times). There still remain noticeable differences in the number of doctors (2.7–3.0 times). On the basis of the analysis it can be concluded that intraregional differentiation has increased in the period under consideration, reaching critical values in some cases.

In the course of studying the trends in intraregional differentiation we reveal that some municipalities in the region have similar characteristics, trends and features of development. This can become the basis for the allocation of groups of districts, for each of which specific priorities and tools for implementation of regional and local socio-economic policy can be defined. Based on the provisions of the methodological approach outlined above, we grouped municipal districts of the Vologda Oblast according to the level of socio-economic development, which confirms the existence of significant intraregional differentiation *(Tab. 5)*. At the same time during the period under consideration the level of development of most districts of the Oblast has not changed significantly, almost half of the districts belong to the group with a low level of development. The results of the grouping of municipalities of the Oblast

Table 4. Indicators of variation of the main parameters of socio-economic development in municipal districts of the Vologda Oblast

Indicator	Type of variation indicator	Year						
		1990	1995	2000	2005	2010	2015	2016
Industrial output per inhabitant	Max/min, times	16.2	368.7	100.4	69.1	507.5	29.3[1]	33.5[1]
	CVariation, %	59.9	143.1	188.7	120.9	140.4	78.6[1]	97.8[1]
Agricultural output per inhabitant	Max/min, times	-	10.1[2]	9.2	18.1	19.8	18.1	19.8
	CVariation, %	-	56.4[2]	56.0	71.6	68.5	63.3	66.0
Investments in fixed capital per inhabitant	Max/min, times	7.1	7.3	7.8	40.9	50.4	52.1[3]	13.0[3]
	CVariation, %	31.0	60.8	70.1	163.9	99.3	112.4[3]	78.4[3]
Average monthly nominal accrued wage	Max/min, times	1.3	2.2	2.2	1.6	1.6	1.8	2.0
	CVariation, %	6.5	17.4	18.8	15.3	14.1	15.5	16.2
Retail turnover per inhabitant	Max/min, times	1.3	3.1	2.3	2.8	1.8	2.1	2.0
	CVariation, %	5.9	29.3	22.7	28.7	15.6	16.7	16.6
Number of doctors per 10,000 population	Max/min, times	2.3	2.7	3.0	3.5	3.0	2.5	2.7
	CVariation, %	20.9	26.2	25.7	25.8	25.1	22.2	23.5

Notes:
Max/min – ratio between the maximum and minimum values of the indicator for the districts of the Oblast; CVariation – coefficient of variation of the values of the indicator among the districts of the Oblast.
[1] Data on the volume of industrial production were not available in the official statistical reports for 2015–2016; so for this year we present the data on the volume of shipment of goods of own production, work performed and services rendered (excluding the volume of production of small business entities).
[2] Data for 1996.
[3] Excluding small business entities.

Table 5. Classification of municipal districts of the Vologda Oblast according to the level of socio-economic development at the end of 2000 and 2016

Level	2000	2016
High	1. Kaduysky (1.655), 2. Vologodsky (1.405), 3. Cherepovetsky (1.354), 4. Sokolsky (1.265), 5. Sheksninsky (1.222), 6. Chagodoschensky (1.202), 7. Gryazovetsky (1.149), 8. Velikoustyugsky (1.141)	1. Sheksninsky (1.385), 2. Vologodsky (1.370), 3. Gryazovetsky (1.363), 4. Sokolsky (1.237), 5. Kaduysky (1.226), 6. Totemsky (1.114), 7. Velikoustyugsky (1.110)
Average	9. Totemsky (1.036), 10. Vytegorsky (0.957), 11. Vashkinsky (0.937), 12. Babaevsky (0.930), 13. Nyuksensky (0.928)	8. Nyuksensky (1.085), 9. Chagodoschensky (1062), 10. Tarnogsky (1041), 11. Mezhdurechensky (1008), 12. Belozersky (1007), 13. Cherepovetsky (0.990), 14. Kharovsky (0.954), 15. Kirillovsky (0.949)
Low	14. Kharovsky (0.895), 15. Belozersky (0.878), 16. Kirillovsky (0.872), 17. Tarnogsky (0.861), 18. Ustyuzhensky (0.857), 19. Mezhdurechensky (0.840), 20. Vozhegodsky (0.818), 21. Ust-Kubinsky (0.813), 22. Verkhovazhsky (0.766), 23. Babushkinsky (0.756), 24. Syamzhensky (0.755), 25. Kichmengsko-Gorodetsky (0.709), 26. Nikolsky (0.693)	16. Verkhovazhsky (0.875), 17. Ustyuzhensky (0.869), 18. Babaevsky (0.867), 19. Syamzhensky (0.835), 20. Vytegorsky (0.831), 21. Vozhegodsky (0.805), 22. Ust-Kubinsky (0.791), 23. Vashkinsky (0.783), 24. Nikolsky (0.743), 25. Babushkinsky (0.731), 26. Kichmengsko-Gorodetsky (0.717)
Note: the value of the integral indicator of the level of socio-economic development is given in brackets next to each district of the Oblast.		

allow us to conclude that the level of socio-economic development and the quality of life above average is typical for the territories adjacent to the urban districts of Vologda and Cherepovets. The development of these territories shows positive trends; a significant proportion of the total volume of production and investment is concentrated there, as well as the migration inflow of the population. Most of the peripheral districts of the Oblast (except for Velikoustyugsky District) are characterized by a low level of development and low investment attractiveness, which hampers development prospects and leads to migration outflow to the cities and more favorable districts.

In the course of our research we have found out that the main factors shaping intraregional differentiation are as follows: economic and geographical position (including the remoteness of the district from major cities), socio-economic potential of the municipality, spatial and sectoral structure of the economy, level of development of production and social infrastructure, level of human capital development, flaws in the federal and regional regulatory and legal framework, insufficient capacity of local government bodies in addressing current problems and managing the development of the municipality, low efficiency of territorial development management and interaction between public authorities and local government bodies. As for intraregional differentiation factors, special attention was paid to such factors as socio-economic policy of the subject of the Federation and the interaction between the public authorities of a constituent entity of Russia and local authorities. RAS Vologda Research Center conducts annual surveys of heads of municipalities of the Vologda Oblast[2]; the results of the surveys show that local governments cannot address territorial socio-economic development issues effectively due to the following barriers: lack of financial resources (lack of own revenue sources, lack

[2] In order to study the problems and prospects of local self-government reform, since 2007, Vologda Research Center of the Russian Academy of Sciences (VolRC RAS, previously – ISEDT RAS) conducts a questionnaire survey of heads of municipal entities of the Vologda Oblast. Annually, 160–210 heads of municipal entities out of 218–372 fill in the questionnaires (30–40 questions), which allows for the sampling error of 4–5%. The heads assess the results of the past calendar year: for example, they assess the results of 2017 in the 2017 survey.

Table 6. Distribution of answers to the question "How do you assess the work of regional authorities aimed at supporting municipalities in the year...?" (% of respondents)

Answer	Municipal entities								
	municipal districts			*urban settlements*			*rural settlements*		
	2009	2015	2016	2009	2015	2016	2009	2015	2016
No assistance was provided	3.8	0.0	0.0	18.2	11.1	0.0	12.0	14.6	19.8
In general, the assistance was ineffective (the developed measures are difficult to implement, and they did not help improve the situation)	19.2	5.9	16.7	27.3	0.0	0.0	21.5	26.8	14.3
Changes have occurred, but they are insignificant	38.5	47.1	55.6	27.3	55.6	21.4	36.1	31.7	38.5
The actions taken have improved the situation	23.1	29.4	22.2	18.2	33.3	57.1	12.0	8.5	14.3
It is difficult to answer	15.4	17.6	5.6	9.1	0.0	21.4	18.4	18.3	13.2
Source: Database of the monitoring of the conditions of reforming local self-government in the Vologda Oblast. VolRC RAS (formerly – ISEDT RAS). Vologda, 2007–2017.									

of financial support from the state); flaws in the legislation concerning the functioning and development of municipal authorities; passivity of local population and lack of mechanisms for accounting balances of business, government and population in the development of territories; lack of effective interaction with public authorities (dependence on regional governments, red tape, lack of consistency of policy documents aimed at the development of the territory); limited powers in the field of economic development of the municipality. We should note that the list of key problems in the development of municipalities of the region throughout the study period remains constant throughout all the eleven surveys of heads of municipalities [20; 21].

Most of the heads of municipalities of the Vologda Oblast do not note any significant changes in the development of municipalities as a result of the implementation of regional policy by the regional authorities *(Tab. 6)*, while almost 20% of the heads of rural settlements pointed out that either there is no assistance from the regional authorities or their actions are ineffective.

Thus, the results of the analysis indicate the need to adjust regional and local socio-economic policy taking into account the factors stated above in order to create conditions for reducing inter-municipal inequality and eliminate its main negative consequences.

In order to find a solution to the problems connected with the aggravation of intraregional differentiation it is necessary to reconsider the approaches to the regulation of the process under consideration from the standpoint of main provisions of the Decree of the President of the Russian Federation dated January 16, 2017 No. 13 "On approving the fundamentals of state policy for regional development of the Russian Federation for the period till 2025". The principles that reveal the content of state policy for regional development contain a differentiated approach to the provision of state support to regions and municipalities depending on their socio-economic and geographical features. We believe that this very principle together with the principles of purposefulness, consistency, taking into account development specifics of the municipality, coherence of interests, self-development and self-government, adaptation and balance should form the basis for a scientific and methodological approach to the regulation of intraregional differentiation.

Table 7. Objectives and main activities for the regulation of intraregional differentiation

Objective	Activities
1. Reducing the lag between "problem" and developed municipalities on the main parameters of social and infrastructure development	Developing and promoting investment projects aimed at the creation or reconstruction of industrial, transport and social infrastructure; providing active support to business structures involved in the implementation of projects in the "problem" districts
2. Creating the incentives to enhance the development of all municipalities in the region (ensuring their self-development through the fullest use of existing potential)	Development of clusters (forest, tourism, agriculture), territories of advanced development, zones of territorial development; promotion of development institutions (PPP, MPP); stimulation of the functioning of small and medium-sized businesses, activities to consolidate personnel, attracting domestic and foreign investors. This will contribute to the opening of new and expansion of existing industries, which will improve the standard of living and quality of life, and the replenishment of the local budget.
3. Coordinating the interests and effective interaction (cooperation) of public authorities and local self-government	Implementation of activities related to the delimitation of powers, responsibilities and property between the state authorities and municipalities; providing support to projects in the field of inter-municipal cooperation; active development of organizational forms of interaction between the authorities (coordination councils, administrative districts, etc.).
4. Increasing the role of the institution of local self-government in addressing the issues related to the development of municipalities	Improving various forms of self-organization of the population and its participation in management at the local level (territorial public self-government, self-taxation of citizens, projects of local initiatives, funds of local communities); providing financial and organizational support to the specified institutions on the part of public authorities and local governments; studying and disseminating the experience of the best practices of municipal management

Public authorities of constituent entities of the Russian Federation and local governments are the subjects of regulation of intraregional differentiation. Regional authorities (departments for strategic planning, economic development, and finance) play the key role; they develop main directions of spatial development of the region taking into account socio-economic features of municipalities and implement activities in accordance with the defined goals and objectives.

The practice of the last decades has shown a significant impact of the so-called actors of influence (regional development institutions, business communities and the population) on the decision-making process of legislative and executive authorities. The object of regulation is the processes of socio-economic development in municipalities, and their distinctive feature lies in their significant differentiation.

The effectiveness and efficiency of regulation is largely determined by the choice and substantiation of the main goals and objectives in accordance with which the process of development of municipalities is carried out. It is important to take into account the interests of all stakeholders and the barriers that affect the process of regulation. The goal of regulating intraregional differentiation is to create conditions for reducing differentiation and overcoming its negative effects. In order to achieve this goal it is necessary to solve a number of interrelated tasks and implement relevant activities *(Tab. 7)*.

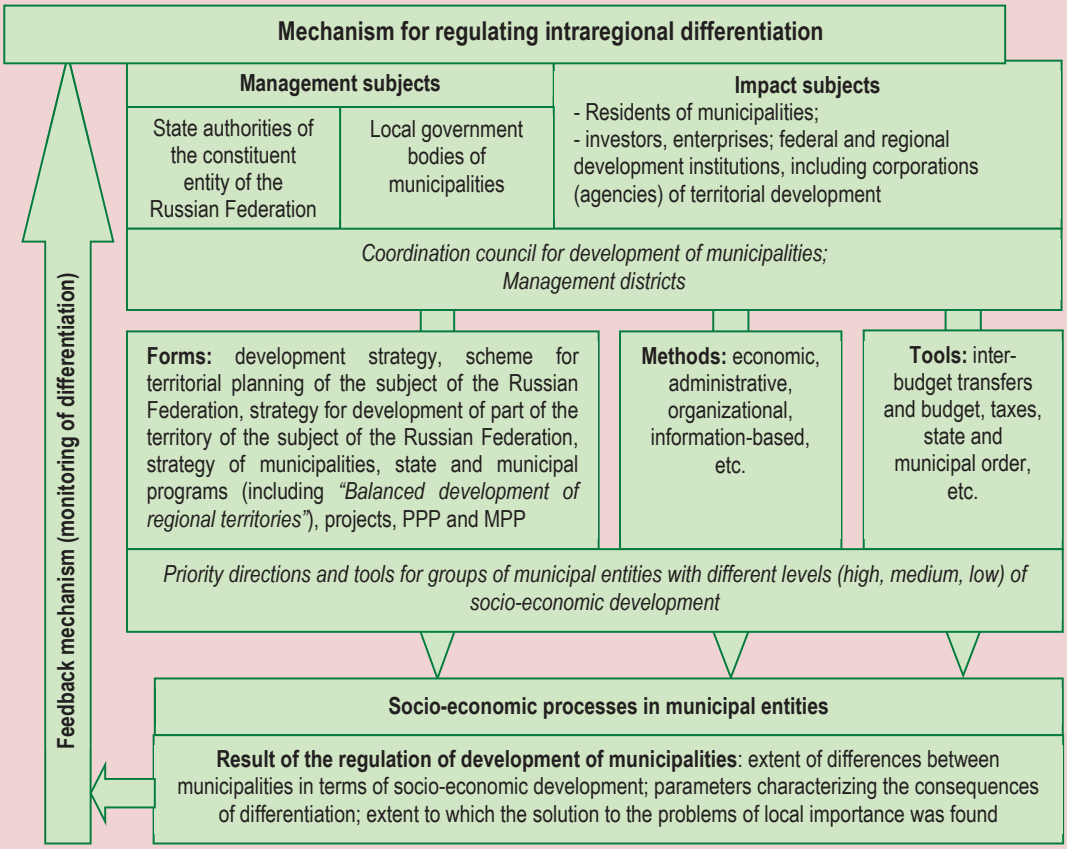
If these tasks and activities are implemented, it will create opportunities for an optimal combination of alignment and stimulation of development of municipal entities and enhance the role of the institute of local self-government.

The complexity and interdependence of the tasks, a special nature of the relationship between the subjects of management, and the continuously changing external environment impose certain requirements on the mechanism of regulation of intraregional differentiation, which is defined as a set of forms, methods and tools by which state and regional authorities and local governments affect the processes of socio-economic development of municipalities. The main requirements of this mechanism are

as follows: flexibility and ability to respond to various changes (environment, goals and objectives), presence of feedbacks, provision of balanced development of economic and social spheres of territories, creation of conditions for the interaction of regional and local authorities, efficiency and effectiveness. We think that in order to regulate intraregional differentiation it is necessary to form a special mechanism, the general scheme of which is shown in *Figure 1*.

Within the framework of the mechanism under consideration, it is planned to implement a differentiated approach to municipalities with different levels of socio-economic development, which will make it possible to determine the priority directions and tools of regulatory impact for each group of districts. Thus, for districts with a high level of development it is important to create incentives for self-development of territories and formation of "growth points" of regional importance (including the generation and dissemination of innovations), etc. In districts with an average level of development it is necessary to create conditions for diversification of their economies and use of available development reserves that have not been utilized before. For the most problematic territories, first of all, it is necessary to ensure the guaranteed provision of the necessary minimum of infrastructure and social services for the population (including

Figure 1. Mechanism for regulating intraregional differentiation*



Elements of the management mechanism that are not currently in use are given in *italics*.

the development of road and transport infrastructure); it is also necessary to preserve and develop existing production facilities and create opportunities for the opening of new enterprises with more efficient use of all available development resources.

One of the ways to synchronize the actions of state and municipal authorities is to create special territorial areas (administrative districts) within the boundaries of the region, which represent a special form of interaction between state authorities of the constituent entity of the Russian Federation and local self-government bodies. We can define the following criteria for the allocation of administrative districts: common borders of municipal districts/urban districts); similar specialization of the economy in the districts/urban districts; transport and geographical connectivity of the districts – the distance from the administrative center of the district to the administrative centers of the district's areas should not exceed 200 km, and, in addition, there should be constant transport links along the closest routes; similar trends in the socio-economic development of the districts. It is proposed to form six administrative districts on the territory of the Vologda Oblast: Western, Northwestern, Vologodsky, Cherepovetsky, Northern, and Eastern [22].

For ensuring effective interaction between the participants of the process of regulation of intraregional differentiation we find it expedient to create a coordination council on development of municipalities – an advisory and coordinating body (that would not be an independent legal entity) under the supreme executive body of the state authority of the constituent entity of the Russian Federation. This will ensure a comprehensive and system-wide implementation of regional policy aimed at the development of municipalities. The council will include representatives of the legislative and executive authorities of the constituent entity of the Russian Federation, local authorities, representatives of academia and non-governmental organizations.

The efficiency of management of territorial development should be improved by establishing a municipal-territorial structure that would suit modern conditions and features of development of municipalities. The municipal-territorial structure is the division of the territory of the region (constituent entity of Russia) into municipalities (or other administrative-territorial units that are the object of management at the local level), and it includes procedures for the transformation of municipalities (association, division, change of their status).

In order to implement projects aimed at the development of municipalities in the region for the purpose of reducing intraregional differentiation, we find it advisable to develop and adopt a special state program "Balanced development of the region's territories" in the constituent entity of Russia. A distinctive feature of this program, which can take its place among other state programs of the constituent entity of Russia, consists in the fact that it will help combine activities related to the promotion of development of municipalities and improve the efficiency of management at the local level. Within the framework of this program, funding will be granted to 1) priority projects in municipalities aimed at reducing differences in the development of municipalities (primarily infrastructure and social sphere), 2) measures to support local self-government (local initiatives, territorial public self-government, etc.), 3) measures for training and retraining of personnel for local self-government. A separate subprogram is envisaged for each of these three areas.

There exist the following sources of funding for activities and projects: 1) federal funds (participation in federal programs); 2) funds of the budget of a constituent entity of the Russian Federation; 3) local budgets; 4) off-budget sources (funds of the business in the implementation of joint investment projects in the framework of public-private and municipal-private partnership; funds of the population). We propose the following proportions between these sources for the whole program: 10%, 50%, 20% and 20%, respectively. The proportions of distribution of funds between subprograms should be established as follows: 70% – for the first subprogram; 15% – for the second subprogram; 15% – for the third subprogram.

Under the *subprogram "Enhancing socio-economic development in municipalities",* two types of subsidies will be provided. The first type is priority support for investment and social projects in municipal districts (urban districts), where the value of the integrated development index ($I_{sed}j$) defined in accordance with the above methodology is less than 1. The amount of support for the j-th municipality (C_j) is determined according to the formula

$$C_j = A \cdot \frac{1 - I_{sed}\, j}{\sum_{j=1}^{m} (1 - I_{sed}\, j)}, \qquad (5)$$

where A is the total amount of support for projects for a year in the framework of this subsidy in accordance with subprogram 1; $I_{sed}j$ is the value of the index of socio-economic development of the j-th district (urban district); m is the number of municipalities with an index value of less than 1.

The implemented project(s) should be aimed at achieving the specific goal and objectives of the municipality and should have a measurable result, expressed in increasing the provision of certain services, infrastructure, etc. Any municipality should have the right to receive the second type of subsidy on a competitive basis. The criteria for the selection of projects for subsidies under subprogram 1 can be as follows: proportion of extra-budgetary sources in the co-financing of the project; proportion of the population of the municipality for which the implementation of this project is relevant; payback period of the project; compliance of the task in the implementation of the project with the goals and objectives of socio-economic development of the constituent entity of the Russian Federation; availability of developed design and estimate documentation of the project; level of co-financing of the project from local budgets, etc.

In order to implement the subprogram "*Support and development of local self-government in the subject of the Russian Federation",* municipalities will receive inter-budget transfers aimed at co-financing territorial public self-government projects, projects for self-taxation of citizens, support of local initiatives, etc. The subprogram "*Development of personnel potential of local self-government bodies of a constituent entity of the Russian Federation"* will require funding for training and retraining of employees of local self-government bodies, for the implementation of various personnel projects and projects to stimulate municipalities and their heads to improve the efficiency of municipal administration.

In addition, one of the prerequisites for solving the problems of intraregional differentiation should consist in the development of the institution of local self-government (provision of support to territorial public self-government, self-taxation of citizens, community funds, projects to support local initiatives, etc.). To achieve this goal, the "Public dialogue platform" project is proposed,

which makes it possible to discuss problems related to the development the municipality, ideas, projects and activities via a special Internet portal, as well as to unite the resources of the population, business and government for the implementation of these projects.

Thus, the contribution of our study to the development of theoretical science consists in the fact that it systematizes the factors that cause intraregional differentiation and substantiates the mechanism of its regulation. Our study contributes to the development of applied science by improving the methodological tools for comprehensive assessment of the differentiation and typology of territories for administration purposes, and by providing specific recommendations for improving regional socio-economic policy in order to reduce territorial inequality and overcome its negative implications.

References

1. *Priorities for 2014-2020.* European Commission. Available at: http://ec.europa.eu/regional_policy/en/policy/how/priorities
2. *Territorial Agenda of the European Union 2020. Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions*. Available at: http://ec.europa.eu/regional_policy/sources/policy/what/territorial-cohesion/territorial_agenda_2020.pdf
3. Kutscherauer A. et al. *Regional Disparities in Regional Development of the Czech Republic: Their Occurrence, Identification and Elimination*. Ostrava: VŠB-Technical University of Ostrava, 2010. 120 p.
4. Naschold F., Bogumil J. *Modernisierung des Staates: new public management in deutscher und internationaler Perspektive*. Wiesbaden: Springer Fachmedien GmbH, 2000. 250 p.
5. Porter M.E. *Regions and the New Economics of Competition: Global City-Regions: Trends, Theory, Policy*. Oxford: Oxford University Press, 2001.
6. Granberg A.G. *Osnovy regional'noi ekonomiki: uchebnik dlya vuzov. 3-e izd*. [Fundamentals of Regional Economics: Textbook for Universities. Third edition]. Moscow: GU VShE, 2003. 495 p.
7. Zubarevich N.V. *Regiony Rossii: neravenstvo, krizis, modernizatsiya* [Regions of Russia: Inequality, Crisis, Modernization]. Moscow: Nezavisimyi institut sotsial'noi politiki, 2010. 160 p.
8. Kolomak E.A. Interregional disparities in Russia: economic and social aspects. *Prostranstvennaya ekonomika=Spatial Economics,* 2010, no. 1, pp. 26-35. (In Russian).
9. Kuznetsova O.V. Typology of factors governing the social-economic development of Russian regions. *Vestnik Moskovskogo universiteta. Seriya 5: Geografiya=Moscow University Bulletin. Series 5. Geography*, 2014, no. 2, pp. 3-8. (In Russian).
10. Lavrovskii B.L. Territorial differentiation and approaches to its reduction in the Russian Federation. *Ekonomicheskii zhurnal Vysshei shkoly ekonomiki=Higher School of Economics Economic Journal,* 2003, vol. 7, no. 4, pp. 524-537. (In Russian).
11. Mezhevich N.M., Zhabrev A.A. Regional differentiation – a factor in socio-economic development of regions. *Ekonomika i upravlenie=Economics and Management,* 2011, no. 5 (67), pp. 159-158. (In Russian).
12. Mel'nikov R.M. *Problemy teorii i praktiki gosudarstvennogo regulirovaniya ekonomicheskogo razvitiya regionov: monografiya* [Problems of Theory and Practice of State Regulation of Economic Development of Regions: Monograph]. Moscow: Izd-vo RAGS, 2006. 199 p.
13. Mitroshin A.A. *Metody otsenki kachestva zhizni naseleniya i sotsial'no-ekonomicheskoi differentsiatsii territorii (na primere Moskovskoi oblasti): avtoref. dis. na soisk. uch. st. k.e.n.: 08.00.05* [Methods for Assessing the Quality of Life and Socio-Economic Differentiation of Territories (Case Study of the Moscow Oblast: Candidate of Sciences (Economics) Dissertation Abstract]. Moscow, 2013. 23 p.

14. Oreshin V.P., Fetisov G.G. *Regional'naya ekonomika i upravlenie: uchebnik* [Regional Economics and Management: Textbook]. Moscow: INFRA-M, 2006. 416 p.

15. Pobedin A.A. *Politika regulirovaniya vnutriregional'noi differentsiatsii sotsial'no-ekonomicheskogo razvitiya (na primere Sverdlovskoi oblasti): avtoref. dis. na soisk. uch. st. kand. ekon. nauk: 08.00.05* [Policy for the Regulation of Intraregional Differentiation in Socio-Economic Development (Case Study of the Sverdlovsk Oblast): Candidate of Sciences (Economics) Dissertation Abstract]. Yekaterinburg, 2008. 24 p.

16. Polynev A.O. *Mezhregional'naya ekonomicheskaya differentsiatsiya: metodologiya analiza i gosudarstvennogo regulirovaniya. 2-e izd.* [Interregional Economic Differentiation: Methodology for Analysis and State Regulation]. Moscow: Editorial URSS, 2011. 208 p.

17. Suspitsyn S.A. (Ed.). *Proekt SIRENA: metody izmereniya i otsenki regional'noi asimmetrii* [SIRENA Project: Methods for Measurement and Evaluation of Regional Asymmetries]. Novosibirsk: IEiOPP SO RAN, 2002. 248 p.

18. Chepik A.E. *Statisticheskoe issledovanie neravnomernosti sotsial'no-ekonomicheskogo razvitiya munitsipal'nykh obrazovanii regiona : avtoref. dis. na soisk. uch. st. kand. ekon. nauk: 08.00.12* [Statistical research into uneven socio-economic development of region's municipal units: Candidate of Sciences (Economics) dissertation abstract: 08.00.12]. Moscow, 2015. 23 p.

19. Voroshilov N.V., Gubanova E.S. Assessment of the level of socio-economic development in municipal formations of the Vologda Oblast. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2014, no. 6 (36), pp. 54-69. DOI: 10.15838/esc/2014.6.36.5. (In Russian).

20. Uskova T.V., Voroshilov N.V., Gutnikova E.A., Kozhevnikov S.A. *Sotsial'no-ekonomicheskie problemy lokal'nykh territorii: monografiya* [Socio-Economic Issues of Local Territories: Monograph]. Vologda: ISERT RAN, 2013. 196 p.

21. Bukhval'd E.M., Voroshilov N.V. Current issues in the development of municipal entities and in reforming the institution of local self-government. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast,* 2018, vol. 11, no. 1, pp. 132-147. DOI: 10.15838/esc.2018.1.55.9. (In Russian).

22. Voroshilov N.V. Assessing the efficiency of regional policy for development of municipal entities. *Vestnik Cherepovetskogo gosudarstvennogo universiteta=Cherepovets State University Bulletin*, 2014, no. 7 (60), pp. 54-59. (In Russian).

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Development Scenarios for Russia's Dairy Industry

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Abstract. Innovative modernization of Russia's dairy industry is a key factor in ensuring the country's food and environmental security in the context of increasing export orientation. The goal of our research is to substantiate the concept for development of the dairy industry in Russia and to develop forecast scenarios for its functioning based on the introduction of the best available technologies. The paper reveals specific features of functioning of the industry and the contradictions they cause. We conclude that effective development of the industry is possible only under balanced state policy that takes into account international experience and the challenges that the industry has to deal with. We analyze the use of the best available technologies in the dairy industry in Russia and propose a model for development of the concept of the dairy industry on the basis of the best available technologies. Our scenarios for development of Russia's dairy industry are of practical interest, as well as our conclusion that the state policy for the development of this industry should be based on an innovative scenario involving its system modernization, which will help ensure food and environmental security of the country and promote dairy products exports. We note that the development and implementation of the best available technologies at enterprises of the dairy industry with the use of foreign experience and tools of state regulation can serve as a response to the system-wide and rapid transformations that are taking place in the industry at the present time. The material of the paper can be used in the educational process in universities; it is relevant for managers and specialists of the dairy industry and for scientists involved in its development through the use of the best available technologies.

Key words: dairy industry, best available technologies, state policy.

Introduction. Socio-economic changes taking place in Russia in the late 20th – early 21st century and caused by globalization make it necessary to revise the approaches to the management of the dairy industry[1] as part of the agro-industrial complex of the country. Thus, it is appropriate to consider this industry on the basis of a functional approach with elements of a system approach that combines demographic, environmental, economic and institutional aspects [1]. In accordance with the decree of the President of the Russian Federation "On national goals and strategic objectives for development of the Russian Federation until 2024" dated May 7, 2018 No. 204, in order to implement scientific and technological breakthrough in the agro-industrial complex it is necessary to create a high-performance export-oriented sector that would be developing on the basis of modern technologies. According to the Concept for long-term socio-economic development of the Russian Federation for the period up to 2020, technological changes are among the main factors that determine strategic development of the economy. In European practice, ecological and environmental permits are among the key instruments that help reduce the negative impact of industry on the environment, promote compliance of industrial enterprises with environmental requirements and facilitate technological innovation [22]. The principle of BAT (best available technologies) was introduced into international practice[2]

[1] Dairy industry is a food processing sector that combines companies producing different dairy products. In our article, the terms "dairy industry" and "dairy sector" are used as synonyms.

[2] Council Directive 96/61/EC of 24 September 1996 concerning Integrated Pollution Prevention and Control. Available at: http://law.edu.ru/norm/norm.asp?normID=1375085

in 2006 [20; 21]. Meanwhile, in Russia, the regulatory documents that determine the vector of development of the dairy industry pay little attention to the introduction of the best available technologies. In this regard, an in-depth study of the current state of the dairy industry and the development of a vision for its long-term development is important and timely.

The goal of our research is to substantiate the choice of a long-term strategy for development of the dairy industry on the basis of the best available technologies that ensure food and environmental safety of the Russian Federation. We achieve the goal by implementing the following tasks:

– we review theoretical and methodological aspects related to the elaboration of forecast scenarios for development of economic systems;

– we identify and consider the factors that affect the development of the industry;

– we define the features of introduction of the best available technologies on the basis of foreign experience;

– the forecast scenarios of development of the Russian dairy industry on the basis of introduction of the best available technologies are developed.

Our paper reveals specific features in the functioning of the dairy industry and the contradictions in its development that they cause. We analyze the application of the best available technologies in the industry and elaborate a concept for its development. This approach helps increase the reliability of industry development strategies and reduce the risks arising in the dairy industry. The scientific novelty of the research consists in the proposed model for the concept of the dairy industry development through the introduction of the best available technologies until 2030.

Classical works of the school of Professor I.V. Bestuzhev-Lada [2] contain the research on the strategies for development of economic systems since the 1950s. Global theories have been developed to support long-term forecast scenarios. The team of scientists under the leadership of the Nobel prize winner in Economics W.W. Leontief developed a long-term forecast of the world economy up to the year 2000 on the basis of a unique interregional model of input-output tables [3].

In the 1950–1970s, the Soviet Union formed a school under the leadership of academicians A.N. Efimov, A.I. Anchishkin, and V.A. Kotelnikov [4; 5]. In the 1980s, the pace of research on forecast scenarios of development decreased due to the transition from industrial to post-industrial society.

In the modern world, a developed economy is formed on the basis of forecast economic strategies and scenarios. As a rule, in most developed countries of the world, forecasting is considered to be the most important management function of the state [6; 7; 8].

The substantiation of the methodology for long-term forecasting in Russia was tested in the GOELRO plan (1920–1935); it was compiled for a number of large regions of Russia and considered sectoral and territorial aspects. The main developers of the concepts were economists N.D. Kondratiev, M.M. Sokolov, S.F. Demidov, V.S. Nemchinov. The theory of foresight, forecasting methodology and long-term planning was founded by Academician N.D. Kondratiev, a representative of Timiryazev Agricultural Academy and the author of the concept of "long waves" [9; 10]. At this stage, three mechanisms for development of the strategies have been identified: North American (Canada, USA), Asian (China, Japan, South Korea), and Western European (Sweden, France).

The second half of the 20th century witnessed a revival of research on socio-economic forecasting and scientific substantiation of foresight methodology. The most prominent researchers of the time were M. Mesarovic and E. Pestel [11; 12]. The results achieved in this field helped outline the range of future problems in overcoming inequality between countries, protecting the environment and mitigating climate change under the influence of the human factor and the choice of alternative options for development of human civilization [13; 14; 15].

Ignoring science as a driving force of technological progress in the long term leads to the country's lagging significantly behind economically developed countries. According to Academician A.A. Dynkin, Director of the Institute of World Economy and International Relations of the Russian Academy of Sciences, "globalization affects the quantitative parameters of growth; innovation affects the quality and the paradigm of development... Money turnover will resume only if there are products of a new quality. Innovations address these very issues [16, p. 56].

All of the above is relevant for the dairy industry in Russia. The works of many domestic and foreign scientists (S.A. Andrianov, I.M. Baynazarov, M.G. Mironov, P. Draker, B. Santo, R. Nelson) consider how to work out a strategy for its development. The scientific knowledge base that defines the features of strategic development in the conditions of mass and continuous introduction of innovations is created [17; 18]. At the same time, the issues related to the substantiation of the strategy for development of the dairy industry through the introduction of the best available technologies to guarantee the environmental safety of products remain insufficiently investigated [19]. Therefore, the goal of our study, the results of which are reflected in the present paper, is to substantiate the need to promote the development of the domestic dairy industry on the basis of the introduction of the best available technologies.

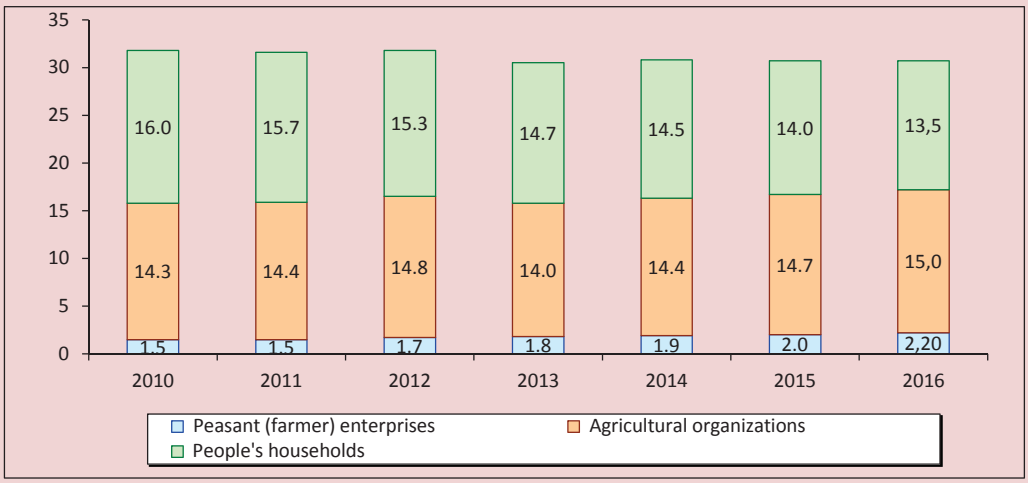
Methodology and technique. The dairy complex of Russia, which covers the entire technological cycle from the creation of raw milk to the production and sale of dairy products, includes dairy cattle breeding, feed production, dairy industry, servicing and trading organizations. The object of analysis in our article is the dairy industry as an economic system, which includes social, economic, organizational and managerial mechanisms of effective functioning and development. The subject of the analysis includes organizational, economic, social processes and relations that characterize and determine the rationale for forecasts and strategies for development of the dairy industry in Russia. The study is based on the fundamental methodological and theoretical provisions, legal documents of the public authorities of the Russian Federation. We use the following methods and approaches: a) monographic (study of the laws and trends of the dairy industry); b) abstract and logical (generalization of conceptual and methodological approaches to the substantiation of directions for development of the dairy industry); c) economic and statistical (study of the trends in the industry); d) expert assessments (development of forecasts of the industry); e) scenario forecasting (substantiation of development scenarios) and others. The application of conceptual provisions of these theories as a starting point in the substantiation of our own version allows us to show its advantages and scientific contribution due to the integration of various theoretical positions and views while maintaining the integrity of scientific approaches to the scientific problem under consideration.

The results of research into the Russian dairy industry at the present stage. There are about 20 thousand enterprises functioning in the industry; they produce about 30 million tons of milk and employ more than 1 million people. The average consumption of milk and dairy products in terms of milk in 2016 amounted to 238 kg per person per year at a rate of consumption equal to 392 kg.

As one of the world's largest milk producers, the Russian Federation is inferior in terms of the efficiency of its production compared to the countries with developed economies; Russia has a lower share of marketable milk in total production – 65.3%. The volume of production of raw milk in Russia is shown in *Figure 1*.

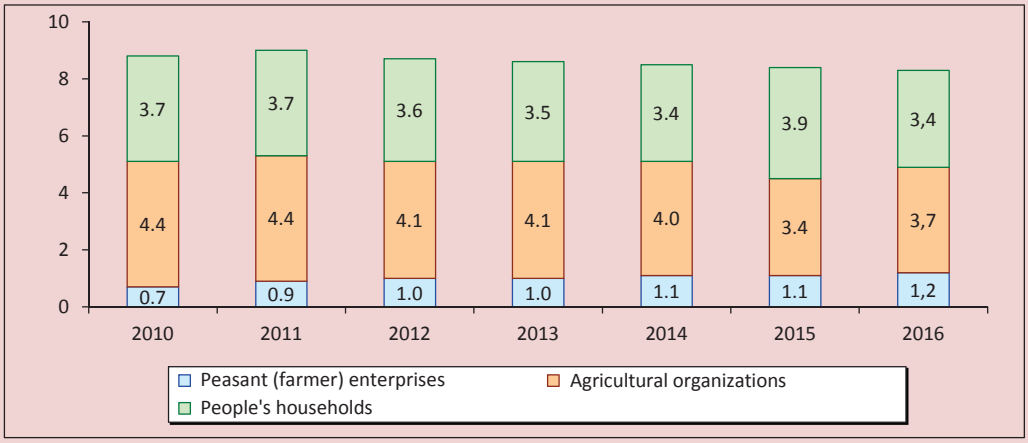
The number of cows in all types of farms during the period under consideration tends to decrease (8.8 million head in 2010 against 8.3 million head in 2016; *Fig. 2*), although their productivity is steadily increasing *(Fig. 3)*.

Figure 1. Milk production in Russia, million tons



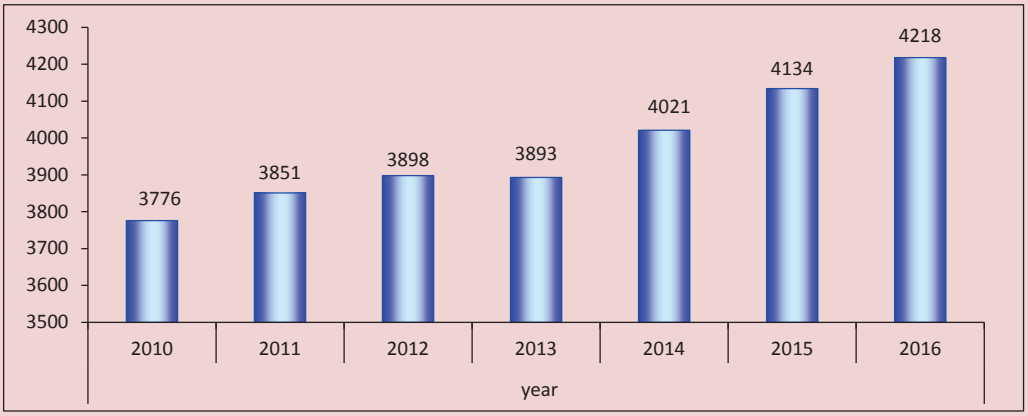
Source: our compilation with the use of: *Russian Statistical Yearbook: Statistics Collection.* Rosstat. Moscow, 2017. 870 p.

Figure 2. Cow population in agriculture in Russia, million head



Source: our compilation with the use of: *Russian Statistical Yearbook: Statistics Collection.* Rosstat. Moscow, 2017. 870 p.

Figure 3. Productivity of cows in Russian agriculture, kg per cow



Source: our compilation with the use of: *Russian Statistical Yearbook: Statistics Collection.* Rosstat. Moscow, 2017. 870 p.

Table 1. Utilization of production capacities in the milk processing industry of Russia, in %

Indicator	2014	2015	2016	2016 to 2014, in p.p.
Whole milk products (in terms of milk)	61.1	60.1	59.10	- 2.00
Condensed milk products	58.2	58.6	59.76	1.56
Milk powder and cream powder	42.4	40.3	39.05	- 3.35
Butter	32.1	33.1	30.94	- 1.16
Cheese and cheese products	62.4	60.9	59.06	- 3.34
Source: our compilation with the use of: *Russian Statistical Yearbook: Statistics Collection*. Rosstat. Moscow, 2017. 870 p.				

The dairy industry of the country faces a number of challenges and problems. These include: a) incomplete provision of enterprises with raw milk *(Tab. 1)* caused, among other things, by a reduction in the number of animals[3]; b) lack of state support; c) flaws in the pricing policy, etc.

Despite this, in 2016, the output of most types of dairy products, especially cheese and cheese products, and the share of domestic milk and dairy products in the total volume of their resources (taking into account the structure of carry-over stocks) increased *(Tab. 2)*.

In addition to economic challenges, the dairy industry in the Russian Federation faces the problems of facilities and equipment upgrade and the task of reducing the negative impact on the environment. And they are no less important: the annual discharge of wastewater in the industry is 25–30 million cubic meters.

Federal Law 219-FZ "On amending Federal Law "On environmental protection" and certain legislative acts of the Russian Federation" dated July 21, 2014, which entered into force January 1, 2015, regulates the transition to the system of technological regulation of negative environmental impact on the basis of the best available technologies

[3] Dairy industry under embargo: prospects and investment opportunities. National Union of Milk Producers. *Milk News Agency.* 2016. October.

Table 2. Production of the main types of dairy products in Russia, thousand tons

Indicator	2014	2015	2016	2016 to 2014, in %
Whole milk products (in terms of milk)	11445.3	11625.7	11854.7	103.6
Liquid processed milk	5317.4	5377.9	5490.5	103.3
Cream	115.5	121.1	125.5	108.6
Curd	382.6	413.3	405.1	105.9
Yogurt	776.9	765.5	778.8	100.2
Kefir	1082.8	1067.6	1068.1	98.6
Boiled fermented milk ("Ryazhenka")	216.2	217.2	221.3	102.3
Sour cream	550.3	586.6	567.9	103.1
Cheese and cheese products	494.3	581.3	599.7	121.3
Butter	250.8	258.9	247.4	98.7

Source: our compilation with the use of: *Russian Statistical Yearbook: Statistics Collection*. Rosstat. Moscow, 2017. 870 p.

[23; 24]. The procedure for their determination is spelled out in a number of legal acts[4].

In accordance with the rules, when classifying technological processes, equipment, technical methods and methods as BAT, it is necessary to take into account the following indicators:

– minimal negative impact on the environment;

– cost-effectiveness of implementation and operation;

– application of resource and energy saving methods;

– time period for implementation;

– implementation of technological processes, equipment, technical methods at facilities that have a negative impact on the environment.

In the process of research on the best available technologies used in the dairy industry, we used the information obtained from a survey of dairy enterprises, publications in the open press and information from industry experts [25; 26].

The results of the questionnaire survey[5] show that large enterprises of the dairy industry of the Russian Federation actively upgrade production and reduce production costs associated with the operation of technological equipment. Thus, at present, specific energy costs (heat and electric power) are comparable with the data of European dairy producers [27] *(Tab. 3)*.

Water is one of the most important resources consumed in the production of dairy products. It is used for washing the equipment and production facilities, as well as for cooling the products. Specific water consumption for the production of certain types of Russian products is close to the volumes consumed by European dairy producers *(Tab. 4)*.

When analyzing the data, it is necessary to take into account the conversion factor that characterizes the specific consumption of milk for the production of a dairy product (for example, 10 liters of milk is spent on the production of one kilogram of cheese).

[4] On the procedure for determining a technology as the best available technology, and also for development, updating and publication of information technology handbooks on the best available technologies (approved by Resolution 1458 dated December 23, 2014 of the Government of the Russian Federation). GARANT System. Available at: http://base.garant.ru/70829288/#ixzz5TQ7TcVss; Rules for defining a technology as the best available technology and for the development, updating and publication of information technology handbooks on best available technologies (approved by Resolution 1458 dated December 23, 2014 of the Government of the Russian Federation). GARANT System. Available at: http://base.garant.ru/70829288/#ixzz5TQ7t7e70.

[5] Development of the dairy industry until 2020. Available at: http://www.dairynews.ru/images4/BCG/Diagnostics%20Res.pdf

Table 3. Consumption of heat and electric power for the production of dairy products of Russian and European manufacturers

Product	Specific energy consumption	
	According to the questionnaire survey of domestic enterprises, per liter of processed milk	According to foreign sources*, per liter of processed milk
Electrical power, kWh		
Liquid milk and fermented milk products	0.02 – 0.24	0.07 – 1.1
Curd	0.14 – 0.39	No data
Cheese	0.13 – 1.1	0.12 – 2.08
Butter	0.12 – 0.57	No data
Condensed milk	0.02	No data
Dry milk	0.177 – 0.562	0.18 – 6.47 kWh
Ice cream	0.5	0.75 – 1.6 kWh
Heat energy (steam), kg		
Liquid milk and fermented milk products	0.08 – 0.16	No data
Curd	0.08 – 0.66	No data
Cheese	0.02 – 0.035	No data
Butter	0.06 – 0.84	No data
Condensed milk	0.72	No data
Dry milk	2.02	No data
Ice cream	No data	No data

* Source: Official website of the European Commission. Available at: http://eippcb.jrc.ec.europa.eu/reference/BREF/FDM/FDM_31-01-2017-D1_BW

Table 4. Water consumption for the production of dairy products by Russian and European producers

Product	Specific water consumption, liters	
	According to the questionnaire survey of domestic enterprises, per liter of processed milk	According to foreign sources*, per liter of processed milk
Liquid milk and fermented milk products	1.32 – 4.5	0.6 – 4.1
Curd	1.46 – 3.0	-
Cheese	2.4 – 3.0	1.2 – 3.8
Butter	1 – 2.5	-
Condensed milk	8	-
Dry milk	3.9	0.69 – 6.3
Ice cream	6	-

* Source: Official website of the European Commission. Available at: http://eippcb.jrc.ec.europa.eu/reference/BREF/FDM/FDM_31-01-2017-D1_BW

Water consumption per ton of milk, which is processed at milk processing plants, varies from 4.2 to 6 cubic meters. Out of the total water consumption, most of the water, up to 85%, is sent by dairy plants to the sewerage after primary use.

About four tons of sour whey is formed during the production of one ton of curds. Waste water in the dairy industry consist mainly of milk residues, whey (one cubic meter of whey is equivalent to 100 cubic meters of domestic waste water), contain alkaline and acidic chemicals that were used for sanitation. Wastewater generated by dairy plants is characterized by high organic load, unstable pH and temperature and a significant content of nitrogen and phosphorus. As a rule, these effluents end up in urban wastewater treatment plants, only a small proportion of dairy plants have their own treatment facilities. The load on wastewater treatment facilities is quite high due to the significant amount of residual milk

fat, proteins and "short" carbohydrates, as well as chemical compounds used for washing the equipment. But the main problem is the fluctuation of pH, disrupting the balance of the biological components at the treatment facilities. To avoid this, a pre-treatment area for wastewater is usually created at dairy plants.

Another equally important environmental issue related to production is air pollution by powder during the drying of dairy products. In order to clean the exhaust air in spray dryers, various aspiration devices, including cyclones, are used. However, their cleaning efficiency is insufficient, and part of the product remains in the exhaust air. For instance, when drying skim milk in the dryers with a capacity of one cubic meter of evaporated moisture per hour, the loss of product with air can reach 23 kg/h, and the exhaust air contains from 40 to 170 mg of product in one cubic meter.

Thus, wastewater treatment and air treatment seem to be the most obvious and in-demand areas of BAT implementation.

The analysis and generalization of international experience in determining approaches to the selection of the best available technologies for the dairy industry and the preparation of a handbook on BAT leads to the conclusion that the integrated (environmental, environmental) permits are one of the key tools to reduce the negative impact of industry on the environment in the European practice. In addition, they ensure the compliance of the industry with environmental requirements and encourage technological innovation [28–32]. We should note that in the world practice there is no direct stimulation of the transition to the best available technologies. The costs of their implementation are partially compensated by reducing the costs associated with the implementation of the established requirements and reducing the responsibility for causing possible or real harm to the environment. At the same time, the role of market incentives such as resource saving and increasing the competitiveness of production is significantly increasing.

The idea of transition to the management of the Russian dairy industry development, which forms the environment of functioning, instead of "adaptation" to the existing circumstances, is, in our opinion, the key one in understanding the strategic goal of upgrading dairy enterprises.

The essence of our concept consists in the formation of directions for development of the dairy industry based on the increasing role of the human factor, promotion of innovation through the introduction of the best available technologies that ensure food and environmental safety, allowing the industry to increase competitive potential.

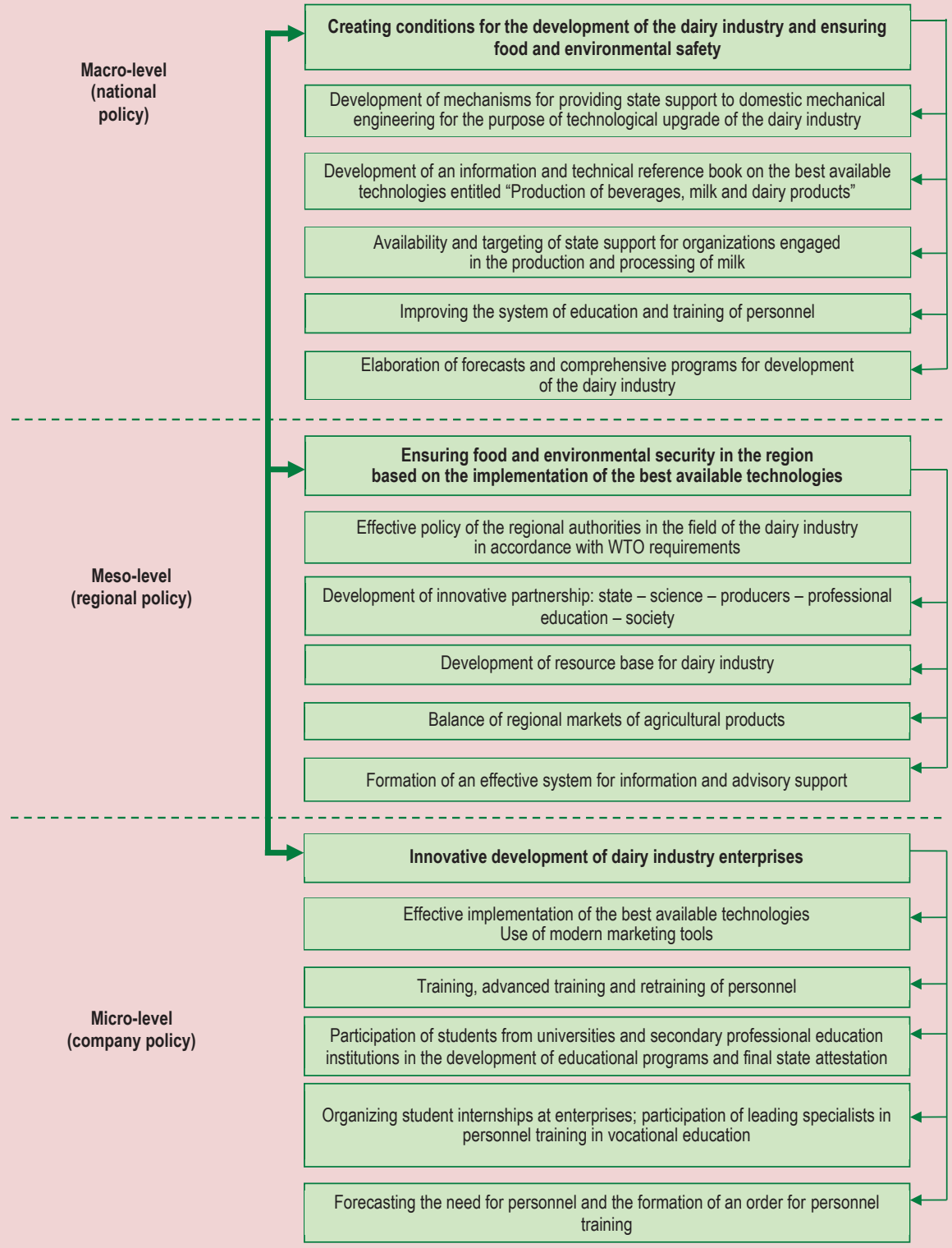
In order to achieve the goal, a number of ideological approaches should be used constructively.

1. Purposeful improvement of the dairy industry in the future requires an understanding of the current changes taking place in Russia and the world in connection with the development of science and technology.

2. The basis for the introduction of BAT is the use of scientific achievements available in the world and in Russia. At the same time, it is necessary to provide basic research with significant state support, to organize active and systematic interaction of educational institutions and enterprises of the industry in the training of highly qualified personnel, to create motives and incentives for the environmental modernization of Russia's dairy industry.

3. Pilot projects, the development of a BAT handbook and technology indicators can be effective tools for promoting the best available technologies.

Figure 4. Concept for development of the dairy industry through the introduction of the best available technologies



Source: our own compilation.

4. It is necessary to revise the procedure of collecting and arranging the data: a) on the levels of emissions of marker substances; b) on the consumption of raw materials and energy resources; modernization of basic and environmental equipment and on the economic aspects of introduction of the best available technologies.

5. Energy-saving technologies should serve as the basis for practical implementation of the innovation strategy.

6. It is necessary to develop a system for effective use of resources and create a favorable investment climate to increase investment in the implementation of the best available technologies in the dairy industry.

These approaches serve as the foundation for the concept that we developed on the basis of introduction of the best available technologies *(Fig. 4)*.

In the course of elaborating the forecast scenarios for development of the dairy industry we took into account provisions of Federal Law 172 "On strategic planning in the Russian Federation" dated June 28, 2014, the Forecast of long-term socio-economic development of the Russian Federation for the period up to 2030, the Strategy for development of the food and processing industry of the Russian Federation for the period up to 2020 (approved by Resolution 559-r of the Government of the Russian Federation dated April 17, 2012), the Concept for long-term socio-economic development of the Russian Federation for the period up to 2020 (approved by Resolution 1662-r of the Government of the Russian Federation dated November 17, 2008), the State program for agricultural development, regulation of markets for agricultural products, raw materials and food for 2013–2020 (approved by Resolution 717 of the Government of the Russian Federation dated July 14, 2012) [34–38].

According to the results of the study, we define the following factors that should be taken into account in the long-term forecasting of trends in the development of the dairy industry:

* intensity of innovative renewal of production and dynamics of labor productivity;

* improving the quality of labor resources;

• level of state support;

* degree of importance of Russian products in the domestic and foreign markets;

* level of financial stability of milk processing enterprises.

Given these aspects and their impact on the development of the dairy industry in the long term, we consider it advisable to determine three scenarios of its development: 1) conservative, 2) innovative and 3) target-oriented (accelerated) *(Tab. 5)*.

The conservative scenario implies a slow and long-term recovery of the dairy industry with the use of available resources. There will be no significant changes in the organizational and economic mechanisms of state regulation of the agro-industrial complex and in the amount of support from the budget. The concentration of capital and production capacity within large holdings and the gradual shutting down of small and medium-sized independent industries will continue. The conservative scenario does not provide competitive advantages to organizations in the conditions of functioning under the WTO and does not ensure compliance with the requirements of the Food security doctrine of the Russian Federation [39] and the federal law "On environmental protection". The implementation of this scenario does not ensure long-term competitiveness of the dairy industry.

The innovative scenario is characterized by the strengthening of investment orientation in agriculture. It is based on the modernization of resources, facilities and equipment within the dairy industry through the introduction of

Table 5. Main characteristics of development scenarios for the dairy industry in Russia

Development scenario	Criteria			
	Dairy industry development dynamics	State support	Educational activity	Innovation activity in the dairy industry
Conservative	The development of the dairy industry in the long term is not ensured. Available resources are used. Production tends to decrease with the growth of imports of goods and technologies. Low level of implementation of BAT.	State policy is based on the preservation of preferential tax treatment, which is contrary to WTO requirements.	Reduction in funding for higher education institutions, and the development of the secondary education system.	Resource provision of innovation activities will be carried out by private investors, which will not provide the necessary amount of capital investment and will adversely affect the changes in the infrastructure of the agro-industrial complex. Labor productivity growth is 1.1 times by 2018 and 1.5 times by 2030 in relation to the level of 2016.
Innovative	Development of the dairy industry with an annual growth of up to 2–4%, in case the state subsidies are preserved. The increase in the share of products using BAT to 35–40% relative to 2016. Twofold growth in investment by 2030 as compared to 2016. Expansion of production of dairy products in connection with the decline in the purchasing power in people's money incomes.	State support in accordance with WTO requirements. Improvement of the investment climate.	Modernization of professional education with the qualitative renewal of the teaching staff. Improving the efficiency of human capital use.	Strengthening of investment and innovation activity, modernization of fixed assets, technological re-equipment of enterprises in the agro-industrial complex in accordance with modern requirements. Labor productivity growth by 1.2% in 2018 and by 1.8 times by 2030 compared to 2016; formation of new centers of innovation development.
Target-oriented (accelerated)	Accelerated growth rates of the agro-industrial complex. Technological upgrade of the dairy industry. Significant inflow of foreign capital. Ensuring the requirements of the Food security doctrine of the Russian Federation and the federal law "On environmental protection". Improving the competitiveness of the dairy industry. Increasing the share of products using BAT to 75–80%.	Significant state support inaccordance with WTO requirements. Improvement of the investment climate	Increase in education costs in order to improve the quality of training of students in agricultural education institutions. Improving the quality of human capital by creating a resource center in the region.	Shifting the agro-industrial complex to an innovative way of development. In the dairy industry – the formation of research teams together with educational institutions and the implementation of applied research for the dairy industry.
Source: our own compilation.				

BAT and involves the influence of innovative factors while improving the efficiency of human capital in 2020–2022 [39]. The scenario will help ensure food and environmental security of the country. It provides for the development of the dairy industry with an annual growth rate of 2–4% (while maintaining the provision of state support to agricultural producers in the next 10 years). Increased competition in the domestic and global markets will make it possible to attract investments in the agro-industrial complex, the volume of which will increase by 2030 by 2 times to the level of 2014, which will contribute to the strengthening of the raw material base of the dairy industry.

The implementation of this scenario will lead to an increase in the spending on education up to 6.5% of GDP by 2030. This will provide support to universities that train personnel for the dairy industry. Education reform also

implies a qualitative renewal of the teaching staff – the transition to effective contracts between staff and educational institutions is inevitable. This mechanism guarantees professional development of scientific and pedagogical staff due to the fact that their responsibility for the results increases.

The innovative scenario in comparison with the conservative one has a number of advantages that will be manifested in improving the quality parameters of development of the agro-industrial complex, especially in the field of efficiency of human capital utilization, already in the medium term.

The target-oriented (accelerated) scenario is created on the platform of the innovative scenario. Accelerated growth rates of production and investment are its advantages. The scenario provides for a full-scale implementation of all tasks set out in Decrees[6] 596 and 204 of the President of the Russian Federation dated May 7, 2012. It is expected that the share of products produced with the use of the best available technologies and resource-saving technologies will reach 75–80% in the industry.

The scenario assumes an increase in spending on vocational education up to 8% of GDP by 2030, which will make it possible to implement changes in the industry, to ensure the introduction of a modern education system and the achievement of the main indicators of the average values for OECD countries[7]. In the field of education, it provides for the increase the level of remuneration of teachers through the transition to a system of effective contract, to specialized training of high school students, which creates conditions for in-depth study of certain subjects that determine the choice of future profession. The scenario also provides for the following measures: assistance to universities engaged in training personnel for the industry; modernization of resources, facilities and equipment in the sphere of education. Applied research aimed at the application of new knowledge to achieve practical goals and objectives for the dairy industry will be implemented with the involvement of budget funds by co-financing the project and creating research teams in conjunction with higher education institutions of the relevant profile.

Conclusions. Our study clearly shows that currently in Russia it is necessary to develop an effective mechanism to implement the selected priorities in the framework of the national innovation system. This mechanism should include: a) development and regular adjustment of long-term forecasts of socio-economic development of the dairy industry, taking into account global trends; b) selection of development priorities; c) development of regional strategic plans and target programs that implement the selected priorities on the basis of innovative partnership of business, government, creative individuals and society.

The results of our study will help:

1. Make well-founded management decisions using comprehensive forecast indicators of the dairy industry based on the use of the best available technologies in the medium and long term.

2. Improve the quality of the information base for analysis, forecasting and monitoring the effectiveness of the development of the dairy industry as an economic system.

[6] On the long-term state economic policy: Decree of the President of the Russian Federation of May 7, 2012 No. 596. *GARANT System*. Available at: http://base.garant.ru/70170954/#ixzz5RueCMAc4; On the national goals and strategic objectives of development of the Russian Federation for the period up to 2024: Decree of the President of the Russian Federation of May 7, 2018 No. 204. GARANT System. Available at: http://www.kremlin.ru/acts/bank/43027.

[7] *Russia and Countries of the World. 2013: Statistics Collection*. Rosstat. Moscow, 2017. P. 96.

3. Form science-based forecasts of the parameters of the effectiveness of development of the dairy industry in the medium and long term.

The results of our study can be used by legislative and executive authorities in the development of a legal framework of the state policy for the dairy industry according to the selected priorities. Some theoretical and practical recommendations can be useful in the educational process in universities, as well as to managers and specialists of the dairy industry, who are engaged in the development of the dairy industry through the use of BAT.

References

1. Medvedeva N.A. *Prognozirovanie razvitiya sel'skogo khozyaistva Evropeiskogo Severa Rossii* [Forecasting of Agricultural Development in the European North of Russia]. Vologda–Molochnoe: ITs VGMKhA, 2017. 181 p.
2. Bestuzhev-Lada I.V. (Ed.). *Mir nashego zavtra: antologiya sovremennoi klassicheskoi prognostiki* [The World of our Tomorrow: an Anthology of Modern Classical Foreasting]. Moscow: Eksmo, 2003. 214 p.
3. Kuzyk B.N., Yakovets Yu.V. *Rossiya-2050: strategiya innovatsionnogo proryva* [Russia-2050: a Strategy for Innovative Breakthrough]. Moscow: Ekonomika, 2005. 624 p.
4. Anchishkin A.I. *Prognozirovanie tempov i faktorov ekonomicheskogo rosta* [Forecasting the Rate and Factors in Economic Growth]. Moscow: MAKSPress, 2003. 300 p.
5. Gulin K.A., Ermolov A.P. Strategic approaches to scientific and technological development potential in the territory. *Problemy razvitiya territorii=Problems of Territory's Development*, 2016, no. 1 (81), pp. 7-14. (In Russian).
6. Zadumkin K.A., Anishchenko A.N., Vakhrusheva V.V., Konovalova N.Y. Enhancing the efficiency of dairy farming through improving the regional system of fodder production. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2017, vol. 10, no. 6, pp. 170-191. DOI: 10.15838/esc.2017.6.54.11. (In Russian).
7. Uskova T.V., Sychev M.F., Chekavinskii A.N. *Monitoring funktsionirovaniya agropromyshlennogo kompleksa Vologodskoi oblasti: zaklyuchitel'nyi otchet o NIR* [Monitoring of the Functioning of the Agro-Industrial Complex of the Vologda Oblast: Final Research Report]. Vologda, 2010. 83 p.
8. Medvedeva N.A. System approach to the forecasting of agriculture of the region: instruments and mechanisms. *Molochnokhozyaistvennyi vestnik=Bulletin of the Dairy Industry,* 2016, no. 3 (23), pp. 100-111. (In Russian).
9. Kondratiev N., Yakovets Yu., Abalkin L. *Bol'shie tsikly kon"yunktury i teoriya predvideniya* [Big Cycles of Conjuncture and the Theory of Foresight]. Moscow: Ekonomika, 2002. 764 p.
10. Ilyin V.A., Shabunova A.A., Kalachikova O.N. et al. *Natsional'naya bezopasnost' Rossii: vnutrennie ugrozy realizatsii strategii* [Russia's national security: internal threats to the implementation of the strategy]. Vologda, 2015. 218 p.
11. Emel'yanov V.S. (Ed.). Mesarovich M., Takakhara Ya. *Obshchaya teoriya sistem: matematicheskie osnovy* [General Systems Theory: Mathematical Foundations]. Moscow: Mir, 1978.
12. Medvedeva N.A. Ways of development of regional agriculture. *Vestnik Povolzhskogo gosudarstvennogo universiteta servisa. Seriya Ekonomika=Bulletin of Volga Region State University of Service. Economics Series*, 2014, no. 3 (35), pp. 60–65. (In Russian).
13. Mansfield E. *Microeconomics. Theory and Applications*. New York; London, 1979. Pp. 499-501.
14. Nakatani T. Price competition and technical choice. *Kobe University Economic Review*, 1979, no. 25, pp. 68-69.
15. Nelson R. Production sets, technological knowledge, and research and development: fragile and overworked constructions for analysis of productivity growth? *The American Economic Review, Papers and Proceeding*, 1982, vol. 70, no. 2, pp. 62-67.
16. Dynkin A.A. Global crisis – an impulse for development of innovation *Problemy teorii i praktiki upravleniya=Issues of Management Theory and Practice*, 2009, no. 4, pp. 8-15. (In Russian).

17. Maklakhov A.V., Tyapugin E.A., Abramova N.I. et al. *Sistema razvitiya molochnogo skotovodstva na osnove sovremennykh tekhnologii proizvodstva moloka s uchetom kormoproizvodstva, kormleniya i razvedeniya krupnogo rogatogo skota v usloviyakh Evropeiskogo Severa Rossiiskoi Federatsii* [The System of Dairy Cattle Breeding Development on the Basis of Modern Technologies of Milk Production Taking into Account Forage Production, Cattle Feeding and Breeding in the European North of the Russian Federation].Vologda-Molochnoe, 2017. 160 p.
18. Maklakhov A.V., Simonov G.A., Tyapugin E.A. et al. *Ot zemli do moloka: prakticheskoe posobie* [From Land to Milk: a Practical Guide]. Vologda–Molochnoe, 2016. 136 p.
19. Kuzin A.A., Lagun A.A. et al. Organization and efficiency of the work of the dairy cluster in the Vologda Oblast. *Molochnokhozyaistvennyi vestnik=Bulletin of the Dairy Industry,* 2016, no. 2 (22), pp. 117-127. Available at: http://molochnoe.ru/journal. (In Russian).
20. Dymar O.V. Energy and resource saving in the dairy industry. In: *Materialy mezhdunarodnogo nauchno-prakticheskogo seminara "Innovatsionnye tekhnologii i oborudovanie dlya molochnoi promyshlennosti"* [Proceedings of the International Scientific and Practical Seminar "Innovative Technologies and Equipment for the Dairy Industry]. Available at: http://www.dairynews.ru/upload/iblock/05e/2016%2002%2019.pdf
21. Canut A., Pascual A. Pollution prevention in food industries through both cleaning of closed equipment with ozonated water and cleaning in place (CIP) systems WATER POLLUTION IX. In: *WIT Transactions on Ecology and the Environment,* 2008, vol. 111, pp. 615-625.
22. Evrard D., Laforest V., Villot J., Gaucher R. Best Available Techniques as a sustainability tool in manufacturing: case study in the dairy sector. 23rd CIRP Conference on Life Cycle Engineering. *Procedia CIRP*, 2016, no. 48, pp. 520-525.
23. On amending Federal Law "On environmental protection" and some legal acts of the Russian Federation: Federal Law 219-FZ of July 21, 2014. *Spravochno-pravovaya sistema "Konsul'tantPlyus"* ["ConsultantPlus" Reference-Legal System]. (In Russian).
24. On approving the criteria for defining the objects exerting negative impact on environment as the objects of categories I, II and IV: Resolution 1029 of the Government of the Russian Federation dated September 28, 2015. *Spravochno-pravovaya sistema "Konsul'tantPlyus"* ["ConsultantPlus" Reference-Legal System]. (In Russian).
25. Agarkova E.Yu., Kruchinin A.G., Ryazantseva K.A. Optimization of the composition of emulsion and paste-like products. *Molochnaya promyshlennost'=Dairy Industry,* 2016, no. 8, pp. 42-44. (In Russian).
26. Kuznetsov P.V. et al. About the choice of the equipment to dry milk and whey. *Molochnaya promyshlennost'=Dairy Industry,* 2015, no. 3, pp. 34-37. (In Russian).
27. *Official Website of the European Commission*. Available at: http://eippcb.jrc.ec.europa.eu/reference/BREF/FDM/FDM_31-01-2017-D1_BW
28. Westergaard W. *Tekhnologiya proizvodstva sukhogo moloka. Vyparivanie i raspylitel'naya sushka* [Technology for Production of Milk Powder. Evaporation and Spray Drying]. Copenhagen, Denmark. Available at: http://www.intent93.ru/useruploads/files/Samples/Niro_Z010_2004.pdf. (In Russian).
29. Daddi T., De Giacomo M.R., Dils E., Polders C., Lepe G.R., Vazquez Calvo V. Transferring the integrated pollution prevention and control (ippc) approach and best available techniques (BAT) concepts to Egypt, Tunisia and Morocco. *Sustainability*, 2013, vol. 5, no. 7, pp. 2944-2959.
30. Midzic-Kurtagic S., Silajdzic I., Kupusovic T. Mapping of environmental and technological performance of food and beverage sector in Bosnia and Herzegovina. *Journal of Cleaner Production*, 2010, vol. 18, no. 15, pp. 1535-1544.
31. Torres Lopez E.R., Doval Leira R., Galera Martinez M., Bello Bugallo P.M. Integrated environmental permit through Best Available Techniques: Evaluation of the dairy industry. *Journal of Cleaner Production*, 2017, vol. 162, pp. 512-528.
32. *Reference Document on Best Available Techniques in the Food, Drink and Milk Industries, January 2017.* 1022 p.
33. On strategic planning in the Russian Federation: Federal Law 172-FZ of June 28, 2014. *Spravochno-pravovaya sistema "Konsul'tantPlyus"* ["ConsultantPlus" Reference-Legal System]. (In Russian).

34. *Prognoz dolgosrochnogo sotsial'no-ekonomicheskogo razvitiya Rossiiskoi Federatsii na period do 2030 goda (razrabotan Minekonomrazvitiya Rossii* [Forecast of long-term socio-economic development of the Russian Federation for the period up to 2030 (elaborated by the Ministry of Economic Development of the Russian Federation)]. Available at: http://www.consultant.ru/document/cons_doc_LAW_144190/

35. *Ob utverzhdenii Strategii razvitiya pishchevoi i pererabatyvayushchei promyshlennosti Rossiiskoi Federatsii na period do 2020 goda: rasporyazhenie Pravitel'stva RF ot 17.04.2012 № 559-r (red. ot 13.01.2017) [*About the approval of the Strategy for development of the food and processing industry of the Russian Federation for the period till 2020: Resolution No. 559-r of the Government of the Russian Federation dated April 17, 2012 (as amended January 13, 2017)]. Available at: http://www.consultant.ru/document/cons_doc_LAW_128940/

36. *O Kontseptsii dolgosrochnogo sotsial'no-ekonomicheskogo razvitiya Rossiiskoi Federatsii na period do 2020 goda: rasporyazhenie Pravitel'stva RF ot 17.11.2008 № 1662-r (red. ot 10.02.2017) (vmeste s Kontseptsiei dolgosrochnogo sotsial'no-ekonomicheskogo razvitiya Rossiiskoi Federatsii na period do 2020 goda)* [On the Concept for long-term socio-economic development of the Russian Federation for the period till 2020: Resolution 1662-r of the Government of the Russian Federation dated November 17, 2008 (as amended February 10, 2017) (together with the Concept for long-term socio-economic development of the Russian Federation for the period until 2020)]. Available at: http://www.consultant.ru/document/cons_doc_LAW_82134/

37. *O Gosudarstvennoi programme razvitiya sel'skogo khozyaistva i regulirovaniya rynkov sel'skokhozyaistvennoi produktsii, syr'ya i prodovol'stviya na 2013–2020 gody: postanovlenie Pravitel'stva RF ot 14.07.2012 № 717 (red. ot 06.09.2018)* [About the State program for development of agriculture and regulation of the markets of agricultural products, raw materials and food for 2013–2020: Resolution 717 of the Government of the Russian Federation of dated July 14, 2012 (as amended September 6, 2018)]. Available at: http://www.consultant.ru/document/cons_doc_LAW_133795/

38. Ob utverzhdenii Doktriny prodovol'stvennoi bezopasnosti Rossiiskoi Federatsii: Ukaz Prezidenta RF ot 30.01.2010 № 120 [On adopting the Food Security Doctrine of the Russian Federation: Decree 120 of the President of the Russian Federation dated January 30, 2010]. *Spravochno-pravovaya sistema "Konsul'tantPlyus"* ["ConsultantPlus" Reference-Legal System].

39. Lachuga Yu.F. Scientific and methodological support for the development of basic and exploratory research in the field of agriculture within the agro-industrial complex. *Ekonomika, upravlenie=Economics, Management*, 2015, no. 2, pp. 3-11. (In Russian).

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Sustainable Development of the Agri-Food Sector: Russia's Priorities and Directions to Adapt Agenda 2030 to Russian Conditions

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Abstract. In 2015, at a UN Summit, the 2030 Agenda for Sustainable Development was adopted; it contains 17 sustainable development goals crucially important for any country in the world. The scientific significance of solving the problem of sustainable development consists in the urgent task to adapt the sustainable development goals (SDGs) to national conditions of different countries and to form a mechanism for their achievement in various economic sectors. Since the central place in the Agenda is devoted to food security and sustainable development of agriculture, we identify the possibility of applying the system of SDGs to promote further sustainable development of Russian agricultural sector. The main scientific idea and goal of the present paper is to determine national priorities in the field of sustainable development on the basis of meaningful analysis of the current state of the agri-food complex; besides we search for possible directions to adapt the global Agenda 2030 to Russian conditions so as to improve existing agriculture development strategies and programs, taking into consideration the UN SDGs. We use system approach and statistical analysis to identify and specify relevant socio-economic and environmental issues in the Russian agri-food sector and to systematize them on the basis of the UN methodology. We believe that the proposed grouping of agri-food sector problems and their relationship with the UN SDGs can serve as a basis for constructing a concept for its sustainable development. We show that in order to adapt the 2030 Agenda it is necessary to conduct an in-depth analysis of existing strategies and programs for development of the agri-food sector by comparing their goals, objectives and indicators with the global SDGs, identifying their inconsistencies and the possibilities to adjust them.

Key words: sustainable development, national economy, agri-food sector, UN sustainable development goals, Russian priorities, indicators, adaptation.

Introduction. In recent years, the world science has used sustainable development and economy with clear social and environmental priorities as a basic model up to 2030. An important feature of the new model of economy ("green" economy) should be the environmental and economic transformation and social welfare of each person in the society [1].

The term "sustainable development" was introduced by the UN World Commission on Environment and Development "Our Common Future" in 1987 to characterize development where meeting the needs of the present does not undermine the ability of future generations to meet their own needs.

The scientific approach to the problem of sustainable development is based on decisions of UN conferences related to the adoption of Sustainable Development Goals (SDG). In 2015, the UN General Assembly adopted a resolution a/RES/70/1 which contains the document "Transforming our world: the 2030 Agenda for Sustainable Development" [2] (hereinafter – the Agenda). The document contains specific directions to form a new economy focused on economic growth, ensuring social welfare of an individual in the society, as well as reducing environmental risks [3]. World leaders came to an agreement in terms of 17 SDGs and objectives, as well as means to implement them [2].

Issues related to achieving SDGs in agriculture are covered in works of researchers from around the world. They pay special attention to individual goals and activities aimed at achieving sustainable development, as a rule, in a particular state. In particular, the work by M. Qadir and co-authors examines in detail SDG 6 related to providing the residents

of countries experiencing fresh water scarcity with clean water [4].

Sustainable development in rural territories in Pakistan is covered in the article by I. Padda and A. Hameed [5], which focuses on the first and, in their opinion, the main SDG aimed at ending poverty. Based on the assessment of different levels of deprivation and poverty among the rural population of Pakistan presented in the work, researchers justify the need for additional state funding for social security, education, sanitation, water supply, and agricultural development in the country. SDG 7 (affordable and clean energy) is studied in detail by the researchers supervised by M. Kurata [6]. The researchers concluded that renewable energy sources (RES) used in rural households without centralized electricity supply in Bangladesh are recognized as promising technologies to mitigate energy shortage in these areas. The importance of renewable energy development is stated in the article by J. 7. Terrapon-Pfaff et al. [7]; here, the authors recognize the relations between water, energy, and food resources as a conceptual framework for effective achievement of SDGs.

The organizational aspects related to achieving SDGs were analyzed by C. Allen, G. Metternicht, and T. Wiedmann [8]; the publication emphasizes the need to adopt evidence-based approaches to achieving SDGs. The authors recommend systematically monitoring national progress to ensure that the scientific community promptly responds to the challenges of the time.

The issues of sustainable development, particularly in agriculture, are reflected in works of Russian researchers: Yu.A. Akimova [9], O.Yu. Antsiferova and A.G. Strelnikova [10], E.F. Muzdin [11], V.M. Belousov [12], A.V. Sobolev and N.I. Raimzhanova [13], E.V. Serova [14], N.I. Shagaida [15] etc. They put an emphasize on food security, improving living standards of the rural population, providing them with drinking water etc., which generally coincides with seventeen UN goals of sustainable development up to 2030.

It is noteworthy that one of the most significant SDGs is SDG 2 related to issues of ending hunger, poverty, ensuring sustainable development of agriculture, food security and nutrition, sustainable management of natural resources, development of rural areas and the agri-food sector. According to forecasts, by 2050 the world will be home to about 9 million people. Therefore, the demand for food will increase. According to estimates of the UN Food and Agriculture organization (FAO), in order to provide the world's population with proper food it is necessary to increase its production by 60%. Provided that farming is managed through the same methods and means, additional 40% of water and energy will be required. However, given the limited basic natural resources and the ongoing climate change on a planetary scale, this increase in food production is not evident.

Currently, Russia like other countries is facing a global environmental challenge. Ensuring economic growth in Russian territories and economic sectors directly affects the quality of the environment. At the meeting of Russia's State Council on Environmental and Economic Development it was shown that the anthropogenic load on ecosystems in certain spheres has reached critical values and annual damage is about 6% of gross domestic product, and taking into account the cumulative effect of pollution and consequences for human health-up to 15% per year [16]. The relevance

and importance of ensuring environmentally sustainable development in Russia as a whole and in various economic sectors is one of the long-term priority objectives of the country's development. This is also important for the agri-food sector. Thus, the Strategy of sustainable development of rural areas in Russia up to 2030 [17] notes that the environmental characteristics of rural areas deteriorate at the same time with a fairly dynamic growth of the agro-industrial complex, the standard of living and the quality of life of the rural population as a whole significantly lags the standard of living in cities, the population's access to social services is declining, the information and innovation gap between urban and rural areas is deepening, which leads to increased migration outflow of the rural population and underdevelopment of rural areas.

In this regard, issues of increasing welfare, employment growth, ending poverty, defining the ways of economic and social development are becoming a priority for scientific and applied research worldwide, including in RussiaRussian. It is obvious that there is an urgent need for correct adaptation of SDGs to the Russian socio-economic systems and economic sectors. At the national level, efforts are already being made to analyze the relations and meaningfully reflect SDGs in relevant key documents outlining the country's development in various areas of socio-economic and environmental development up to 2030. The most significant result in this area is the annual research carried out by the Analytical center under the Government of the Russian Federation – a report on human development in Russia for a specific year, where researchers maximally adapt the main priorities of UN SDGs for 2015–2030 to Russian conditions and prospects. In particular, the authors of the report for 2016 – S.N. Bobylev and L.M. Grigoriev – made an attempt to interpret and use the UN methodology for Russian conditions, pointing out that the country, having a sufficient number of data and indicators reflecting the performance of the socio-economic components of sustainable development, has experienced a shortage of statistics and indicators on the economic greening [18].

It is obvious that such studies are required for specific economic sectors, including the agri-food sector. The appeal to the problems and prospects of its sustainable development is explained by the fact that it is the leading system-forming sector of the country's economy, which ensures its food and economic security. Thus, the purpose of the article is to search for national priorities and guidelines for sustainable development of the agri-food sector of the economy, as well as to identify the possible areas to adapt the Agenda 2030 for Sustainable Development to the Russian conditions to subsequently improve the existing strategies and programs for agriculture development.

The principal novelty of the author's view on the problem lies in the systematic research and development of the scientific framework to construct the concept of sustainable development in the Russian agri-food sector taking into account the adopted Agenda, as well as to justify the need to create a national system of indicators to monitor and assess progress in the development of the economic sector under review.

Research methodology and rationale for its selection. As indicated earlier, achieving SDGs as a whole will require their achievement in separate sectors. In this regard, the authors of the article attempt to consider SDGs in relation

to the Russian agri-food sector based on analysis of key interrelated problems characteristic of agriculture, as well as systematize them according to SDGs.

It should be recalled that Sustainable Development Goals adopted by the world community in 2015 up to 2030 have somehow become a "successor" to the Millennium Development Goals (MDGs), expanding and deepening them. In addition to the goal of ending poverty and hunger, which was the main objective of MDGs, the 2030 Agenda focuses on sustainable development and includes actions that have an impact on the environment, social sphere and economy [19]. In order to build the SDG system, the hierarchical structural approach "goals–objectives–indicators" used in MDGs was retained.

The current Agenda is universally applicable to both developed and developing countries. It implements the principles of sustainability, complies with international law, takes into account national peculiarities, opportunities and priorities, and includes priorities and goals that have been developed by the world community. The document proposes 17 sustainable development goals to implement which 169 objectives and more than 240 indicators were developed. The proposed SDG system is fairly balanced as it achieves a certain balance between economic, social, and environmental objectives. Many goals combine several components of sustainability [20]. In turn, each of 17 SDGs contains a set of indicators to be achieved by 2030.

At the present stage, the evaluation sustainable development is a rather complex issue as all its aspects must be taken into account. For all its diversity, sustainable development is a dynamic concept with economic, social, and environmental phenomena developing at a different pace [21]. In the world practice, there are two main approaches to assessing sustainable development: construction of a system of indicators and aggregation of a cumulative indicator-index [22]. The first approach involves construction of a system of indicators: environmental, economic, and social [23]. Examples of this approach are systems of indicators of the United Nations, the European Union, the World Bank, etc.

The second approach involves the calculation of a cumulative index, which comprehensively assesses the sustainability of socio-economic development. The cumulative index is defined as a geometric mean of the three group indices of economic, social, and environmental sustainability. Indicators are converted to a comparable form by comparing them with the reference value or with the highest indicator value in the sample of territories under review [24].

Of course, to measure progress in achieving sustainable development at the national level it is required to adapt the goals and objectives of the Agenda, as well as develop a system of indicators for Russia. To this end, a special section called "Sustainable development goals" was created at the official website of the Federal State Statistics Service to systematize information on statistical accounting and monitoring of SDG indicators [25]. Although the resource is currently being developed, it is already used as a national thematic report platform on sustainable development. It is noteworthy that to develop a national SDG system Rosstat retained the formulation of goals and objectives of the Agenda proposed by the UN, significantly changing both qualitative and quantitative system indicators. In particular, most of the 244 proposed global indicators –

156 (64%) – are not developed in our country as they are not typical for Russia and do not have a methodology developed and coordinated at the international level. Nineteen (7%) are in being developed together with their methodology; the range of agencies responsible for providing data is being defined. Only 69 (28%) of indicators are reflected in the UN definition; all of them are included in the federal statistical work plan.

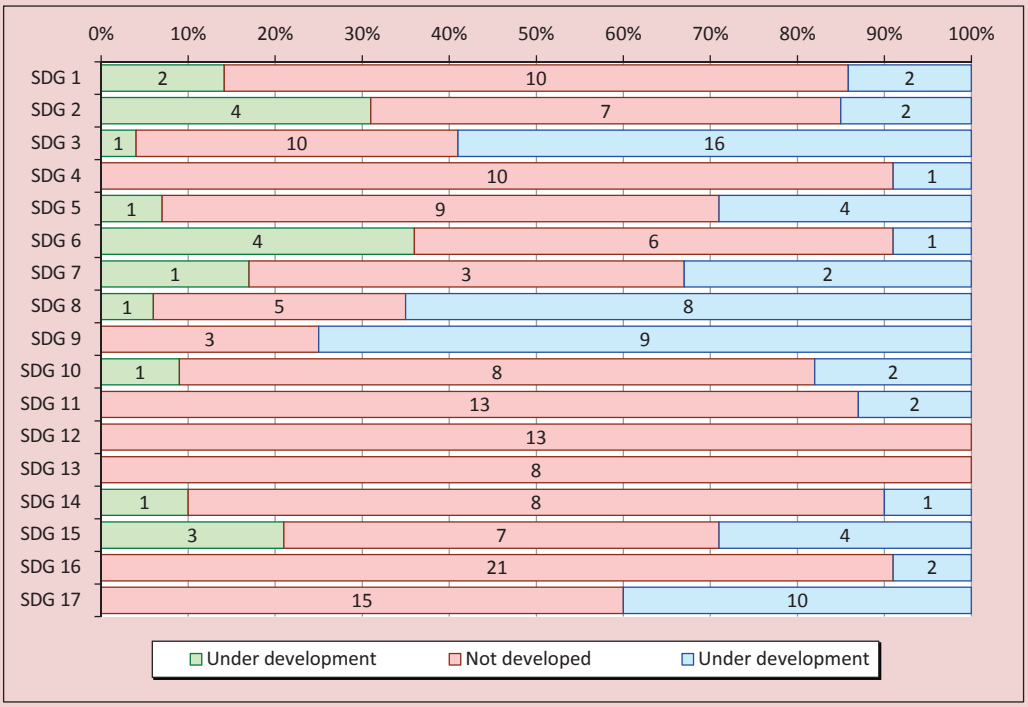
SDG and the degree of development of UN indicators in Russia are clearly demonstrated in *Figure 1*.

Thus, the proposed UN Agenda in its original form only retains 69 indicators. All others are formed taking into account the national priorities and availability of statistical reports. At this stage, the national system of indicators within SDG is proposed for discussion at the Rosstat website; more than 30 federal executive bodies take part in the work on forming statistical information on these indicators.

Research results and their analysis. In order to search for national priorities and guidelines for sustainable development in the agri-food sector in Russia we describe its socio-economic and environmental problems based on official statistics and empirical facts (*Table 1*).

According to the table, during 2000–2016, the share of the agri-food sector in Russia comprised 3.5–4.7% of GDP (in 2016 – 4.5%). Indeed, in recent years, domestic agri-industrial sector has demonstrated fairly high rates of economic growth: in 2015 – 3%, in 2016 – 4.8%. The volume of agricultural products in 2016 reached 5.5 trillion rubles, including products of crop farming – 3 trillion, and animal farming – 2.5 trillion rubles.

Figure 1. Sustainable Development Goals and degree of development of UN indicators



Source: compiled from [25].

Table 1. Performance of indicators characterizing state and development of agriculture and rural areas in 2000–2016

Indicator	2000	2005	2010	2011	2012	2013	2014	2015	2016	Deviation (+; -) 2016 to 2000
Macroeconomic and sectoral economic indicators										
Share of GVA of agriculture, hunting and forestry in total GVA in basic prices, %	n/a	4.7	3.6	3.8	3.5	3.6	3.9	4.3	4.5	-
Agricultural products in all types of farms (in actual prices), billion RUB, including:	742.4	1380.9	2587.8	3261.7	3339.2	3687.1	4319.1	5164.9	5505.7	4763.3
crop farming	394.7	669.8	1191.5	1703.5	1636.4	1918.8	2222.5	2791.4	3035.8	2641.1
animal farming	347.7	711.1	1396.3	1558.2	1702.8	1768.3	2096.6	2373.5	2469.9	2122.2
price index	1	1.90	3.11	3.30	3.52	3.75	4.18	4.72	4.98	-
Agricultural products in all types of farms (in comparable prices adjusted for inflation), billion RUB, including:	742.4	726.8	832.1	988.4	948.6	983.2	1033.3	1094.3	1105.6	363.2
crop farming	394.7	352.5	383.1	516.2	464.9	511.7	531.7	591.4	609.6	214.9
animal farming	347.7	374.3	449.0	472.2	483.7	471.5	501.6	502.9	496.0	148.3
Performance of capital investment under foreign economic activity "Agriculture, hunting, and forestry" (in actual prices), billion RUB	34.8	142.3	303.8	446.9	476.4	516.6	510.3	505.8	605.8	571.0
Performance of capital investment under foreign economic activity "Agriculture, hunting, and forestry" (in comparable prices adjusted for inflation), billion RUB.	34.8	74.9	97.7	135.4	135.3	137.8	122.1	107.2	121.7	86.9
Depreciation of fixed capital under foreign economic activity "Agriculture, hunting, and forestry", %	n/a	n/a	38.1	37.3	38.2	38.8	39.7	40.7	41.1	-
Energy security of agricultural organizations (generating capacity per 100 ha of cultivated land), h.p.	329	270	227	212	211	201	201	197	200	-129
Environmental and economic indicators										
Application of mineral fertilizers per ha for crops in agricultural organizations, kg	19	25	38	39	38	38	40	42	49	30.0
Application of organic fertilizers per ha for crops in agricultural organizations, tons	0.9	0.9	1.1	1.0	1.1	1.1	1.3	1.3	1.4	0.5
Share of agricultural land treated with pesticides in total agricultural area, %	14.8	20.5	26.7	31.6	33.3	35.4	36.1	36.8	39.2	24.4
Water intake from natural water bodies for use under foreign economic activity "Agriculture, hunting, and forestry", million m^3	21060	16084.7	14858.9	13996.6	15183.0	14639.8	14858.9	13996.6	13785.1	-7274.9

End of Table 1

Indicator	2000	2005	2010	2011	2012	2013	2014	2015	2016	Deviation (+; -) 2016 to 2000
Water loss during transportation under foreign economic activity "Agriculture, hunting, and forestry", million m^3	690.0	605.4	480.9	612.4	523.9	498.3	573.6	549.9	561.3	-128.7
Discharge of contaminated wastewater into surface water bodies under foreign economic activity "Agriculture, hunting, and forestry", million m^3	1408	1035.5	842.1	891.6	853.2	819.4	783.0	771.9	816.8	-591.2
Socio-economic indicators										
Share of rural population, %	26.9	26.9	26.2	26.0	25.8	26.0	25.9	26.0	25.9	-1.0
Total increase (decline) of rural population per year, %	-0.6	-0.52	-0.87	-0.35	-0.23	-0.30	n/a	-0.26	-0.30	0.3
Share of employed in agriculture, hunting, and forestry, %	13.9	11.2	9.8	9.7	9.5	9.4	9.2	9.2	n/a	-
Unemployment rate among rural population,%	11.2	11.4	11.1	10.0	9.0	8.7	8.2	8.4	n/a	-
Ratio of average monthly wage of agriculture workers to the average Russian level, %	44.3	42.6	50.9	53.3	53.1	52.8	54.5	58.0	59.3	15.0
Share of the poor living in rural settlements, %	32.6	37.6	39.1	37.7	39.1	39.5	37.1	36.1	36.0	3.4
Proportion of extremely poor people living in rural settlements, %	n/a	n/a	n/a	50.8	44.9	47.1	45.4	45.7	48.6	-
Average age of the rural population, years	37.3	38.1	38.7	38.8	39.0	39.1	39.2	39.4	39.5	2.2
Natural increase (decline) of the rural population, per 1,000 people	-7.3	-7.6	-2.1	-1.1	-0.1	-0.02	-0.1	-1.6	-2.0	5.3
Share of rural population over working age, %	22.7	21.4	22.2	22.6	23.1	23.7	24.3	24.6	24.9	2.2

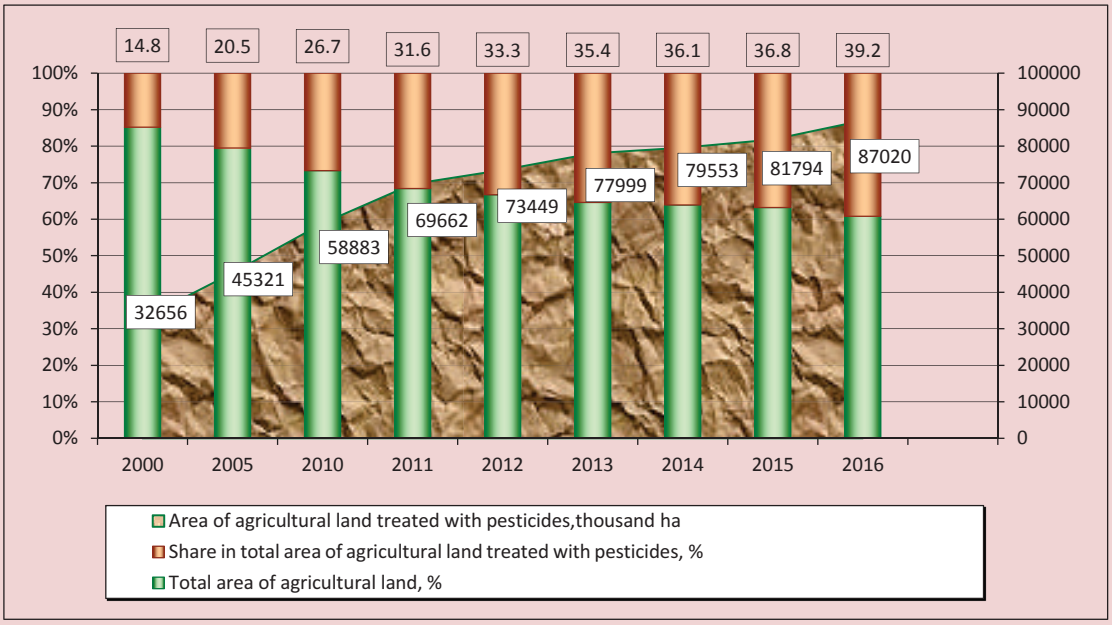
Source: compiled from [25, 26, 27, 28, 31].

However, experience shows that increased intensification of agricultural production leads to serious negative consequences for the environment. In particular, the problem of safe use of plant protection chemicals remains unresolved. *Figure 2* indicate that the area of agricultural land treated with pesticides increased by 54.364 thousand ha during 2000–2016, and the share of agricultural land treated with pesticides in the total area of agricultural land increased by 24.4% over the same period.

The figure also clearly shows that during 2002–2016 the area of arable land treated with chemicals increased almost 3 times, its share in the total area of agricultural land comprises 15–40%.

The fact that, as a result of intensive use of land resources and the reduced amount of land reclamation and fertilization in almost all regions of the country, the content of humus and nutrients in soils has decreased is also alarming. Thus, according to the Ministry of

Figure 2. Area of agricultural land treated with pesticides, 2000–2016



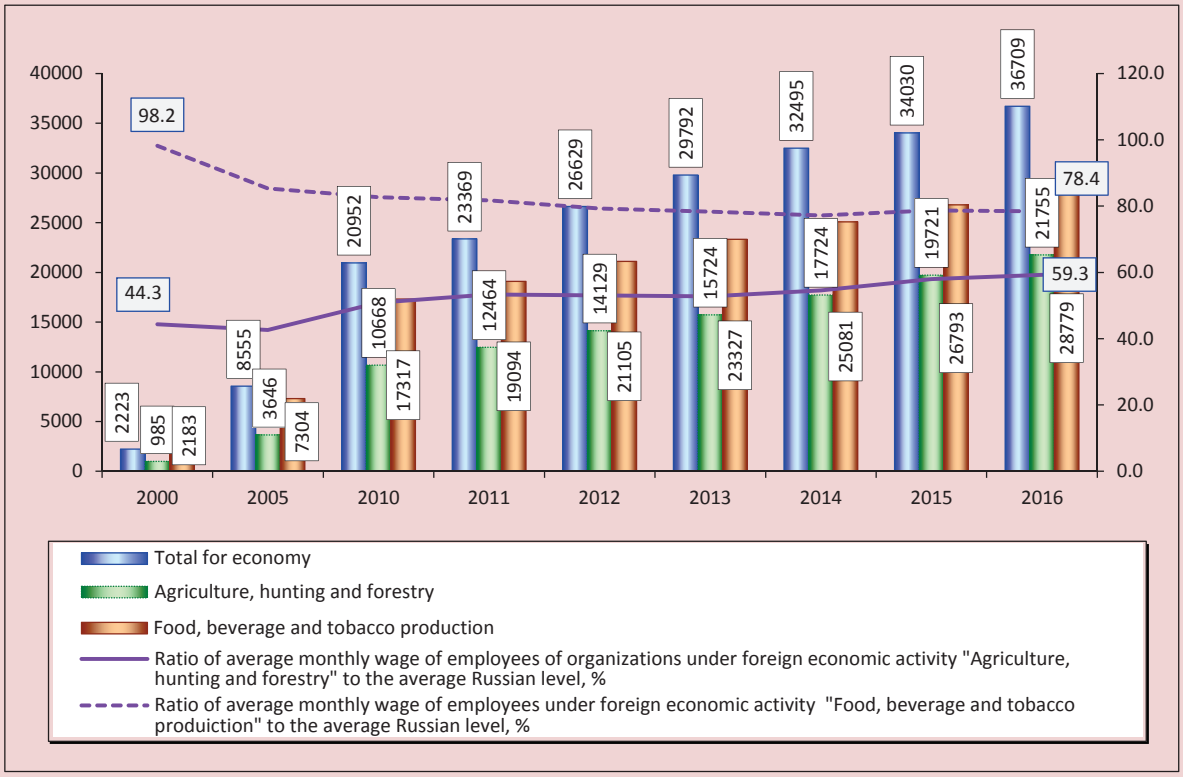
Source: compiled from [26].

Agriculture of the Russian Federation, 35% of arable lands have high pH, 31% – low humus content, 22% – lack phosphorus [27].

It is well known that agriculture is an economic sector most exposed to the effects of climate change. Increased frequency of adverse hydrometeorological phenomena is associated with climate change. Over the past two decades, the number of meteorological hazards has more than doubled. According to Roshydromet (Federal Service of Russia on Hydrometeorology and Monitoring of the Environment), 590 cases of dangerous meteorological phenomena were registered in the country in 2016 [27]. Of course, such processes cause changes in crop farming zones and entail a decrease in productivity in warm climate zones. It is also noteworthy that in recent decades the average ground air temperature in our country has been rising at a rate of 2.5 times faster than globally. Higher temperatures and associated extreme weather phenomena such as droughts and increased aridity in a number of regions contribute to accelerated soil degradation. For the same reason, the majority of Russian territories are facing the problem of earlier ice clearance of rivers and water bodies, which leads to further flooding of agricultural land.

We cannot ignore the fact that the agri-food sector is the main consumer of water resources. With the existing technologies of agricultural production there are significant water losses in irrigation systems. Data of Rosstat demonstrate that during transportation water loss in agriculture is about 60% of the all-Russian loss. Moreover, intensive use of water resources in agriculture leads to their pollution as a result of wastewater discharge. At the same time, the main sources of pollution are discharges of processing plants and large stock breeding complexes, and flushing rain

Figure 3. Performance of average monthly wage of employees at organizations by type of economic activity, RUB.



Source: compiled from [30].

streams of toxic chemicals and fertilizers from fields [28]. Modern agricultural production is characterized by high energy consumption and low energy efficiency, the country's agriculture currently retains a high degree of dependence on centralized energy supply. Due to large scarcely populated agricultural areas there exist problems associated with long networks and dispersion of rural consumers.

According to experts, as a result of the impact of natural and anthropogenic factors, Russia annually experiences shortage of agricultural products in the mount of 47 million tons (in cereal equivalent) [29]. At the stage of consumption, there are also significant food losses: 56 kg of food waste per year per one Russian citizen. About a quarter of all products remain unused and are disposed before use [14].

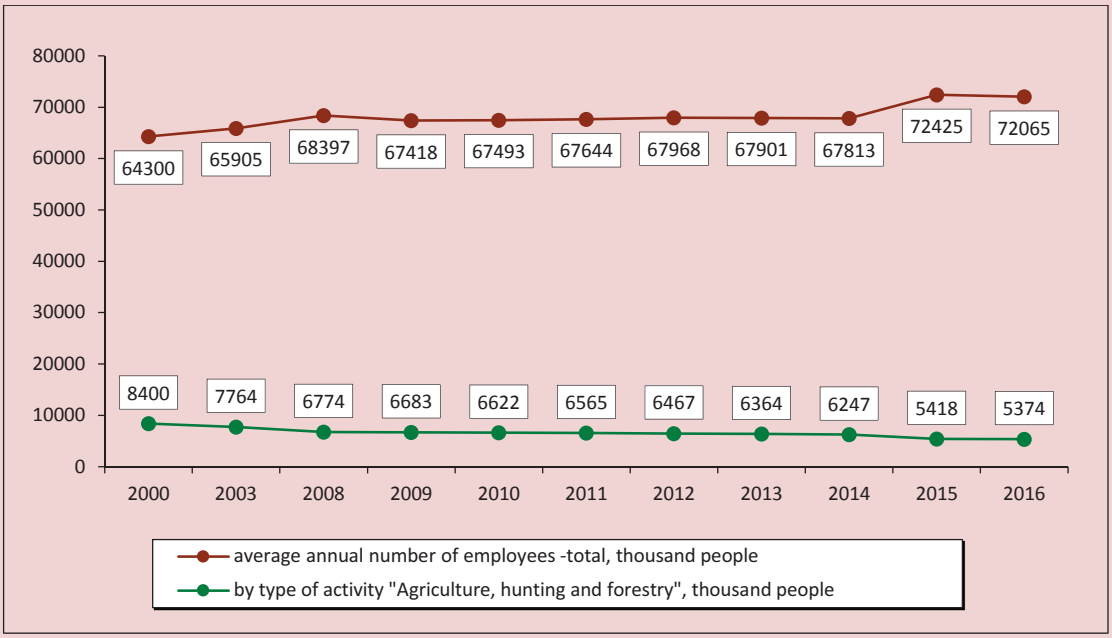
At present, the problems of unemployment and depopulation in rural areas are particularly relevant for Russia's agri-food sector since the quality of life and the standard of living of the rural population differs significantly from those of urban residents. Table 1 demonstrates that the share of employed in main sectors of the rural economy (agriculture, hunting, forestry) has decreased from 13.9 to 9.2 % in recent years.

Figure 3 shows the performance of average monthly wages of employees at organizations by economic activity "Agriculture, hunting, and forestry" and "Food processing".

The data demonstrate that despite the increase in average monthly wage of agricultural workers in actual prices by almost 10 times (21,755 RUB) in 2016 compared to 2000 (2,223 RUB) it still remains 40% lower than the average in the economy. The increase in wages in this sphere of economic activity adjusted for inflation during the period under study (see Table 1) has only doubled. It is because of low wages that the rural population accounts for more than a third of the country's poor (36%) and almost half of the extremely poor (48.6%), while the rural population accounts for only a quarter of the total Russian population [30]. Mass migration of rural population, especially young people, to cities has serious negative demographic consequences since young people is the most employable population group and account for three quarters of births.

The number of women per 1,000 men, including women of reproductive age, has declined significantly over the past 20 years. It is a well-known fact that women in rural areas, compared to men, are largely engaged in hard unpaid work doing housework and supporting private farms. According to the Federal State Statistics Service, in 2015 the share of women whose main job was related to agricultural production in their own household accounted for 52% in the country (the share of men – 24%). Women still do not have equal access to decision-making processes, distribution of financial results, etc. compared to men. The existing obstacles to gender equality in employment and mobility of rural women in the labor market directly depend on women's limited access to acquiring professional skills and knowledge,

Figure 4. Performance of average annual number of employed in total and by type of economic activity "Agriculture, hunting, and forestry", thousand people



Source: compiled from [20].

Table 2. Systematization of key problems of Russia's agri-food sector according to UN Sustainable Development Goals

Goal of the global Agenda	Problem articulation
SDG 1. Ending poverty	Low income level of rural population and people employed in agriculture
	Violation of rights of land (share) owners
SDG 2. No hunger and sustainable agriculture	Malnutrition in all forms
	Limited physical availability of food
	Limited economic access to food
	Food safety; reduced quality of food
	Unsustainable food production
	Heavy dependence on imports of genetic resources
	Lack of funds of agricultural producers for modernization and expanded reproduction
	Underdeveloped organic production; lack of market regulation for organic products
SDG 3. Good health and well-being	Increased morbidity rate
	Alcohol abuse
	Limited access to healthcare services
SDG 5. Gender equality	Restrictions of rights of rural women; hard working conditions in households
SDG 6. Clean water and sanitation	Misuse of water resources
	Discharge of contaminated wastewater into water bodies; low level of recycling and sustainable use of water resources
	Low availability of drinking water of standard quality, water supply system and sewage
SDG 7. Affordable and clean energy	Limited access to modern energy sources; low energy efficiency
SDG 8. Decent work and economic growth	Reducing employment rate, unemployment, outflow of young qualified personnel
SDG 9. Industry, innovation and infrastructure	Unstable infrastructure*
	Limited access to financial resources and marketing channels for small-scale agricultural producers
	Outdated equipment and technology
	Weak innovation and research activities
SDG 10. Reduced inequalities	Difference quality of life in rural and urban areas
	Low activity of the rural population (mainly elderly and older) in social, economic and political life
SDG 11. Sustainable4 cities and communities	Poor transport infrastructure
	Urbanization; spontaneous development of suburban and rural areas
SDG 12. Responsible production and consumption	Production losses during production and consumption at various stages
	A large amount of production wastes, a weak level of recycling secondary raw materials
SDG 13. Climate action	Negative impacts of agriculture on climate change; impacts of climate change on agriculture
SDG 14. Conservation of marine resources	Misuse and pollution of marine ecosystems; reducing marine bioresources
SDG 15. Conservation of land resources	Degradation of the natural environment due to disruption of technological processes; reduction of biodiversity and increased sensitivity of crops to pests and diseases

* The term "unstable infrastructure" refers to the underdeveloped rural infrastructure characterized by low road quality, poor provision of modern systems of energy and water supply, telecommunication systems, limited access to public transport.
Source: compiled by the authors.

on infrastructure development in pre-school education and household services, transport communications, etc. Of course, the current trend is a significant barrier to the formation of the HR base for the development of the country's agri-food sector. The situation is aggravated by the consistently high level of alcohol consumption among the rural population, which causes numerous negative social and medical consequences, leads to physical and moral degradation. It is noted that people of working age with low income level living in rural areas and having abuse alcohol particularly often.

It is known that rural territories, especially small settlements, have the prevailing share of elderly and old people characterized by adaptive-passive behavior, commitment to preserving a traditional rural way of life and poorly motivated to change the way of life. All these conditions and factors lead to low social and economic activity of the rural society.

Unfortunately, depopulation in rural areas has reached a critical point, directly affecting the replenishment of agricultural sectors with labor resources. *Figure 4* reflects the performance of the average annual number of employed in total and by type of economic activity "Agriculture, hunting, and forestry" for 2000–2016.

According to the figure, over the past 16 years the average annual number of people employed in agriculture and forestry decreased by almost 40% – from 8.4 to 5.3 million people. The information and innovation gap between urban and rural areas continues to grow, leading to the underdevelopment of rural areas. In recent decades, there has been a significant increase in the area of residential lands, with detrimental effects on peri-urban and rural areas. Unplanned urbanization not only occurs on agricultural land and natural habitat, but also leads to increased travel distances, deterioration in resource use per capita, increased emissions, and dispersion of production factors. The underdeveloped transport infrastructure in rural areas is explained by lack of funds for road construction, repair, and maintenance, purchase of new equipment, as well as lack of qualified engineering and technical personnel.

Thus, analysis of the agri-food sector development has revealed a number of socio-economic and environmental problems that currently exist in agriculture. Despite the fact that they are peculiar, they are still largely similar to the global problematic issues. In this regard, we have made an attempt to systematize the identified problems in national agriculture according to SDG adopted by the 2030 Agenda.

Table 2 presents final research results: we formulate and systematize the key problems of the agri-food sector according to SDG, which the authors specify as relevant to the Russian agriculture.

According to the table, 14 goals are directly or indirectly related to the problematic state of the agri-food sector and its development (1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15). Within the framework of these goals, the authors identify 78 relevant targets (46%). Note that none of the goals can be achieved separately from others; all of them are related to the proposed targets. At the same time, the balance and correlation between the three dimensions of sustainable development is reflected not only at the level of goals, but also at the level of targets.

Figure 5 shows the targets of the Agenda identified by the authors as relevant to the agri-food sector.

Figure 5. Goals and targets of the Agenda relevant to the agri-food sector

SDG 1	SDG 2	SDG 3	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15
1.2	2.1	3.4	5.a	6.3	7.1	8.1	9.1	10.1	11.2	12.1	13.1	14.1	15.1
1.4	2.2	3.5		6.4	7.2	8.2	9.3	10.2	11.a	12.2	13.2	14.2	15.2
1.5	2.3	3.8		6.6	7.3	8.3	9.4			12.3	13.3	14.3	15.3
	2.4	3.9		6.b	7.a	8.4	9.5			12.4		14.4	15.4
	2.5	3.d			7.b	8.5				12.5		14.5	15.5
	2.a					8.6				12.6		14.6	15.6
	2.в					8.8				12.7		14.7	15.7
	2.c					8.9				12.8		14.a	15.8
						8.b				12.a		14.b	15.9
										12.b		14.c	15.a
													15.b
													15.c

Source: compiled by the authors based on [32].

The provided information suggests that the greatest number of challenges relevant to the agri-food sector will need to be addressed under SDG 2 (Ending hunger and sustainable agriculture), SDG 8 (Decent work and economic growth), SDG 12 (Responsible consumption and production), SDG 14 (Conservation of marine resources) and SDG 15 (Conservation of land resources). At the same time, actions aimed at solving relevant targets and achieving one goal will be directly related to achieving other goals. In this sense, Sustainable Development Goals function as an interrelated system, regardless of whether they are considered at the national, regional or sectoral (sectoral) level.

The interrelation of the identified problems of the agri-food sector, the goals and targets of the adopted UN Agenda is presented below. Goal 1, for example, aims to end poverty. The issue of poverty is not relevant to our country, yet there is a high share of the poor with incomes below living wage. Given the fact that almost half of the extremely poor live in rural areas, it is clear that this goal cannot be achieved without increasing rural employment rate (Goal 8) and rural incomes (Goal 2, 2.3). Therefore, there will be a need to increase productivity and income in agricultural production the short term, as well as significantly increase non-agricultural employment rates in rural areas. At the same time, expanding the scope of social security systems is crucial not only for creating new jobs in rural areas, but also for expanding agricultural production.

Target[1] 2.3 of Goal 2 aims to double agricultural productivity and incomes of small-scale food producers by 2030. Russia possesses considerable potential to increase agricultural productivity. In particular, the country can achieve a significant increase in crop yields by extended use of means of increasing fertility,

[1] Target 2.3: by 2030 double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.

biological in particular, as well as by introducing more efficient agricultural technologies and equipment. It is also possible to double the productivity and income of family farms, this will be critical to achieving target 2.3. Moreover, a significant increase in the income of small farmers can be achieved by better distribution of income along value added chains [33]. Finally, we believe that there is a need to increase access to services, knowledge, markets, resources and finance for small farmers and family farms in order to increase their productivity and income.

When discussing the issue of food security (SDG 2), Russia has traditionally talked about the volume of production, rather than the need to ensure economic access to food. The priority of production over access is expressed in ranking targets of the national food security Doctrine and in criteria for assessing its status. Thus, the targets to ensure physical and economic accessibility, as well as food safety (target[2] 2.1) are at the end of the list, and criteria are actually self-sufficiency coefficients of own production [15, 34].

Although the extent of the problem of malnutrition (SDG 2) in Russia is considered relatively insignificant, in some regions specific populations remain vulnerable to food insecurity. Access to food is adversely affected by difficult economic conditions and lack of decent jobs. To ensure that all, especially the vulnerable poor, have year-round access to "safe, nutritious and decent food" urgent action on target 2.1 is required. Obesity remains the most important target among various aspects of malnutrition, including in Russia. Eating disorders also include a significant level of micronutrient deficiency. The problem in this context is related to target[3] 2.2 of Goal 2 which appeals for ending all forms of malnutrition [35]. To scale down this problem it is required to significantly improve diet and change lifestyles. In this regard, the introduction of healthy diets in pre-school, school and public institutions, at work and in every family should be encouraged.

Goal 8 deals directly with issues related to employment and livelihood. The agri-food sector is the main source of employment in many regions of our country; therefore providing full employment, decent working conditions and equal wages in these regions will depend crucially on the development of agriculture as an industry [35]. In this regard, priority measures in increasing employment and regulating the labor market in rural areas should be the following: create new modernized jobs and conditions for attracting qualified young professionals to rural areas; develop entrepreneurship, self-employment and forms of family employment based on private farms and consumer cooperation, etc. [17].

It is known that sustainable functioning of the agri-food sector implies economic sustainability, environmental integrity, and social well-being. For example, the sustainability of incomes of food producers and workers in a food supply chain and reduction of losses and waste in agri-food systems implies economic sustainability. Its security is reflected in the framework of SDG 2 and SDG 12. For example, target 2.3 of SDG 2 relates to increasing the income of small food producers, while target 12.3[4] of SDG 12 aims to reduce

[2] Target 2.1: by 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.

[3] Target 2.2: by 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons..

[4] Target 12.3: by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

losses and waste in the food system. The current situation in food production and distribution systems is both a challenge and an opportunity to strengthen the economic sustainability of the agri-food sector. Social sustainability refers to ensuring basic rights and decent living conditions for people working in the agri-food sector. These aspects are addressed in target[5] 8.5 of SDG 8: achieve full and productive employment and decent work for all [35].

Environmental sustainability involves sustainable use of natural resources and minimization of negative human impact on the environment. Goal 2, targets 2.4 (Sustainable food production[6]) and 2.5 (Biodiversity[7]), Goal 6, target 6.4 (Water use efficiency[8]), Goal 12, targets 12.1 (Sustainable production and consumption[9]), 12.2 (Rational resource management[10]), as well as various targets under Goal 13 (Climate change), Goal 14 (Oceans and marine resources) and Goal 15 (Forests and land) address various aspects of environmental sustainability within the agri-food sector [35].

Goal 13 covers climate change and climate action. In Russia and worldwide, climate change has already increased the number of cases of heat stress and led to extreme weather conditions. The agri-food sector is experiencing all effects of climate change, with an increasing number of extreme weather phenomena and natural disasters such as flooding, droughts, and landslides. These effects have already led to degradation of natural resources, changes in water availability and loss of biodiversity. One of the most important objectives for the Russian agri-food sector in this sphere is to reduce the anthropogenic impact on the environment.

The targets of Goal 14 also remain relevant for our country, as despite the efforts of the government illegal fishery of marine bioresources and illegal exports of fish products abroad continue to expand. Criminalization processes in extraction of marine resources continue to advance [36]. Marine ecosystems are contaminated by oil and petroleum products, waste water, industrial and domestic waste. Goal 14 contains the main patterns of development related to oceans, seas and marine resources. The implementation of these patterns will ensure efficient production management, prevent illegal fishing and destructive fishing practices. The harmonization of national policies with the various targets under Goal 14 will contribute to the conservation and sustainable use of marine resources.

Recognizing the importance of forests for rural development, biodiversity, bioenergy and addressing climate change, it is necessary to update the state forestry development program

[5] Target 8.5: by 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.

[6] Target 2.4: by 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

[7] Target 2.5: by 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.

[8] Target 6.4: by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

[9] Target 12.1: to implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.

[10] Target 12.2: by 2030, achieve the sustainable management and efficient use of natural resources.

in our country with a focus on sustainable forest management. Target[11] 15.3 under Goal 15 reflects the problems of land degradation, which affects a significant part of the Russian regions. Combating land degradation requires target investment and technological support to improve land and water management.

Such, according to the authors, should be the main priorities in the process of transition of the Russian agro-food sector to sustainable development and, accordingly, possible directions of adaptation of the Agenda to national conditions taking into account the identified problems in agriculture.

Conclusion. Let us formulate the main conclusions and research results.

1. In modern Russia, based on key political documents determining the country's development in socio-economic and environmental development up to 2030, efforts are being made to identify national priorities and opportunities for adapting the 2030 Agenda. Of course, the concept of the UN SDG provides a good opportunity for a systematic attempt to adapt the global goals to Russian conditions taking into account the relatively high level of the country's development as a whole and its separate economic sectors. In some cases, SDG recommended by the UN, including specific indicators, have already been achieved in the Russian context. However, at present, we have to talk only about certain guidelines that could become an important element of the national debate on future sustainable development of the country's economy and its individual sectors. In our opinion, in order to achieve sustainable development as a whole it must be achieved simultaneously in all spheres and economic sectors. At the same time, given the ambitious and comprehensive nature of the 2030 Agenda, we expect that all ministries and departments of national governments will have to harmonize their policies and programs, as well as integrate the SDG targets into them.

2. An attempt is made to systematize the problems existing in the agricultural sector of the national economy according to Sustainable Development Goals (SDG) and targets of the 2030 Agenda. We believe that 14 goals are directly or indirectly related to the problematic state of the agri-food sector and its development (1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15). In the framework of these goals 78 relevant target (46%) are identified. The greatest number of challenges relevant to the agri-food sector will need to be addressed under SDG 2 (Ending hunger and sustainable agriculture), SDG 8 (Decent work and economic growth), SDG 12 (Responsible consumption and production), SDG 14 (Conservation of marine resources) and SDG 15 (Conservation of land resources). At the same time, actions aimed at solving the relevant targets and achieving one goal will be directly related to achieving other goals. In this sense, Sustainable Development Goals function as an interrelated system regardless of whether they are considered at the national, regional or sectoral level. Thus, the proposed systematization of problems in agriculture and their correlation with the UN SDG can serve as a research framework for constructing a concept of sustainable development of the studied sector of the national economy.

3. It is demonstrated that achieving sustainable development requires not only identification of problems and their solution, but also the accompanying development of appropriate indicators to measure progress in

[11] Target 15.3 under Goal 15: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

this sphere. Rosstat has proposed a national system of indicators of sustainable development, for most of which statistical information is available. A number of indicators developed by Rosstat are also relevant for the agri-food sector, although this issue is the subject of scientific discussions. Thus, first of all, it is necessary to study the system of indicators for their possible application to monitor progress in sustainable development of the agri-food sector specifically. This will require an in-depth analysis of the existing strategies and programs for agriculture development by comparing their goals, objectives and indicators with global SDG to identify inconsistencies and opportunities for change.

4. The promising area for further research will be an in-depth analysis of the existing programs for the development of the agri-food sector and their comparison with global SDG and targets to identify inconsistencies and opportunities for change, as well as improvement and development of specific indicators for monitoring and assessing progress in the development of a particular economic sector. Such an area of future research is certainly of scientific interest and will require the future creation of an interactive tool that would combine statistics in order to develop a national system of indicators to measure the sustainability of the country's agri-food sector.

References

1. Potravnyi I.M., Novoselov A.L., Gengut I.B. Formalizing the general model of green economy at the regional level. *Ekonomika regiona=Economy of Region*, 2016, vol. 12, no. 2, pp. 438-450. (In Russian).
2. *Transforming Our World: the 2030 Agenda for Sustainable Development*. UN, New York, 2015. Available at: http://docs.cntd.ru/document/420355765.
3. Bobylev S.N, Solov'eva S.V., Khovavko I.Yu. State environmental policy: identifying new economic and legal priorities. *Ekologicheskoe pravo=Enviromental Law*, 2016, no. 4, pp. 43-49. (In Russian).
4. Qadir M., Schubert S., Oster J. High magnesium waters and soils: emerging environmental and food security constraints. *Science of the Total Environment*, 2018, vol. 642, pp. 1108-1117.
5. Padda I.U., Hameed A. Estimating multidimensional poverty levels in rural Pakistan: a contribution to sustainable development. *Journal of Cleaner Production*, 2018, vol. 197, pp. 435-442.
6. Kurata M., Matsui N., Ikemoto Y. Do determinants of adopting solar home systems differ between households and micro-enterprises? Evidence from rural Bangladesh. *Renewable Energy*, 2018, vol. 129, pp. 309-316.
7. Terrapon-Pfaff J., Ortiz W., Dienst C. Energising the WEF nexus to enhance sustainable development at local level. *Journal of Environmental Management*, 2018, vol. 223, pp. 409-416.
8. Allen C., Metternicht G., Wiedmann T. Initial progress in implementing the Sustainable Development Goals (SDGs): a review of evidence from countries. *Sustainability Science*, 2018, vol. 13, no. 5, pp. 1453-1467.
9. Akimova Yu.A. Sustainable development in agriculture amid main goals of a single EU agrarian policy. *Kontentus=Contentus*, 2017, no. 1, pp. 21-29. (In Russian).
10. Antsiferova O.Yu., Strel'nikova A.G. A mechanism for achieving the goals of sustainable development in agriculture. *Teoreticheskie i prikladnye aspekty sovremennoi nauki=Theoretical and applied aspects of modern science*, 2014, no. 4-2, pp. 110-113. (In Russian).
11. Muzdin, E.F. The role of organic agriculture in achieving Sustainable Development Goals. *Vektor ekonomiki=Economic Vector*, 2017, no. 11, pp. 17. (In Russian).
12. Belousov V.M. Justifying the system of sustainable development goals of the agrarian sector of economy. *Agroprodovol'stvennaya politika Rossii=Agro-food Policy in Russia*, 2017, no. 1, pp. 33-39. (In Russian).

13. Sobolev A.V., Raimzhanova N.I. Global challenges and objectives of sustainable development: strategy for agriculture and cooperatives. *Fundamental'nye i prikladnye issledovaniya kooperativnogo sektora ekonomiki=Fundamental and Applied Researches of the Cooperative Sector of the Economy*, 2017, no. 1, pp. 10-16. (In Russian).
14. Serova E.V. The goal is to reach sustainable development. *Ekonomika sel'skogo khozyaistva Rossii=Russia's Agricultural Economy,* 2017, no. 7, pp. 2-3. (In Russian).
15. Shagaida N., Uzun V. Food security: issues of assessment. *Voprosy ekonomiki=Economic Issues*, 2015, no. 5, pp. 63-78. (In Russian).
16. *Stenogramma Gosudarstvennogo soveta po voprosu ob ekologicheskom razvitii Rossiiskoi Federatsii v interesakh budushchikh pokolenii ot 27 dekabrya 2016 goda* [Shorthand report of the State Council on Russia's environment development in favor of future generations dated 27.12.2016]. Available at: http://kremlin.ru/events/president/news/53602.
17. *Strategiya ustoichivogo razvitiya sel'skikh territorii Rossiiskoi Federatsii na period do 2030 goda* [Strategy of sustainable development of rural areas in Russia up to 2030]. Approved by the Decree of the Government of the Russian Federation no. 151-r, dated 02.02.2015. Available at: http://www.consultant.ru/document/cons_doc_LAW_174933.
18. Bobylev S.N., Grigor'ev L.M. (Eds.). *Doklad o chelovecheskom razvitii v Rossiiskoi Federatsii za 2016 god* [Report on human development in Russia for 2016]. Moscow: Analiticheskii tsentr pri Pravitel'stve Rossiiskoi Federatsii, 2016. 298 p.
19. Bobylev S., Solov'eva S. United nations: redefining goals. *Mirovaya ekonomika i mezhdunarodnye otnosheniya=World Economy and International Relations,* 2016, vol. 60, no. 5, pp. 30-39. (In Russian).
20. Bobylev S.N., Solov'eva S.V. New targets for the new economy. *Mir novoi ekonomiki=The World of New Economy*, 2016, no. 1, pp. 6-14. (In Russian).
21. Zomonova, E.M. *Strategiya perekhoda k «zelenoi» ekonomike: opyt i metody. Analiticheskii obzor* [A strategy for shifting towards "green" economy: experience and methods]. Novosibirsk: GPNTB SO RAN, 2015. 283 p.
22. Bobylev S.N., Solov'eva S.V. Sustainable development goals for Russia's future. *Problemy prognozirovaniya=Issues of Forecasting*, 2017, no. 3, pp. 26-33. (In Russian).
23. *Pokazateli ustoichivogo razvitiya: struktura i metodologiya* [Sustainable development indicators: structure and methods]. Tyumen: IPOS SO RAN, 2000.
24. Uskova T.V. *Upravlenie ustoichivym razvitiem regiona* [Region's sustainable development management]. Vologda: ISERT RAN, 2009. 355 p.
25. *Materialy Federal'noi sluzhby gosudarstvennoi statistiki. Tseli ustoichivogo razvitiya* [Material of the Federal State Statistics Service. Sustainable development goals]. Available ta: http://www.gks.ru/free_doc/new_site/m-sotrudn/CUR/cur_STATUS.htm.
26. *Okhrana okruzhayushchei sredy v Rossii: materialy Federal'noi sluzhby gosudarstvennoi statistiki* [Environment protection in Russia: materials of the Federal State Statistics Service]. Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1139919459344.
27. *O sostoyanii i ob okhrane okruzhayushchei sredy Rossiiskoi Federatsii v 2016 godu: gosudarstvennyi doklad* [On the state and protection of Russia's environment in 2016: state report]. Moscow: Minprirody Rossii; NIA-Priroda, 2017. 760 p.
28. *O sostoyanii i ob okhrane okruzhayushchei sredy Rossiiskoi Federatsii v 2015 godu: gosudarstvennyi doklad* [On the state and protection of Russia's environment in 2015: state report]. Moscow: Minprirody Rossii; NIA-Priroda, 2016. 639 p.
29. Cherednichenko O.A., Rybasova Yu.V. Ekologizatsiya ekonomiki kak osnova ratsional'nogo ispol'zovaniya i vosproizvodstva resursnogo potentsiala agrarnogo sektora [Economic environmentalization as a ramework for regional use and reproduction of the resource potential of agriculture]. *Ostrovskie chteniya=Readings from Ostrovsky*, 2017, no. 1, pp. 300-308. (In Russian).

30. *Sotsial'noe polozhenie i uroven' zhizni naseleniya Rossii. 2017: stat. sb.* [Social Status and Standard of Living of the Russian Population. 2017; statistical book]. Moscow: Rosstat, 2017. 332 p.
31. *Sel'skoe khozyaistvo, okhota i okhotnich'e khozyaistvo, lesovodstvo v Rossii. 2015: stat. sb.* [Agriculture, Hunting and Hunting Industry, Forestry in Russia. 2015: statistical book]. Moscow: Rosstat, 2015. 201 p.
32. *Doklad Mezhuchrezhdencheskoi gruppy ekspertov po pokazatelyam dostizheniya tselei v oblasti ustoichivogo razvitiya* [Report of the Inter-agency expert group on the performance of indicators of sustainable development]. 8-11 March, 2016. Available at: https://unstats.un.org/unsd/statcom/47th-session/documents/2016-2-IAEG-SDGs-Rev1-R.pdf.
33. *Sodeistvie sozdaniyu ustoichivykh proizvodstvenno-sbytovykh tsepochek v sfere prodovol'stviya. Rukovodyashchie printsipy*.[Promoting the introduction of sustainable production-marketing chains in food supplies] Rome: FAO, 2015. Available at: http://www.fao.org/3/a-i3953r.pdf.
34. Fedorenko I.N. The current view on the taxation of small businesses in the context of economic and food security. *Ekonomika sel'skokhozyaistvennykh i pererabatyvayushchikh predpriyatii=Economy of Agricultural and Processing Enterprises*, 2017 no. 11, pp. 52-55. (In Russian).
35. *Tseli v oblasti ustoichivogo razvitiya i ikh vliyanie na razvitie sel'skogo khozyaistva i sel'skikh raionov v regione Evropy i Tsentral'noi Azii* [Sustainable development goals and their impact on development of agriculture and rural regions in Europe and Central Asia]. Antalya, 2016. Available at: http://www.fao.org/3/a-mp172r.pdf.
36. Bobkova S.S. Preventing illegal extraction of water bioresources (case study of Kamchatka Krai). *Molodoi uchenyi=Young Researcher*, 2010, vol. 2, no. 1-2, pp. 124-130. (In Russian).

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Taxation in the System of Natural Resource Management and its Influence on the Economic Development of Northern Territories*

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Abstract. The paper considers types of taxes on and payments for the use of natural resources and shows their volume and dynamics in Northern regions of Russia. We highlight tax policy in the system of natural resource management from the point of view of coordinating private and public interests and observing social and territorial justice. The goal of the paper is to present the findings of a research on the theory and practice of taxation in the system of environmental management and its impact on economic development in the Northern territories. The objectives are as follows: to determine the types of tax exemptions for the use of non-renewable natural resources, to reveal current problems in fiscal relations, to establish general principles of taxation of environmental management and to assess its effectiveness. Scientific novelty of our study consists in the fact that we assess imbalances in the system of economic federalism in terms of taxation and the excessive gap between the places of production and consumption of natural resource revenues. Our study is relevant in a practical perspective because it determines current problems in tax and budget relations, establishes general principles of taxation of environmental management essential for the strategy of public administration in economics, analyzes and evaluates its effectiveness in Russia's Northern regions. The research methodology we use is based on the theories of taxation, environmental economics and regional economics. In order to achieve the goals and objectives of the study, we use methods such as quantitative comparison, dynamic and static analysis of tax revenues related to the use of natural resources in the Northern regions of Russia; this makes it possible to reveal relevant problems in fiscal relations.

Key words: types of taxes and payments, use of natural resources, taxation in the world and Russia, Northern regions, performance assessment, volume, dynamics and structure of taxes, fiscal relations.

Introduction

We believe that the methodologically correct consideration of "Northern" taxes and payments can have a significant impact on the assessment of the state of the entire financial and budgetary system of the country. Financial relations between the center (Federation) and the Northern regions are currently becoming particularly relevant due to the aggravation of the problem of spatial gap between the created and consumed surplus product. The division of income between the state and the enterprises of the extractive industry is also connected with the difficulties in balancing their interests on the basis of a certain compromise. Our general initial premise is that the taxation of natural resources should be formed taking into account the future of resource-based regions; besides, it is necessary to perform effective transformation of natural resources into resources of direct social purpose.

Specific types of tax immunity have their own features in certain sectors of the natural resource economy; at the same time, there is a significant increase in the promising role of biological and water resources. But the current problems of regionalization of fiscal relations are largely related to the extraction of minerals, primarily hydrocarbons.

We try to analyze the current problems of distribution of taxes related to natural resources in the framework of existing theories of taxation from the point of view of the need to improve regional policy.

Content of the problem

The development and use of natural resources is the basis of socio-economic development in the Northern regions of Russia. The share of natural resource industries in their GRP ranges from 25% in Kamchatka Krai to 69% in Nenets Autonomous Okrug (2015).

The proportion of people employed in these industries is lower; for example, it is 23% in Nenets Autonomous Okrug. But the nature and dynamics of all other types of employment is determined mainly by the arrangement of the extractive industry, its institutions and the role played by the natural resource factor in the scientific and technological development of the country. Most researchers of resource-based regions are critical about the thesis of "resource curse", "oil export dependence", "dependence on raw materials", etc. [1, 2, 3, 4, 5, 6, 7]. The main premise is that "resource wealth and good institutions are two fundamental factors that ensure sustainable economic growth in a long-term historical trend. In fact, it is political and economic axiom that needs no further explanation" [8, p. 88].

The question whether "to extract or not to extract" is not a problem one; the problems arise due to the existence of a variety of ways to assess resource potentials, their correct use, the inclusion of "raw materials and resources" in the system of social reproduction, the formation of end-to-end technological cycles "raw materials–semi-finished products–finished products", the calculation and distribution of rental and other revenues, the implementation of the constitutional norm in terms of joint (Federation and subjects of the Federation) state regulation of processes and financial results of nature management. It is in this aspect that the subject of economic science comes to the fore with a focus on the formation of a new system of capitalization of labor and natural resources of society [9, 10]. In order to improve rent taxation and enhance its role in the sustainable development of regions, research is carried out on concrete mineral and fuel and energy complexes of Siberia and the European North of Russia taking into account world experience of environmental management institutionalization [11, 12, 13] and distribution of the corresponding income among the budgets of different levels and the funds of the future. Concern about the future of resource-based regions and mining centers is associated with the cyclical character of natural resources and involves the early accumulation of funds for their modernization or radical reconstruction.

We can assume that the relations in the system of environmental management are well elaborated and regulated by legal documents. And yet they still remain opaque, not sufficiently systematic, contradictory, and ultimately socially and territorially unfair. The situation here is such that we have to go back to the theoretical foundations of taxation issues and their revision under the due to the risks of depression in the regions with raw materials specialization.

Research results

The economic basis of natural resource taxation is the state ownership of subsoil, most of the land, forests, and water, as well as the need to create funds for public reproduction and national security. The principles of establishing the payments for the use of natural resources imply the necessity to harmonize private and public interests. Differences in the reproduction of mineral and biological resources are also taken into account.

From the standpoint of the laws of social reproduction and social justice, the fact that the state withdraws part of the income of specific economic entities is perfectly justified. In the system of environmental management, the need for this exemption (except for the classical approach to income taxes and environmental payments) is supported by the theory of natural resource rent (absolute and differentiated), formed in the works of the classics of political economy (A. Smith, D. Ricardo, K. Marx)

and economic scientists of the present day (J. Stiglitz, D. Ellerman, Dm. Lvov, etc.). The regional aspect of rent taxation taking into account geographical, geological and social conditions is thoroughly analyzed in the works of V.A. Kryukov, V.V. Shmat, T.E. Dmitrieva and other authors [14, 15, 16, 17, 18]. The works [19, 20, 21] emphasize the Northern specifics of the issues of socially significant approach to financial and economic relations. These works consider various options for the payments for the right to develop mineral deposits and various options for the establishment of norms to withdraw superprofits. It is shown that the "ideal" calculation, withdrawal and distribution of natural resource rent could make minor changes in the volume and structure of GRP and significant changes in the formation of incomes of people and territorial budgets. Methodological difficulties of finding an unambiguous and acceptable practical solution for the calculation and withdrawal of rental income are revealed.

It is necessary to take into account the fact that in our country the tax load on subsoil users is the highest in comparison with other economic sectors: in 2017 in Russia – 10.8%, in the sector of fuel and energy minerals extraction – 45.4%, in the mining sector, except for fuel and energy, – 18.8%. Here, the payment of taxes is carried out both under the traditional system, including profit tax, value added tax, property tax, transport tax, export and import duties and other mandatory payments, through which the fiscal sovereignty of the country is realized, and also through special tax payments for the use of natural resources, namely mineral extraction tax, water and land taxes. Here we add fees for the use of objects of fauna and other biological resources[1].

Analysis and explanation of the results

Taxes in environmental management have a significant impact on the assessment of the condition of the entire financial and budgetary system of the country. For example, in 2015, GDP in Russia was 80 trillion rubles, taxes

[1] Tax exemptions for the use of non-renewable natural resources are quite diverse and include the following: rental bonuses, rentals, royalties, mineral extraction tax, in-kind payments received on the basis of production sharing agreements, and a number of others. *Rental bonuses* are pre-payments, the amount of which may be established according to the results of a competition for the right to use a natural object. *Rentals* (rent), as well as bonuses, do not depend on the volume of mineral extraction or profitability of the object (field) and are paid annually, thus ensuring a stable replenishment of the revenue side of the budget. The size of rentals can be established both for the entire contracted area and for a part of the area. *Royalty payment* is a payment to the owner for the right to develop natural resources; royalty payment is essentially a tax on the developer of minerals, it is set at a fixed rate for each ton of extracted raw materials or is calculated as a percentage of its market value. This type of tax exemption guarantees the state a certain minimum revenue from the beginning and until the end of the field operation. *Rent tax* on natural resources is a tool for the withdrawal of part of the rent, the source of which is the excess income exceeding the alternative cost of capital for the company. This tax is paid only from the implementation of high-yield projects and can be applied as an addition to royalties. *Production sharing agreement* is an agreement between the state and investors (usually foreign) on the division of extracted minerals within the framework of a specific investment project.

Different countries use different combinations of these payments. In Russia, the extraction of non-renewable natural resources, in particular hydrocarbons, is accompanied by the exemption of mineral extraction tax, excise taxes (on motor gasoline, diesel fuel, motor oils for diesel and (or) carburetor (injector) engines, straight-run gasoline, medium distillates (i.e. mixtures of hydrocarbons in liquid state obtained as a result of primary and (or) secondary processing of oil, gas condensate, associated petroleum gas, oil shale), benzene (i.e. a liquid containing (by weight) the corresponding elementary aromatic hydrocarbon in the amount of 99%), paraxylene, orthoxylene, aviation kerosene, petroleum raw materials (i.e. a mixture of hydrocarbons consisting of one component or several components, including oil, stable gas condensate, vacuum gas oil, tar, fuel oil), dark marine fuel (i.e. mixtures of hydrocarbons in liquid or solid state, obtained as a result of primary and (or) secondary processing of oil, stable gas condensate, associated petroleum gas, oil shale), natural gas), corporate income tax, export duties on oil and less fiscal exemptions – royalties, bonuses, fees for participation in the competition, for the issuance of licenses, payment for geological information about the subsoil, as well as the conclusion of production sharing agreements. (For details, see: Tax payments for the use of natural resources, their brief description. Available at: http://pravo.studio/kreditovanie/nalogovyie-plateji-polzovanie-prirodnyimi-46235.html).

and fees – 14 trillion, and the tax burden was only 17.5%, i.e. its level was relatively low. But "... the actual level of tax burden is significantly higher than the officially declared one. If its calculation takes into account the receipt of these payments withdrawn from the tax system, as well as oil and gas revenues (oil and gas production tax, export customs duties on oil, gas and oil products), which are not reflected in the revenues of the budget of the current year, but are sent to the state (federal) reserve stabilization funds, then the tax burden in the economy in recent years will be about...38-40% of GDP. This level roughly corresponds to the average European tax burden (ranging from 27.8% in Ireland to 48.2% in Denmark) and significantly exceeds its value in the U.S. economy (24%) and Japanese economy (28.1%). Thus, we come to an obvious conclusion: it is necessary to return customs duties, fees for harvesting raw wood (forest tax), regular payments for negative environmental impact (environmental tax) to the tax system" [22]. The example given above shows that before declaring that "our taxation in the field of raw materials and fuel is quite moderate", it is necessary to make a clear record of all financial and budgetary flows. In addition, the monitoring of specific tax rates for the extraction of multi-component complex ores in Krasnoyarsk Krai (the rates were established on mineral extraction tax as of January 1, 2017) will make it possible to prepare recommendations for their distribution to other types of minerals, including common ones, and to other regions, and to take into account specific features of nature management related to taxation in the Northern regions [23].

Financial relations between the center (Federation) and the regions are currently coming to the fore due to the aggravation of the problem of spatial gap between the created and consumed surplus product. This problem has historical prerequisites for the development of capitalism in Russia. At the time, N.N. Baransky showed its essence on an example of a pre-revolutionary situation in the cities of Ivanovo-Voznesensk and Moscow: the former manufactured goods (fabrics), and the latter accumulated the profit from the sales of those goods. Workers in Ivanovo-Voznesensk considered such a situation as socially unfair, which greatly contributed to their revolutionary mood [24]. And at present, the geography of income and consumption reflects territorial and social injustice: Moscow and some other large centers and their surroundings benefit from the concentration of capital, while other regions – especially the North – lose. One of the reasons for this lies in undetected and undistributed natural resource rent, the great portion of which is accumulated far from where it was created. The problems of spatial gap between the created and consumed surplus product will continue after the introduction of a new tax regime for the oil sector from January 1, 2019. The tax on additional income in the extraction of hydrocarbon raw materials will be introduced, and the amount of its inflow in the budget will depend on the amount of the estimated cash flow from the activities for the development of a separate subsoil plot (taking into account global market prices for hydrocarbon raw materials) and on the capital and operating costs for its production actually incurred and paid by the taxpayer. The problems will linger because the revenues to the budget after the introduction of a tax on additional income from hydrocarbon production and the reduction of the total amount of budget revenues under the new tax regime (mineral extraction tax and export customs duty on oil) due to the dependence on gross indicators, concern only the federal level.

The division of revenues between the state and the natural resource user is connected with the difficulties of maintaining the balance of their interests on the basis of a certain compromise. But in any case, the state should not allow the user of natural resources to appropriate the unearned part of the profit. The latter should have a profit of sufficient size to develop production and maintain economic incentives to exploit not only the best or highly profitable, but also hard-to-exploit fields. Here it is necessary to take into account mutual relations between business and local authorities. For instance, in the Republic of Komi, the tendency toward strengthening the links between corporate and territorial development has become more noticeable. In 2018, corporations operating in the Komi Republic began to invest significant funds not only in production, but also in the development of territories and in social environment. LUKOIL, Gazprom, Rosneft, Transneft, Mondi SLPK, Renova, Severstal, RUSAL and other companies increased the volume of financial support to 4.2 billion rubles[2] (5.5% of the consolidated budget revenues in the Republic).

Taxation of natural resource management implies taking into account the future of resource-endowed regions and effective transformation of natural resources into resources of direct social purpose. The analysis performed by T.E. Dmitrieva on the formation and distribution of funds for future generations, for example, the Alaska Permanent Fund, shows that they can be considered as territorial-resource trust funds [25]. The main points of the formation and use of this kind of trust funds are as follows: establishment of specific sources of formation, favorable placement of capital, elaboration of a dividend program, organization of management, and people's awareness. The general idea is to increase and protect domestic financial capital, the source of which is the common resource property.

In addition to outlining the current problems of fiscal relations, the theory of taxation of natural resources allows us to understand general principles essential for the strategy of state economic management:

– legislative establishment of taxes and fees for the use of natural resources should be carried out on the basis of legal norms: universality and equality of taxation; actual ability of economic entities to pay them; inadmissibility of discriminatory taxation and manipulation of elements of taxes (differentiated rates of taxes and fees for the use of natural resources, and tax benefits) depending on the form of ownership of the taxpayer and citizenship of natural persons or the place of origin of capital;

– establishment of taxes and fees for the use of natural resources should not violate the unity of the economic space of the country and should not limit the free movement of capital;

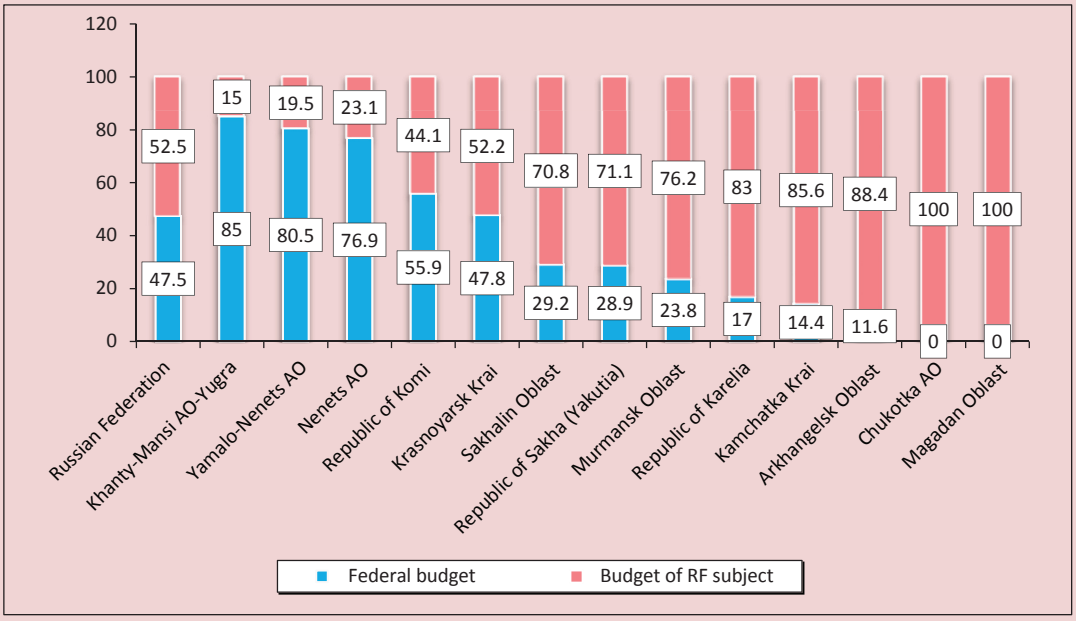
– parity between the fiscal and regulatory functions of taxes on the use of natural resources should be maintained, taking into account national and regional interests.

Assessment of environmental taxation effectiveness in the Northern regions of Russia

The proportion of taxes received by the federal budget and by consolidated budgets of the Northern constituent entities of the Russian Federation amounted to 47.5 and 52.5%, respectively, which is quite an acceptable proportion. But this ratio differs significantly in specific regions *(Fig. 1)*. For instance, in 2016, the ratio of tax revenues of the federal to territorial budgets was (as a percentage): in Khanty-Mansiysk Autonomous Okrug – 85 to 15, in Yamalo-Nenets Autonomous Okrug – 81 to 20, in Nenets Autonomous Okrug – 77 to 23, in the Komi Republic – 56 to 44 (for comparison: in 2000 – 42 to 58).

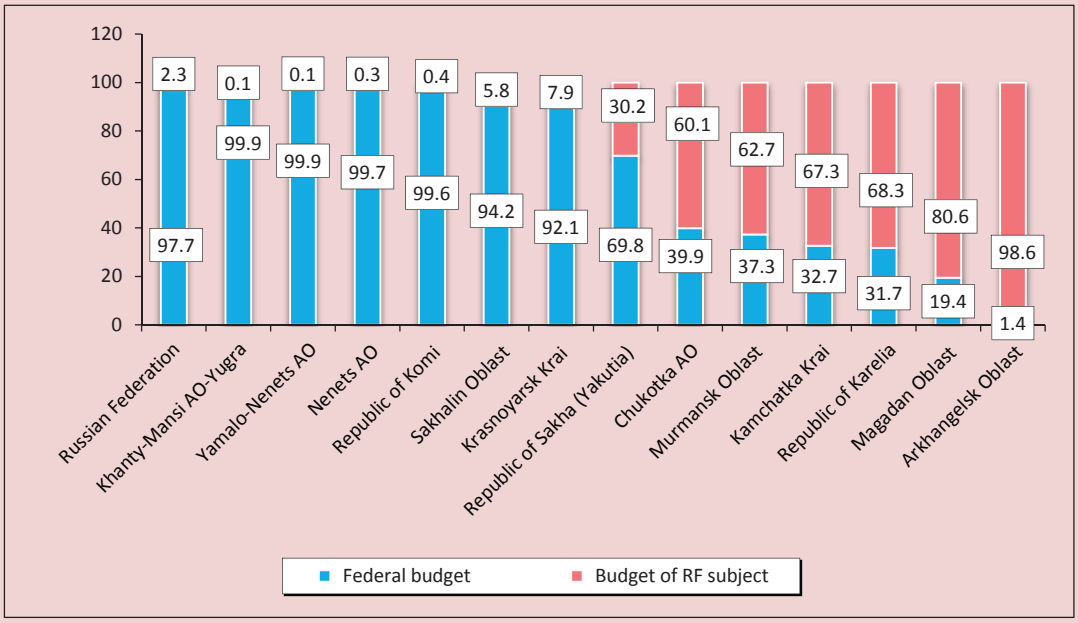
[2] BNK. Internet source. Accessed May 7, 2018.

Figure 1. Proportion of taxes received by the federal budget and the budgets of Northern constituent entities of the Russian Federation in 2016, %



Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

Figure 2. Proportion of taxes, fees and resource payments for the use of natural resources (total) received by the federal budget and the budgets of Northern constituent entities of the Russian Federation in 2016, %

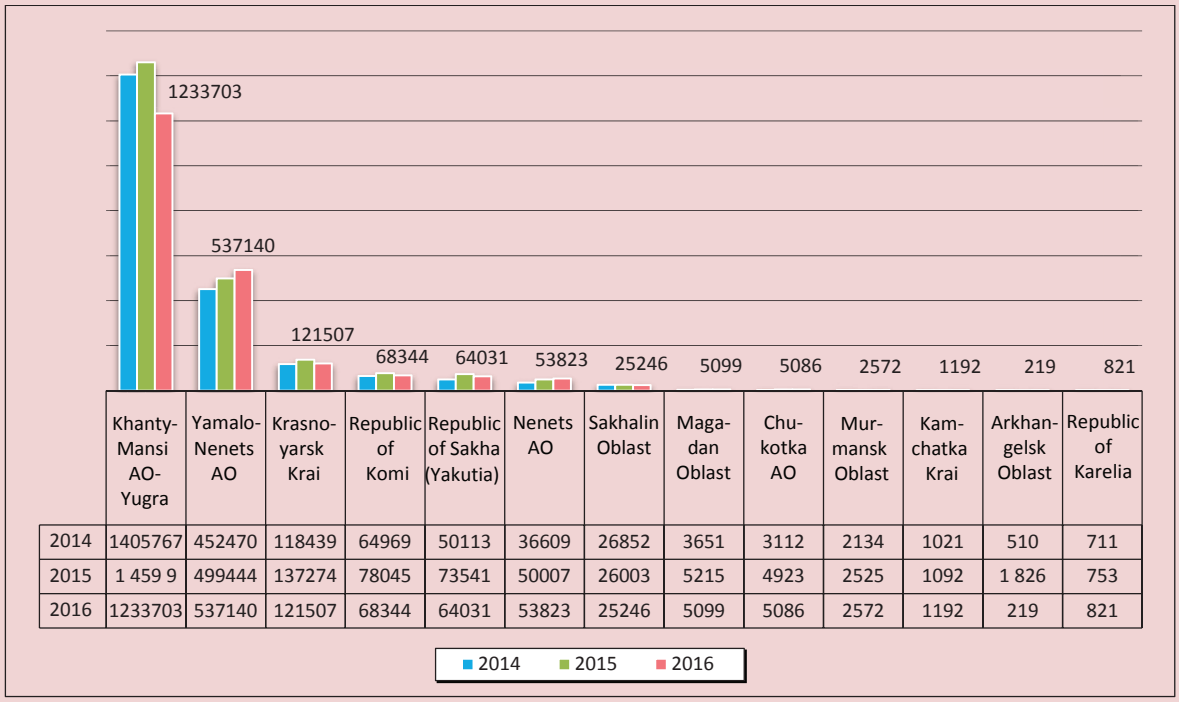


Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

In these constituent entities of the Russian Federation, the proportion of taxes, fees and payments for the use of natural resources (total), received by the federal budget and the budgets of constituent entities of the Russian Federation in 2016, amounted to more than 99% *(Fig. 2)*. At the same time, in six of the twelve Northern regions under consideration, more than 60% of the total payments for the use of natural resources was received by the budgets of the following constituent entities of the Russian Federation: Chukotka Autonomous Okrug – 60%, the Murmansk Oblast – 63, Kamchatka Krai – 67, the Republic of Karelia – 68, the Magadan Oblast – 81, the Arkhangelsk Oblast – 99%.

Redistribution of natural resource taxes and payments in favor of the federal budget or territorial budgets depends on the type of resources (taxes on oil, gas, coal, land, forest, water are distributed differently). Therefore, the very problem of the unsatisfactory state of territorial budgets should also be considered in a differentiated way. It is particularly acute in the areas of oil and gas specialization, but is little visible in the areas specializing in hunting, fishing, agriculture and forestry. The presence of specific types of natural resource economy determines the dynamics of budget revenues, taxes, fees and payments for the use of natural resources and the dependence of the economy on the world markets. It is for this reason that budget revenues from resource payments decreased in six of the twelve Northern constituent entities of the Russian Federation; these entities include Khanty-Mansi Autonomous Okrug, Krasnoyarsk Krai, the Republic of Komi, the Republic of Sakha (Yakutia), the Sakhalin and Magadan oblasts *(Fig. 3)*.

Figure 3. Dynamics of revenues from taxes and fees for the use of natural resources received by the budget in the Northern regions of Russia in 2014–2016, million rubles



	Khanty-Mansi AO-Yugra	Yamalo-Nenets AO	Krasnoyarsk Krai	Republic of Komi	Republic of Sakha (Yakutia)	Nenets AO	Sakhalin Oblast	Magadan Oblast	Chukotka AO	Murmansk Oblast	Kamchatka Krai	Arkhangelsk Oblast	Republic of Karelia
2014	1405767	452470	118439	64969	50113	36609	26852	3651	3112	2134	1021	510	711
2015	1 459 9	499444	137274	78045	73541	50007	26003	5215	4923	2525	1092	1 826	753
2016	1233703	537140	121507	68344	64031	53823	25246	5099	5086	2572	1192	219	821

Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

Table 1. Structure of revenues from taxes and fees for the use of natural resources received by the budget in the Northern regions of Russia in 2016

RF constituent entity	Tax revenues, total	Mineral extraction tax			Water tax			Fees for the use of objects of fauna and for the use of objects of water biological resources			Land tax		
		Mln. RUB	Share in total tax revenue, %	Share of RF constituent entity, %	Mln. RUB	Share in total tax revenue, %	Share of RF constituent entity, %	Mln. RUB	Share in total tax revenue, %	Share of RF constituent entity, %	Mln. RUB	Share in total tax revenue, %	Share of RF constituent entity, %
Russian Federation	14386061	2929408	20.4	100	2270	0.02	100	2593	0.02	100	176417	1.23	100
Khanty-Mansi AO-Yugra	1700643	1233552	72.5	42.1	142	0.01	6.3	9	0.00	0.4	1467	0.09	0.8
Yamalo-Nenets AO	810744	537107	66.3	18.3	28	0.00	1.2	5	0.00	0.2	227	0.03	0.1
Krasnoyarsk Krai	371289	121384	32.7	4.1	94	0.03	4.1	29	0.01	1.1	1475	0.40	0.8
Republic of Komi	148441	68325	46.0	2.3	15	0.01	0.7	4	0.00	0.2	284	0.19	0.2
Republic of Sakha (Yakutia)	159646	63997	40.1	2.2	13	0.01	0.6	21	0.01	0.8	575	0.36	0.3
Nenets AO	61907	52014	84.0	1.8	3	0.00	0.1	10	0.02	0.4	30	0.05	0.0
Sakhalin Oblast	178249	8994	5.1	0.3	12	0.01	0.5	463	0.26	17.9	314	0.18	0.2
Magadan Oblast	18843	5050	26.8	0.2	2	0.01	0.1	46	0.24	1.8	46	0.24	0.0
Chukotka AO	15797	5044	31.9	0.2	1	0.01	0.0	41	0.26	1.6	18	0.11	0.0
Murmansk Oblast	79311	2250	2.8	0.1	5	0.01	0.2	317	0.40	12.2	401	0.51	0.2
Arkhangelsk Oblast	52981	2117	4.0	0.1	6	0.01	0.3	74	0.14	2.9	713	1.35	0.4
Republic of Karelia	25498	771	3.0	0.03	1	0.00	0.0	49	0.19	1.9	406	1.59	0.2
Kamchatka Krai	30428	602	2.0	0.02	21	0.07	0.9	568	1.87	21.9	297	0.98	0.2

Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

The structure of inflow of taxes and fees for the use of natural resources to the budget varies considerably throughout the Northern regions *(Tab. 1)*, due to the difference in the types and volumes of natural resources involved in the economic turnover of the country. Namely, the total volume of production of hydrocarbons and other minerals in Khanty-Mansi, Yamalo-Nenets, Nenets and Chukotka autonomous okrugs, the Republic of Komi, Krasnoyarsk Krai and the Republic of Sakha (Yakutia) and other Northern regions of Russia allowed for collecting 2.1 billion rubles of mineral extraction tax. Thus, the Northern regions account for 72% of the total inflow of the tax into the budget. With the national average value of the proportion of mineral extraction tax being 20.4% the figure ranges from 2% in Kamchatka Krai to 84% in Nenets Autonomous Okrug. The proportion of water tax and fees for the use of wildlife objects and for the use of water biological resources in all the Northern regions is insignificant – less than 1 % (except for Kamchatka Krai – 1.89%), the proportion of land tax does not reach 2%.

Taxation of mineral extraction. Mineral extraction tax has the largest share among resource payments. Its dynamics in the Northern regions of the country varies considerably *(Tab. 2)*.

Budget revenues from mineral extraction tax in Russia over the past 10 years increased in 2.4 times. In 2016, compared with the previous year, tax revenues decreased by 9.2%; this also happened in five (out of twelve) Northern subjects of the Russian Federation: in Khanty-Mansi Autonomous Okrug – by 15.5%, in Krasnoyarsk Krai – by 11.5%, in the Republic of Komi – by 12.4%, in the Republic of Sakha (Yakutia) – by 12.9%, in the Magadan Oblast – by 2.2% *(Fig. 4)*. At the same time, the significance of the Northern subjects of the Russian Federation for the country as a whole is different. Despite the decrease in the absolute value of the tax, Khanty-Mansi Autonomous Okrug has the largest share – 42.1% of the total amount of mineral extraction tax in the country. The following factors influenced the decline in budget revenues from mineral extraction tax: the dynamics of world oil prices,

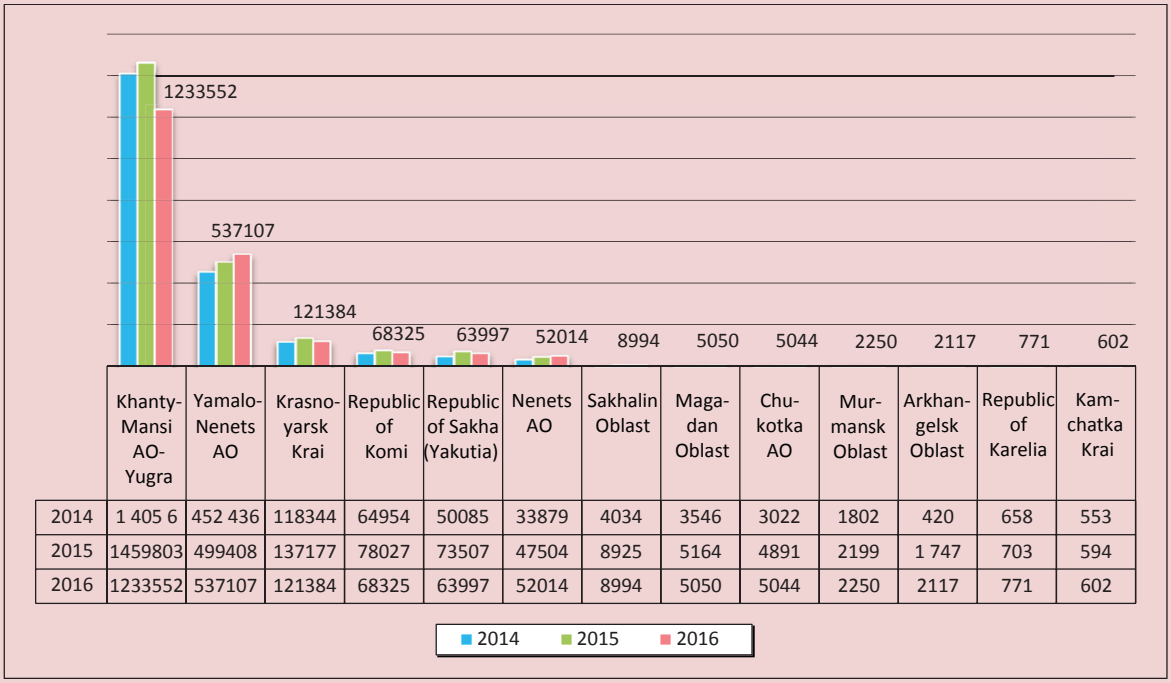
Table 2. Mineral extraction tax in the Northern regions of Russia in 2014–2016, million rubles

Constituent entity	2014	2015	Yearly dynamics, 2015 to 2014, %	2016	Proportion, %	Yearly dynamics, 2016 to 2015, %
Russian Federation	2 904201	3226831	111.1	2929408	100	90.8
Khanty-Mansi AO-Yugra	1405651	1459803	103.9	1233552	42.1	84.5
Yamalo-Nenets AO	452436	499408	110.4	537107	18.3	107.6
Krasnoyarsk Krai	118344	137177	115.9	121384	4.1	88.5
Republic of Komi	64954	78027	120.1	68325	2.3	87.6
Republic of Sakha (Yakutia)	50085	73507	146.8	63997	2.2	87.1
Nenets AO	33879	47504	140.2	52014	1.8	109.5
Sakhalin Oblast	4034	8925	221.4	8994	0.3	100.8
Magadan Oblast	3546	5164	145.6	5050	0.2	97.8
Chukotka AO	3022	4891	161.8	5044	0.2	103.1
Murmansk Oblast	1802	2199	122.0	2250	0.1	102.3
Arkhangelsk Oblast	420	1747	416.0	2117	0.1	121.2
Republic of Karelia	658	703	106.8	771	0.03	109.7
Kamchatka Krai	553	594	107.4	602	0.02	101.3
Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).						

underestimation of promising opportunities for the development of the manufacturing sector of the Russian economy, and tax administration.

Water tax. Its role in the budget revenues of the country and the Northern regions is insignificant *(Tab. 3)*. The share of the

Figure 4. Dynamics of mineral extraction tax receipts in the budget of the Russian Federation from the Northern regions of Russia in 2014–2016, million rubles



	Khanty-Mansi AO-Yugra	Yamalo-Nenets AO	Krasnoyarsk Krai	Republic of Komi	Republic of Sakha (Yakutia)	Nenets AO	Sakhalin Oblast	Magadan Oblast	Chukotka AO	Murmansk Oblast	Arkhangelsk Oblast	Republic of Karelia	Kamchatka Krai
2014	1 405 6	452 436	118344	64954	50085	33879	4034	3546	3022	1802	420	658	553
2015	1459803	499408	137177	78027	73507	47504	8925	5164	4891	2199	1 747	703	594
2016	1233552	537107	121384	68325	63997	52014	8994	5050	5044	2250	2117	771	602

Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

Table 3. Water tax in the Northern regions of Russia in 2014–2016, million rubles

RF constituent entity	2014	2015	Annual dynamics, 2015 to 2014, %	2016	Proportion, %	Annual dynamics, 2016 to 2015, %
Russian Federation	2201	2551	115.9	2270	100	89.0
Khanty-Mansi AO-Yugra	108	125	115.7	142	6.3	113.6
Krasnoyarsk Krai	71	71	100	94	4.1	132.4
Yamalo-Nenets AO	30	31	103.3	28	1.2	90.3
Kamchatka Krai	22	21	95.5	21	0.9	100
Republic of Komi	11	14	127.3	15	0.7	107.1
Republic of Yakutia (Sakha)	14	15	107.1	13	0.6	86.7
Sakhalin Oblast	10	10	100	12	0.5	120
Arkhangelsk Oblast	7	7	100	6	0.3	85.7
Murmansk Oblast	52	55	105.8	5	0.2	9.1
Nenets AO	3	3	100	3	0.1	100
Magadan Oblast	7	2	28.6	2	0.1	100
Republic of Karelia	1	1	100	1	0.0	100
Chukotka AO	1	1	100	1	0.0	100
Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).						

Northern regions ranges from 6.3% in Khanty-Mansi Autonomous Okrug to 0% in Chukotka Autonomous Okrug, due to the specifics of water use.

Water tax receipts to the budget in the Russian Federation for the period of 2007–2016 increased in 1.5 times: from 1,484 to 2,270 million rubles. Their volume and dynamics broken down by regions *(Fig. 5)* depend on the nature of production, number of population and tariff policy.

Among other factors, we note the following:

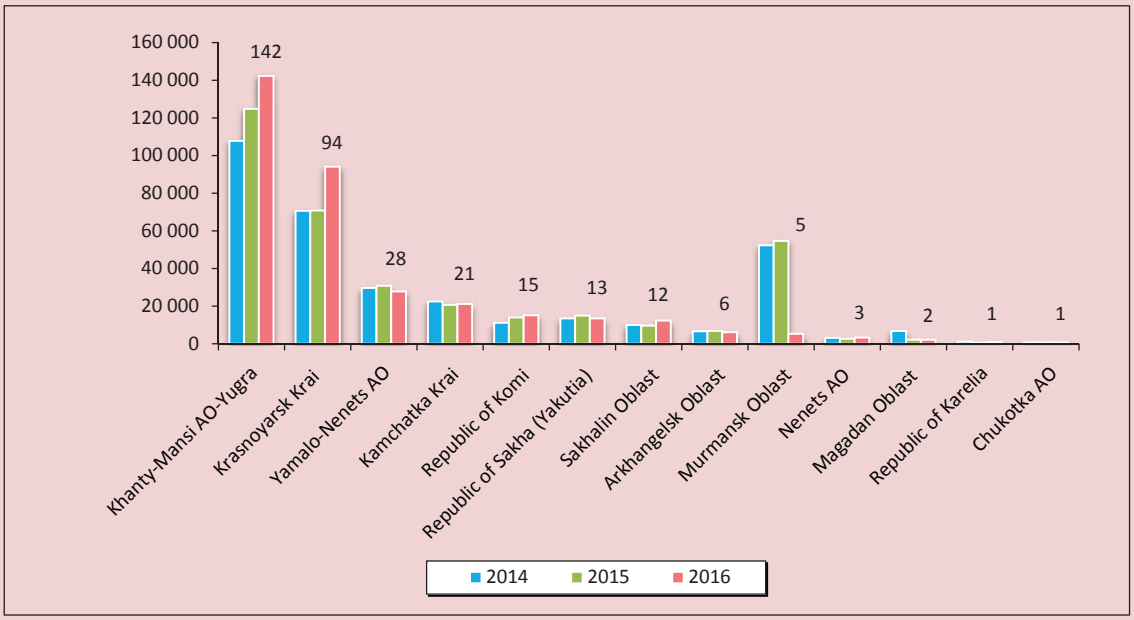
1. The authorities of the subjects of the Russian Federation lack the competence to change the elements of water tax as a federal tax. We should note that until 2005 the authorities of constituent entities of the Russian Federation were granted the right to adjust (depending on the physical-geographical, hydro-regime and other features of water bodies) federal rates of payment within their maximum and minimum values. It is expedient to restore this right.

2. Underestimation of the ecological value of water tax. Thus, wastewater discharge is excluded from the object of taxation. A fee is charged for the discharge of pollutants into water bodies, which has no direct connection with the entire water management system.

3. Excessive tax administration.

These disadvantages are due to the lack or use of outdated measuring instruments necessary to account for the amount of water taken. Taxpayers determine this figure according to the amount of water registered in the invoices received by customers and also according to the norms of use of water by residents who do not have counters, excluding the losses during in its intake or in the networks of water pipes.

Figure 5. Dynamics of water tax receipts in the budget of the Russian Federation from the Northern regions of Russia in 2014–2016, million rubles



Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

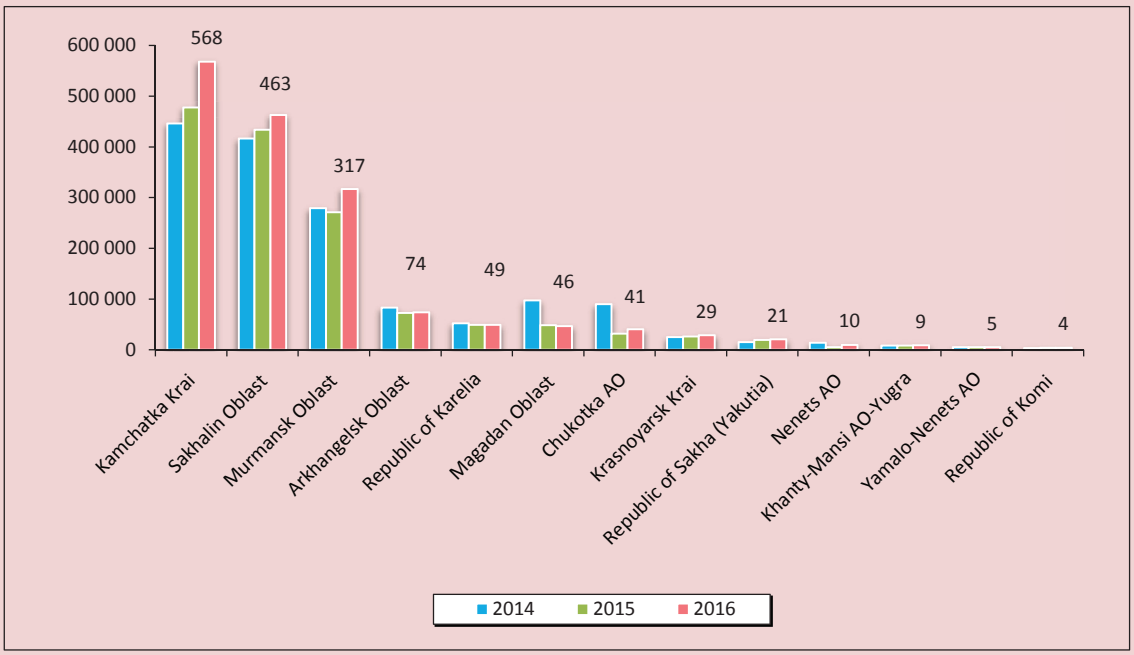
Charges for use of objects of fauna and objects of water biological resources. They are permissive and at the same time compensatory in nature, due to the state ownership of natural resources. Their role in the formation of budget revenues is insignificant *(Tab. 4)*.

Table 4. Charges for use of objects of fauna and for use of objects of water biological resources in the Northern regions of Russia in 2014–2016, million rubles

RF constituent entity	2014	2015	Annual dynamics, 2015 to 2014, %	2016	Proportion, %	Annual dynamics, 2016 to 2015, %
Russian Federation	2386	2237	93.7	2593	100	115.9
Kamchatka Krai	446	477	107.0	568	21.9	119.1
Sakhalin Oblast	416	434	104.3	463	17.9	106.7
Murmansk Oblast	280	271	96.8	317	12.2	117.0
Arkhangelsk Oblast	83	72	86.7	74	2.9	102.8
Republic of Karelia	52	49	94.2	49	1.9	100
Magadan Oblast	98	48	49.0	46	1.8	95.8
Chukotka AO	90	32	35.6	41	1.6	128.1
Krasnoyarsk Krai	25	26	104. 0	29	1.1	111.5
Republic of Yakutia (Sakha)	15	20	133.3	21	0.8	105.0
Nenets AO	14	5	35.7	10	0.4	200
Khanty-Mansi AO-Yugra	8	8	100	9	0.4	112.5
Yamalo-Nenets AO	5	5	100	5	0.2	100
Republic of Komi	4	4	100	4	0.2	100

Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

Figure 6. Dynamics of receipts in the budget of the Russian Federation of the charges for use of objects of fauna and objects of water biological resources from the Northern regions of Russia in 2014–2016, million rubles



Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

The receipt of the fees for the use of objects of fauna and objects of aquatic biological resources to the budget in the Russian Federation over the past 10 years increased slightly, only by 15%, and amounted (as of 2016) 2,593 million rubles. *(Fig. 6)*. In 2016, compared to the previous year, the revenues increased or remained at the same level in eleven Northern regions of the Russian Federation out of twelve. The decrease in the fees occurred in the Magadan Oblast (by 4.2%).

The insignificant volume of receipts of the fees for the use of objects of fauna and objects of water biological resources to the budget from the Northern regions of Russia is caused by the following factors:

– lack of competence of the authorities of the subjects of the Russian Federation to change the elements of the fees, taking into account specific features of the region, including the possibility of increasing or reducing the rates of fees depending on changes in the population of wildlife in certain territories;

– problems of administration of fees associated with the complexity of accounting for the population of animals and birds and objects of aquatic biological resources;

– the list of the objects of taxation of the objects of fauna and objects of water biological resources established by Article 333.3 of the Tax Code of the Russian Federation does not contain some types of objects of hunting widespread in the Northern regions of Russia, including ducks, partridges, geese, foxes, and hares;

– unlicensed use of objects of fauna and objects of water biological resources, under which the subjects of hunting and fishing do not calculate these fees and do not pay them to the budget.

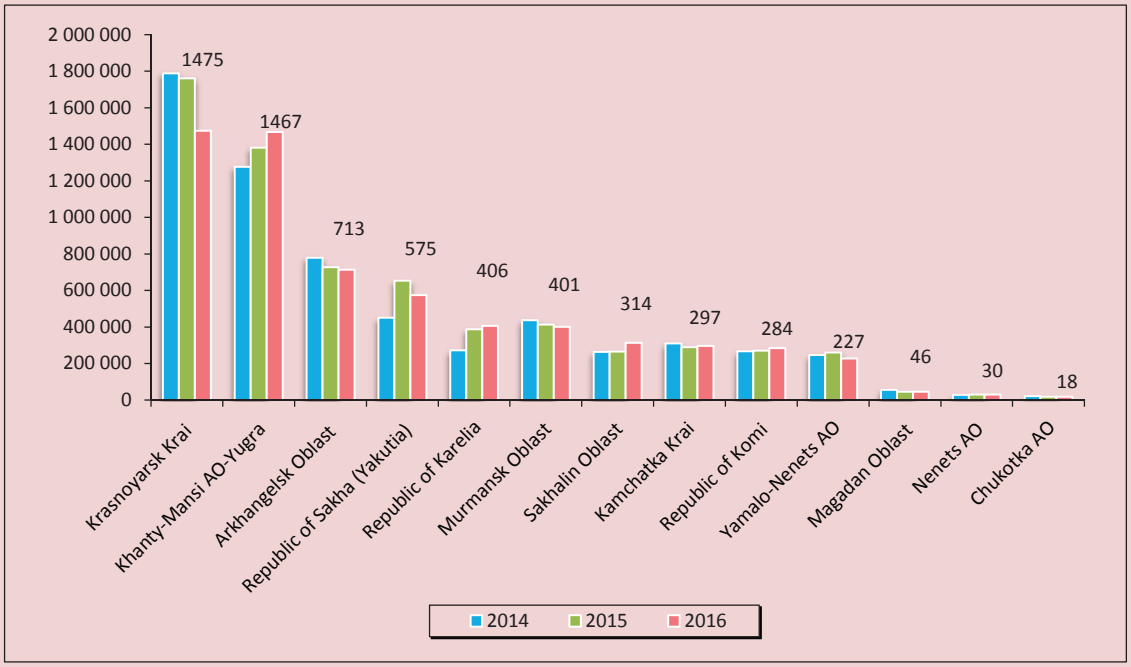
Land tax. In the North, the importance of land tax for local budgets and for the national budget is small – less than 1% *(Tab. 5)*.

Land tax revenues received by the budget in the Russian Federation over the past 10 years increased in 2.6 times: from 68,943 million rubles in 2007 to 176,417 million rubles in 2016. Compared to the previous year, the tax decreased by 4.7%; it also happened in the six (out of twelve) Northern subjects of the Russian Federation: in Krasnoyarsk Krai – by 16.3%,

Table 5. Land tax, broken down by the Northern regions of the Russian Federation in 2014–2016, million rubles

RF constituent entity	2014	2015	Annual dynamics, 2015 to 2014, %	2016	Proportion, %	Annual dynamics, 2016 to 2015, %
Russian Federation	175299	185131	105.6	176417	100	95.3
Krasnoyarsk Krai	1789	1762	98.5	1475	0.8	83.7
Khanty-Mansi AO-Yugra	1277	1381	108.1	1467	0.8	106.2
Arkhangelsk Oblast	779	726	93.2	713	0.4	98.2
Republic of Yakutia (Sakha)	451	653	144.8	575	0.3	88.1
Republic of Karelia	272	386	141.9	406	0.2	105.2
Murmansk Oblast	438	413	94.3	401	0.2	97.1
Sakhalin Oblast	264	265	100.4	314	0.2	118.5
Kamchatka Krai	309	289	93.5	297	0.2	102.7
Republic of Komi	267	270	101.1	284	0.2	105.2
Yamalo-Nenets AO	247	260	105.3	227	0.1	87.3
Magadan Oblast	56	46	81.1	46	0.0	100
Nenets AO	28	30	107.1	30	0.0	100
Chukotka AO	22	19	86.4	18	0.0	94.7
Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).						

Figure 7. Dynamics of land tax receipts in the budget of the Russian Federation from the Northern regions of Russia in 2014–2016, million rubles



Source: Statistical tax reporting of the Federal Tax Service. Available at: http://www.nalog.ru (accessed March 14, 2018).

in the Arkhangelsk Oblast – by 1.8%, in the Republic of Sakha (Yakutia) – by 11.9%, in the Murmansk Oblast – by 2.9%, in Yamalo-Nenets Autonomous Okrug – by 12.7%, in Chukotka Autonomous Okrug – by 5.3% *(Fig. 7)*.

Problems of taxation of land plots are due to a number of circumstances, such as: the lack of consideration of specific features of the zones of risky agriculture; incomplete accounting of the number of land plots and shares in the right to land plots; parallel effect of the right of lifetime inheritable ownership and the right of ownership, frequent changes in the structure of the total tax base; declarative nature of the valuation of land plots on which multi-apartment houses are situated; illegal use of preferential taxation at the rate of 0.3% for the land plots classified as agricultural land used for other purposes; information resources of tax authorities and other state and local authorities are often not interrelated, the issues of their use for management decisions have not been resolved.

Discussion of the results

Scientific and analytical review of different types of taxation in the system of environmental management raises the thoughts about their role in the future. It is possible to highlight the underestimation of economic work in terms of land, water and forest resources. A bio-resource economy is now in the background of the mineral-raw materials and fuel and energy resources. But it will soon become of paramount importance for the organization of life in the regions of the Arctic and the North; and therefore it is necessary to create a new mechanism for the flow of capital from the mining industries to the sectors of

agriculture, forestry and water management. In our opoinion, it is in this process that properly organized taxation of environmental management and improvement of budget activities can lead to the desired result of stable development.

Conclusion

Our study of the practical experience of taxation in the field of environmental management, taking into account the problems of natural resource-type regions, revealed some shortcomings both within the tax policy and in its insufficient role in stimulating the Northern territories.

We believe that it is necessary to implement the following measures:

– to conduct an "inventory" of the legislation of the Russian Federation on taxes and fees and other normative acts regulating social relations in the field of environmental management, in order to systematically link all its components;

– to develop guidelines for the definition, withdrawal and distribution of rental income using the typology of deposits, land, forest and water areas under the conditions of their development; the Ministry of Finance of Russia can be a possible organizer and form a working group with the involvement of scientists and experts;

– to assess more thoroughly the environmental component in determining the tax burden on the users of natural resources, taking into account their participation in environmental protection at the expense of their own financial resources;

– to organize a special audit and independent examination of the reliability of indicators of the general tax base and tax potential in the field of environmental management;

– to improve intergovernmental fiscal relations in order to increase revenues of the budgets of subjects of the Russian Federation and municipalities, with the use of long-term stable standards;

– to take into account specific features of the Arctic and the North as much as possible; to stimulate rational use of natural resources within the framework of tax policy in extreme and difficult climatic conditions with the use of tax regulation tools (tax rates, adjusting coefficients to the tax base, tax benefits and tax deductions, tax credit, tax sanctions).

References

1. Guriev S., Plekhanov A., Sonin K. Economic mechanism of the resourcce-based model of development. *Voprosy ekonomiki=Issues of Economics*, 2010, no. 3, pp. 4-24. (In Russian).
2. Auty R.M. *Sustaining Development in Mineral Economies: The Resource Curse Thesis.* London: Routledge, 1993. 273 p.
3. Baldwin R.E. Patterns of development in newly settled regions. *Manchester School of Social and Economic Studies*, 1956, no. 24, pp. 161-179.
4. Hirshman A.O. A generalized linkage approach to development with special reference to staples. In: *M. Nash Essays on Economic Development and Cultural Change in Honor of Bert F. Hoselitz*. Chicago III: University of Chicago Press, 1977. Pp. 67-98.
5. Sachs J.D., Warner A.M. Natural resource abundance and economic growth / NBER Working Paper Series no. 5398. December 1995; Sachs J., Warner A. Fundamental Sources of Long Run Growth. *American Economic Review Papers and Proceedings*, 1997, vol. 87, no. 2, pp. 184-188.
6. Shelomentsev A.G., Belyaev V.N. Assessment of the impact of the development of mineral resources on the economic security of Russia. *Ekonomika regiona=Economy of Region,* 2012, no. 2, pp. 144-152.

7. Shelomentsev A.G., Doroshenko S.V., Choijil E. The post-soviet space-government socio-economic development through the concept of "natural recourse curse. *Zhurnal ekonomicheskoi teorii=Russian Journal of Economic Theory*, 2015, no. 2, pp. 17-29. (In Russian).
8. Kuleshov V.V. (Ed.). Resursnye regiony Rossii v "novoi real'nosti" [Resource-Based Regions of Russia in the "New Reality"]. Novosibirsk: IEOPP SO RAN, 2017. 308 p.
9. L'vov D.S. Economic manifesto. *Svobodnaya mysl'=Free Thought,* 1998, no. 6, pp. 5-22. (In Russian).
10. L'vov D.S. *Razvitie ekonomiki Rossii i zadachi ekonomicheskoi nauki* [Development of the Russian Economy and the Tasks of Economic Science]. Moscow: Ekonomika, 1999. 79 p.
11. Ponkratov V.V. Oil production taxation in Russia and the impact of the maneuver. *Journal of Tax Reform*, 2015, vol. 1, no. 1, pp. 100-111.
12. Garnaut R., Clunies-Ross A. *Taxation of Mineral Rents*. Oxford University Press. 1983. Available at: https://EconPapers.repec.org/RePEc:oxp:obooks:9780198284543
13. Daniel P., Keen M., McPherson C. *The Taxation of Petroleum and Minerals: Principles, Problems and Practice*. New York: Routledge Taylor & Francis Group, 2010. 480 p.
14. Kryukov V.A., Tokarev A.N., Shmat V.V. Problems of differentiation of taxation in the gas industry of Russia. In: *Sbornik materialov mezhdunarodnogo nauchnogo kongressa "GEO-Sibir'-2007": Nedropol'zovanie. Novye napravleniya i tekhnologii poiska, razvedki i razrabotki mestorozhdenii poleznykh iskopaemykh* [Proceedings of the International Scientific Congress "GEO-Siberia-2007": Subsoil use. New directions and technologies of search, exploration and development of mineral deposits]. Novosibirsk: Sib. gos. geodezicheskaya akad. 2007. Vol. 5. Pp. 88-92. (In Russian).
15. Kryukov V., Tokarev A., Shmat V. Differentiation of taxation in the gas industry: a step-by-step approach to implementation is needed. *Gazovyi biznes=Gas Business,* 2007, pp. 18-22. (In Russian).
16. Sevast'yanova A.E., Shmat V.V. Situational analysis of diversification of the economy of an oil and gas region. *Region: ekonomika i sotsiologiya=Region: Economics and Sociology,* 2006, no. 2, pp. 49-66. (In Russian).
17. Lazhentsev V.N. (Ed.). *Toplivnyi sektor Respubliki Komi: napravleniya i metody regulirovaniya razvitiya* [Fuel sector of the Komi Republic: directions and methods of development regulation]. Syktyvkar: Komi NTs UrO RAN, 2002. 416 p.
18. Kireyeva E. Tax regulation in agriculture: current trends, selection of a state support forms. *Journal of Tax Reform*, 2016, vol. 2, no. 3, pp. 179-192.
19. Lazhentsev V.N. Public nature of the concepts for economic development in the Northern and Arctic regions of Russia. *Ekonomicheskie i sotsial'nye peremeny: faktory, tendentsii, prognoz=Economic and Social Changes: Factors, Trends, Forecast*. 2016, no. 4, pp. 43-56. (In Russian).
20. Shelomentsev A.G., Doroshenko S.V., Kozlova O.A., Belyaev V.N., Toskunina V.E., Provorova A.A., Gubina O.V., Ilinbaeva E.A. *Formirovanie sotsial'no-ekonomicheskoi politiki severnykh regionov Rossii s uchetom faktora osvoeniya prirodnykh resursov: kollektivnaya monografiya* [The Formation of Socio-Economic Policy of the Northern Regions of Russia, Taking into Account Natural Resource Development Factors: Collective Monograph]. Yekaterinburg: Institut ekonomiki UrO RAN, 2011. 140 p.
21. Chuzhmarova S.I. Socio-economic development of the Northern regions in terms of reforming mineral extraction taxation. *Federalizm=Federalism*, 2009, no. 2 (54), pp. 179-190. (In Russian).
22. Nikulina O.M. *Nalogovaya nagruzka v Rossii: osnovnye podkhody* [Tax Burden in Russia: Basic Approaches]. Available at: http://1-fin.ru/?id=972 (accessed 27.05.2018).
23. The main directions of the budget, tax and customs tariff policy for 2019 and the planning period of 2020 and 2021 (approved by the Ministry of Finance of Russia). *Website of the Ministry of Finance of Russia*. Available at: https://www.minfin.ru (accessed 19.11.2018). (In Russian).
24. Anuchin V.A. et al. (Eds.). Baranskii N.N. *Izbrannye trudy: Stanovlenie sovetskoi ekonomicheskoi geografii* [Selected Works: Formation of Soviet Economic Geography]. Moscow: Mysl', 1980. 287 p.

25. Lazhentsev V.N., Dmitrieva T.E. *Geografiya i praktika territorial'nogo khozyaistvovaniya* [Geography and Practice of Territorial Management]. Yekaterinburg: Nauka, 1993. 137 p.

26. Ilyin V.A., Povarova A.I. Shortcomings of the tax administration of large business and their impact on regional budgets. *Ekonomika regiona=Economy of Region,* 2017, vol. 13, no. 1, pp. 25-37. (In Russian).

27. Chuzhmarova S.I., Chuzhmarov A.I. Taxation of the use of objects of fauna in the Northern (Arctic) regions of Russia: ecological and economic approach. *Ekonomika i upravlenie. Izvestiya Dal'nevostochnogo federal'nogo universiteta=Economics and Management. Proceedings of the Far Eastern Federal University*, 2018, pp. 146-155.

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A Metaphor for Trust: the "Umbrella Effect" in Global Science*

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Abstract. The purpose of the article is to consider the foreign experience in conceptualization and study of trust, to provide a critical review of the multidisciplinary issues of trust in modern world science, the relevance of which is explained by the increasing shortage of public trust. The research novelty of the study lies in the identification of forms, types, and trends in the subject area of trust in terms of determining the internal and interdisciplinary boundaries of various humanitarian fields. The interdisciplinary subject of trust in terms of the "umbrella effect" of competing paradigms and approaches is presented; the definition of trust as a multidimensional construct is conceptualized; the category-concept set of classification of trust include variables: resource pools (availability and configuration); rules of the game (resource share and coordination); target functions (efficiency, productivity); functions focused on people (social roles and practices, interpersonal relations); sense-making (realistic and perceived effect); focus on action (practical effects); focus on perception (interpretive effects). Trust as a choice addresses theoretical issues in specific contexts between the trustee and the trusted; metaphors such as "shadows of the future", "vulnerability", "leap of faith" reveal signs of a trust continuum in an uncertain situation; identification of the tension of trust as its natural and ambivalent property between altruism and self-interest associated with control and differentiation of prospects, acquires the meaning of trust dimension in a variety of institutional contexts. The results can be applied in the following fields: scientific, educational, management, information, and analytical..

Key words: interdisciplinary approach, definitions, trust, a multi-dimensional design, classifications, "umbrella structure", models, types.

1. Introduction. The study of foreign experience in conceptualizing and studying trust, the results of recent (2017 and 2018) studies in many countries show that generalized trust and institutional trust are at their historically low levels; levels of public trust in institutions, business, NGOs, the media and individuals have fallen to record low levels [1 (Edelman, 2018); 2 (Gallup, 2018); 3 (Pew Research Center, 2018)]. Due to negative performance of manifestations of trust at different levels and in various humanitarian fields, it is concluded that the role of trust in the society is radically underestimated [4, p. 219] and the failures of trust reflect serious social shortcomings.

Trust is an interdisciplinary phenomenon but within each discipline there is its own specialization for studying trust issues. In modern economic science, the understanding of trust depends on the selected basic prerequisites. Depending on whether it is a version of tradition of the empirical rational choice theory of the Chicago school (G. Becker, H. Demsetz, G. Stigler, F.H. Knight, H. Simons, M. Friedman, A. Harberger) or a competing version of the scientific tradition of the axiomatic rational choice of the Princeton school of economics (P. Krugman, H. Leibenstein, F. Machlup, O. Morgenstern, J. von. Neumann, J. Nash, T. Sargent, C. Sims) the focal points and boundaries of the "theory of trust" will be very diverse. In trust psychology, there are four different basic approaches to trust: as a behavioral intention or internal action similar to choice, judgment or preference; as an expression of trustworthiness where trust is studied in contexts of personal characteristics inspire positive expectations of trustworthiness on the part of the others ("the outsiders"); as an individual's property that develops at an early age and remains relatively stable through

adulthood; as a synonym to cooperation or risk taking expression [5, p. 909].

Similar problems of creating adequate mental constructions on "topics and limits of trust" exist in anthropology, history, management, political science, sociology, philosophy, economics, ethics, and other behavioral sciences; the set of disciplines is indicated based on the number of scientists in relevant research areas at three international conferences on trust in 2016–2017 [6; 7; 8].

The purpose of the article is to present a critical review of the multidisciplinary problems of trust in the modern world science. The research *objectives*: to identify a set of key features identifying forms, types, and trends in trust; to assess the interdisciplinary boundaries in trust.

The article is based on *the hypothesis* that the set of relevant features of subject areas of trust can be developed based on system analysis, modern data of empirical and theoretical studies, and be presented through metaphors of trust in a concentrated form. The authors cover uncertainties, risks, and difficulties in various disciplines in determining the concepts of trust, including in the context of post-modernity or reflexive modernization. One of the examples of genesis of trust is the emergence of the meaning of trust as a resource through the transformation of its structure [9].

Features of applied methodology and research methods

The article uses methods of contextual analysis and selection of ideas drawn from the discussions of speeches, "included observation and participation", from articles and monographs of leading scientists, experts, and researchers, as well as analysis of metaphors [10]. The authors focus on structural and functional analysis, understanding sociology and phenomenology [11], integration of these components as parts of theories into a single semantic space. The functional aspects of different levels and types of trust are systematized (see *Tab. 1*) with examples of operationalization of micro-levels of trust and mistrust (*see Tab. 2*).

The article is organized as follows: after the introduction, a literature review is offered, which traces the subject boundaries of trust. Then the authors briefly cover the most important approaches that were proposed at three international scientific conferences on trust. This is followed by a brief review of literature on trust in special areas. It is demonstrated how relevant characteristics of trust were determined from the point of view of establishing internal and interdisciplinary boundaries between the humanities. One of the main conclusions is formulated as one of the metaphors of trust – the "umbrella effect" in the global science.

2. Literature review

Among many *sociological* interpretations of trust the dominating approaches are those developed within the framework of rational choice theories (J. Coleman [12]), systems theory (N. Luhmann [13–16]), structuration theory (A. Giddens [9; 17]), social action based on scientific tradition of M. Weber (for example, M. Endreß [18]); "culture of trust" as a macro-sociological prospect for social change (P. Sztompka [19–21]), "moral trust" (E. Uslaner [22–23]).

The understanding of the fact that the use of the term trust greatly varies in different scientific fields (for example, R. Seppanen, K. Blomqvist, and S. Sundqvist identify more than 70 definitions of trust [24]), and can be contradictory even within a single discipline with competing paradigms, leads to the choice of the basic concept. The chosen theoretical foundation for studying trust is the

system analysis and the neo-systems theory by N. Luhmann [25, p. 1]. Moreover, the methodology to analyze the "metaphor of trust" was applied [26, p.149]. In this context, we analyzed one of the best historical monographs on the topic of "metaphors of trust" by J. Hosking – *Trust: A History* which traces the genesis of trust [27].

Classic sociologists justify the concepts of trust based on the recognition of the theory of social reproduction of the modern world, where people act amid incomplete information, risk and potential undesirable changes, which makes trust necessary. E. Goffman perceived the concept of trust as an action-related dependence on the evidence of others, based on assumptions about the unity of their moral qualities, drawing attention to the pre-reflexive, functioning and inaccessible knowledge of trust [28]. Continuing this theoretical line, E. Giddens applied the terminology of "structuring social context", distinguishing "personality trust" (trust "between familiar people") and "trust for abstract systems" as products of "late modernism". Revealing the essence of modern institutions, A. Giddens noticed a trend: the importance of institutions is becoming "a faith in the correctness of principles of which nobody knows" [9, p. 33]. The use of categories for the analysis of less known subjects led to the crossing of inter-subject boundaries. For example, the "climate change policy" is opened by the "Giddens paradox" in relation to the problem of risks of climate change: if these risks are still intangible, mediated, and invisible in everyday life, very few face them seriously, [17, pp. 2–3, 7–9]. "Critical or active trust" is increased if more citizens scrutinize knowledge requirements and critically analyze expertise. Describing the concept of "double structuration", Giddens includes not only the existence of rules involved in production of social systems, but also "resources" themselves [9, p. 68]. Thus, a "resource" was included in the structure of trust.

Thus, assessing the discussion, classic sociologists may reveal different theoretical nuances in the concept of trust. J. Coleman developed its rational-reflexive version, A. Giddens covered trust primarily in terms of "double structuration"; E. Goffman emphasized the socio-integrative function of action in the context of trust, N. Luhmann was attracted by the prospects for the development of trust in the context of managing social complexity.

The subject boundaries of "trust"

Classifications of approaches to various sociological schools show that the ideas of trust among classic researchers represent a fairly broad theoretical spectrum. As pointed out by A. Seligman, "the use of the term trust tends to be loose and inaccurate as it varies from the micro to the macro levels, is used to express the basic ideas of Durkheim's solidarity to confidence coupled with ideas of iteration in interactions" [29, p. 28].

There is a well-known N. Luhmann's metaphor about trust as a connection (a hinge joint, a "Scharnier") between diverse systems, which is capable of reducing complexity, stabilizing expectations and increasing system capabilities of people's actions. N. Luhmann pointed out that trust is a versatile tool: it maintains the decision-making process within the "controlled borders", making many sources of tension surmountable [15, 20]. According to this view, in complex behavioral and risky situations, individual action paradoxically becomes predictable; "rules of conduct" become socially restrictive. Thanks to such expectations many people reduce behavior to quite simple examples that are easy to understand and predict by themselves and others.

Preferences are considered equivalent to expectations in the economy; they denote the propensities of an individual that relate to their consumption according to the theory of rational choice [30]. Following this logic, the term "trust" means rationality of consent when two or more contracting parties are the maximizers of utility. Based on this theory, R. Hardin developed the concept of trust as "encapsulated interest". The meaning of the latter lies in the fact that every individual has the desire to trust and continue the relationship that is especially valuable [31, p. 88]. The concept of trust at the level of interpersonal relations describes the expectations of the trustee (bezugspersonen) and the trustor (vollmachtgeber); their actions should be based on common values and moral beliefs. In the theory of rational action there are similar, yet somewhat different terms: a principal as a decision-maker contrasted to an agent acting as the executor of decisions.

Analysis of the semantic field of trust reveals its fundamental duality: pragmatic and moral. E. Uslaner tried to reveal the features of "moral" trust in the framework of the sociological theory [23]. E. Uslaner introduced this term as trust for some "generalized other", "a stranger", without expecting anything specific in return, realizing a commandment: "treat others well even in the absence of reciprocity" [23, p.18] and realizing E. Kant's categorical imperative as an instruction related to the moral due: "We should trust each other" [23, p. 23]. But the paradox is that moral independence leads to *ethical vulnerability* which can only be protected by the principles of honor, respect, and dignity. It is noteworthy that there is a similar point in psychology: in the well-known definition of D. Rousseau (and co-authors) the main semantic *psychological reference point* of the definition of trust is the following "... a psychological state that includes the desire to accept vulnerability based on positive expectations of intentions or behavior of another individual" [32, p. 395]. In our opinion, in these definitions, the ethical and psychological definitions of trust are substantially close. The difference between the concepts of trust and hope is that hope, although it includes the possibility of negative consequences of the course of events, is focused only on a positive result while trust is much more than hope, trust has a complex structure. The foundations of trust in a wide variety of approaches and theories are supported by credibility, reliability, authenticity, and other values. People are interested in trust and reliability, which helps cooperate for mutual benefit. Cooperation is a priority objective but there are numerous examples of cooperation that do not require and are probably not related to trust.

The purpose of the article is to clarify and shed light on how trust is studied and evaluated in various subject areas. To achieve it let us turn to the experience of analyzing ideas on trust at relatively recent international conferences.

Review of three international scientific events on trust

It is important to note the contribution of new ideas and experience to the study of trust by participants of conferences in Tokyo ("Trust Research from Multi-Disciplinary Perspectives", November 18–20th, 2017 [6]; at a research seminar on interdisciplinary prospects of trust at University of Nebraska-Lincoln (USA) followed by publishing a book in 2016 [7]; and the study of trust as a risk based on reports of the European Union expert group (Luxembourg, 2017) which presented medium-term consequences for policies and institutions in case of a decrease in the level and quality of trust [8].

At the conference "Trust" in Tokyo P. Sztompka proposed to start from the "six moral ties constituting the basis of the moral space: loyalty, reciprocity, solidarity, respect, justice, and confidence" [33]. Sztompka formed a theoretical and metaphorical construct in which "trust builds a bridge over the sea of uncertainty". B. Noteboom (Netherlands) drew attention to the fact that the definition of trust is still ambiguous and confusing. Noteboom noted that if we look at any cooperation we inevitably face the problem of cost savings: the search for information about the partner, alternative transactions, product prices; characteristics of a transaction subject; negotiations and processes of signing a contract; protection of a contract from infringement by third parties; monitoring compliance with the terms of the contract between the partners. There was a discussion about some economists' statements. For example, O. Williamson argued that trust is impossible in market conditions [34]. According to Williamson, trust in markets only makes sense if it does not go beyond personal interests. Noteboom did not agree with this statement. Indeed, any business prioritizes personal interest, profit, but there is also a place for something similar to trust. Amid radical uncertainty, confidence-building is an investment transaction. As an economist, Noteboom put the theories of transaction costs and opportunistic behavior in trust o the foreground; as a sociologist, he insisted that trust is the basis of the society; a full understanding of trust requires an appropriate combination of components of economy, sociology, social psychology, and cognitive science. R. Bachmann defined the current situation with trust as a tectonic shift in understanding and interpreting organizational and socio-economic conditions [35]. R. Salerno in a report made an assessment of new ways of trust operationalization. Here the concept of "trust" is a good example of the general case that the anthropologist C. Lévi-Strauss called "floating signifier" [25, p. 11]. According to R. Salerno, the phenomenon of "floating signifiers" in sociology of trust has a deep fundamental meaning just like "the other", "the stranger" became the central philosophical and socio-cultural categories that define the other as a "not me" [26].

G. Möllering distinguished four parts of main problems of trust in management: "old/new; real/big". The solution to the "old" problem answers the questions: "How can systems trust systems?". The solution to the "new" problem involves answering questions about the reflexivity of inter-organizational trust: "How can systems avoid the "dark sides" of trust?; What is meant by the concepts of unwanted, dysfunctional or false trust, excessive or optimal trust?" The solution of "real" problems is associated with self-reinforcing inter-organizational trust processes. When it comes to "big" trust issues, Möllering described the phenomena of "trust traps" demonstrating feedback and self-reinforcement cycles: general and inter-organizational; traps of opportunities, obligations, bureaucratic cycle, dependence on the organizational path and critical moments of development. According to Möllering, the problem of critical ties in trust relations is particularly relevant in cases where perception of reliability turns into trust practices and the willingness to be vulnerable turns into an actual state of helplessness [36–38]. At this conference, explanations were given as to why processes of reducing the level of social trust in general, trust to governments and opposition parties in particular take place in the world and why populism is growing. For example, Brexit and Trump's election are fraught with people's deep resentment about their insulted sense of

national identity. As a result, the motivation to self-identification ("trust in one's country, preserving the sense of identity") was stronger than financial motivation ("trust in money"). It was recognized (in Giddens's terms) that the elites did not outline the correct "risk profile".

The Multidisciplinary symposium and interdisciplinary seminar (University of Nebraska-Lincoln, USA) was focused at finding theoretical and methodological integration of trust components. As a result, a scientific monograph was published in 2016 with the publication of 12 best articles reflecting the multi-level concepts of trust [7]. The correlation between legitimacy, procedural justice and cooperation in the context of sociology, political science, criminology, and the impact of political polarization on institutional trust were discussed; as well as disciplinary and contextual differences between using trust [7]. Participants noted that the experience gained accumulated by the participants of Trust seminars at University of Nebraska was "tough, mind-blowing and frustrating", that interdisciplinary work is required, but it is rarely done within studies of trust [7].

The third area of review is the study of trust based on reports of the EU expert group (Luxembourg, 2017) who presented assessments of addressing social problems based on the concept of "trust in reliability" as opposed to the alternative concept of "trust in risk", expert assessments of the medium-term consequences for policies and institutions in case of a decreased level and quality of trust in various countries [8]. The concept of *function of trust* refers to the key provisions initiated by the European Commission to rebuild the citizens" trust in the European project [8, p. 18]. The possible consequences of the destruction and collapse of trust in various areas are demonstrated. It is argued that democracies in many countries are under threat because there is no clear understanding of where the "boundaries of trust" lie. When social trust is destroyed the social fabric is rebuilt towards lower-level entities and institutions which then create rigid impenetrable boundaries around themselves; then trust tends to re-focus on another center of power: a political party, a religious movement, an ethnic group, a regional leader, a chief-type leader, a strong military leader or an economically powerful figure; such groups and their leaders set rigid boundaries increasing distrust even more. Any push towards a murderous conflict may become insoluble; this can be seen in examples of what is happening in Ukraine and in the Middle East [8, p. 14]. It must be recognized, however, that the deepest and most fundamental causes and circumstances of such "dark scenarios for the destruction of trust" have not yet been fully studied.

An overview of ideas and search for interdisciplinary boundaries of trust from handbooks

We study and compare the general contexts of trust, identifying their boundaries, starting from economy, moving to sociology and social theory, psychology and philosophy, management and history, and then – specialized publications on trust and social capital.

In the Oxford reference textbook *Political Economy,* the latter is treated as a relation between economy and politics: the economic approach itself called public choice which distinguished individual rationality, and the sociological approach, the analysis of which was purely institutional [39, p. 4]. Trust through these three approaches reflects contextual problems (whom the voters know and trust); games in the context of preparing and arranging voters' registration; forms of

trust between politicians and bureaucrats, the theory of asymmetric information. The debate from the standpoint of "political economy" of trust led to the development of blocks of risk issues of moral damage coupled with the focus of actors on different interests, group choice and decisions on the possibility of cooperation. For example, the use of distrust in the logic of terror was demonstrated, which is especially important today [39, p. 33, 144, 258, 291, 698, 863, 976, 1006].

The reference book on modern growth economy [40] concludes that the fundamental reasons for long-term growth are the institutions of trust, "high confidence balance with high quality" are also important. In this regard, the trust factor is viewed as an element of institutional choice, especially when concluding and executing contracts. Such logic leads us to the term of "collective reputation" which ensures success and prosperity for the society. The concepts of "dysfunctionality" or "non-adaptability' are presented as opposite, where agents adopt a system of beliefs or methods of action related to rent-oriented behavior, corruption, culture of trust only to relatives or members of their families and refuse to cooperate in a broad context [40, pp. 303–304, 364–365, 402–404, 430, 519].

Modern microeconomic approaches represented by traditional topics of consumer choice, supply and demand, production [41; 42], use various game-theoretic models; studies of prerequisites of the model of trust of *homo reciprocans* [41, p. 56, 257, 264, 301, 313], assessment of irrational economic behavior in the context of trust and distrust, the subject of patent rights and antimonopoly laws [42, p. 93, 451–458, 529, 580].

The publication on modern behavioral economics is devoted to the problems that could not be solved by traditional approaches, accumulating the conclusions of psychologists, sociologists, political scientists, legal experts, and biologists [43]. Trust was presented in the terms of structure of personality and is studied in the context of biological and neurological systems. In behavioral economics, models of trust can be applied to new challenges of global trade and business based on self-respect and respect for others, dynamic interaction of an individual and empathy, if trade is carried out without threats of conflict [43, p. 33, 142–146, 152, 261, 268, 339, 400–418, 458–463, 654].

Analyzing the paradigm of trust in the mainstream of new institutional economics it is necessary to emphasize that its central modern issue is the problem of destructing human interaction caused by the inability to sustain the reliability of responsibilities of people and institutions [44]. The issue of trust is of key importance as lack of credible commitments destroys three types of human interaction: economic exchange, relations between voters and politicians, and social contract. The problems in each area of credible commitments are solved through social standards that invoke trust and reliability. In order to explain the emergence and sustainability of credible actions or joint behavior in "principal-agent" relations or voluntary provision of public goods, purely sociological phenomena such as dynamics of social ostracism or participation in dense horizontal networks are studied. Standards of trust as products of repetitive games and formal institutions are considered to be the toughest institutions yet they vary widely between countries, having a significant impact on economic results. The culture of trust between strangers is ensured through networks of associations that help overcome problems related to collective action, which is also in line with the topic of social capital. The metaphor of trust in new institutional economy is mainly

related to decisions of rational actors, the costs and benefits that they take into account when making choices based on social norms. The latter, in contrast to sociology, are more limited to be used for solving the problems of collective action [44, pp. 16–17, 108–109, 180, 213–214, 614–628, 684, 702–721].

Publications on social studies of rational choice [45] and comparative institutional analysis [61] present the problems of trust in much more specific and therefore more interesting contexts. Studies of rational choice consider the concepts of trust together with reliability, give the results of different situations, and study trust in game-theoretic models where expectations about costs and benefits largely depend on stereotypes of social groups (status, race, gender, age). Trust is interpreted as a "shadow of the future"; the main feature of the two-actor social dilemma is understood as a "conflict" between individual and collective rationality. In economics such conflict is called "the problem of public goods"; in sociology it is a situation of "the problem of collective action"; in political science – a "tragedy of common heritage". When analyzing trust valuable peculiarities are revealed: repeated negotiations, as a rule, stimulate opportunistic behavior since an unexpected unforeseen situation usually strengthens the negotiating positions of one partner and weakens the positions of the other; strong reciprocity can lead to a situation of neglect of trust; trust is strengthened by the results of actions of rational actors who consider the long-term effects of their behavior [45, pp. 48–51, 60–74, 114–117, 122–127].

The Oxford edition of comparative institutional analysis [46] shows how forms, outcomes and dynamics of an economic organization (company, network, market) relate to other social institutions (e.g., educational systems, policies, rights, etc.) and the consequences for economic growth, innovation, employment and inequality. A comparative approach was applied to these issues. The editors are very concerned about the "delineation of boundaries" from the "common area of interest" represented by a number of debates, concepts, and arguments that are substantially similar yet different from other subject areas [46, pp.1–3]. Here contracts are covered in relation to trust, as well as short- and long-term opportunism, relations between employees and employers; law, networks, types of state and features of political environment, and institutional regimes. The ratio of types of trust and market models and non-market relations are presented; the impact of trust on the dynamics of macroeconomic indicators through institutions is analyzed. It is recorded that low levels of trust are often associated with predator states and unpredictable financial systems [46, pp. 47–48, 93, 123, 213–218, 285, 378, 468–482, 533, 618].

In the Oxford reference book on analytical sociology, the subject area is briefly defined as "strategy of understanding social world" [47]. It is argued that theorists and practitioners greatly underestimate the concept of trust as a framework for action based on signaling theory. Trust interacts with informal monitoring mechanisms; the challenge is how trust affects, undermines, and supports them. The consequences of trust at the macro-level are of deep interest for analytical sociology. The decline in trust (of individuals and institutions) is especially frequent [47, pp. 83–87, 160–169, 173–180, 185–188]. Analytical sociology explains trust through detailing the mechanisms which produce social facts; these mechanisms are always related to individuals' actions and relations binding the actors.

The intellectual framework of economic sociology is related to the epigrammatic definition of its classic researchers as "a sociological perspective applied to economic phenomena" [48, pp. 3–5]. *Economic anthropology* is defined as "a description and analysis of economic life from an anthropological perspective". Anthropologists perceive and describe trust, just like other social and cultural phenomena, through ambivalent behavioral patterns as actual patterns of behavior [50, pp. 1–2].

When considering reflexive and functioning trust, the concept of a leap of faith can act as a dividing line [36; 49]. The relations between these two types of trust reflects an ongoing search for a balance between trust, understood as reliability, resting on the routine of daily actions (reflexive trust), and trusting actions under uncertainty (functioning trust). Quantitative measurements and assessments of relations of trust measure only reflexive confidence (reflexive trust) cannot be easily perceived as relevant to behavior. When using the concept of functioning trust it is primarily a sociological interpretation of the structural ambivalence of trust that we are talking about. Therefore there is a need to distinguish levels of reflection of trust in action. It is necessary to understand the importance of forms, growth rates and distribution of "radii of trust" of people "acting on the other side". At the level of theoretical understanding of modern society and its structures, the role of "intermediate" types of trust, as well as the phenomenology of trust within the framework of general social changes, increases. Finally, it is important to clarify the determinants of social trust, taking into account the income dynamics and social status, especially in view of the growing trend towards group selfishness (isolation) and certain ideas of justice (in the versions of "friend–foe"). There is also a need to expand the concept of knowledge by covering the phenomenological perspective and analyzing the semantic structures of the background knowledge. In this regard, functioning trust appears as an alternative to reflexive trust, and the interpretation of a person's attitude to their own actions and beliefs, where their trust in their rightness is manifested, contrasts with the analysis of the semantic structures of background knowledge. If trust is presented as a specific mode of relations, as a certain connection, then the properties of this connection described in the concepts of reflexive and functioning trust can be due to the confrontation of routine actions and actions that deviate from the standard. At this point, we come to an understanding of trust in sociology, economics and anthropology as a choice which helps solve theoretical issues in a specific context, use metaphors as "shadows of the future", vulnerabilities and opportunities due to a "leap of hope".

The semantic load and content of reflexive and functioning trust is related to the problems of individual's radical uncertainty, the tension of trust and its ambivalent property between altruism (solidarity) and self-interest coupled with personal interest and control.

Discussion of results

A critical analysis of the theoretical positions of classic and modern foreign researchers has helped us understand that trust can be determined by a number of heterogeneous features interconnected by different justifications *(Tab. 1)*. Different levels and types of trust can be reflected on different analytical platforms, in particular, basic theoretical approaches as fundamental systems of access in the framework of structural and functional analysis or phenomenological approach (E. Husserl, A. Schütz), systems theory (N.

Table 1. Functional aspects of different levels and types of trust

Levels	Types	System functions and models of realization	Meaning-making contexts
Mega- and macro-	Systemic trust	Reduction of complexity, free information flow; facilitate the exchange of information; effect of generic rules	Systemic contexts that shape the repertoires of meanings; fundamental institutional design; system reputation of the institutions
	Societal trust	Institutional impartiality of credibility of action; interpersonal trust understood generally; societal trust as generalized trust	Societal communication; societal rules of reciprocity; institutional design of government forms
	Abstract trust	Behavior of parties in the context of anonymous social structures, directed mutual expectations, providing stable patterns of interaction	Contexts of generalized norms and rules of business conduct; context of trust as institutional forms;
	Moral trust; ethic trust; culture trust	Patterns moral of the trust; setting to "morally decent" of the trust; guarantee trust effect by moral principles; models of trust rooted in this type of culture; problems of moral hazard; morality as a matter of rationality; moral rationalism emphasizes hypothetical agreement	Moral, political and socio-economic mutual expectations of cooperation; moral generators of repertoires of meaning; moral hazard and opportunism; "morality arises from market failure" when rational behavior of market actors who adequately react to information produced by the market does not ensure Pareto-optimality.
	Institutional trust	Models of institutional trust; functions of institutions that form patterns of behavior	Institutional decision-making styles; repertoire of meaning
Meso-	Regional trust	Cultural features embedded in each member of the regional community; distinctive features of regional identity; R. Putnam conceptual twist: social capital as a property of local communities; meso rules	Signs of cultural embeddedness; institutional design of local governance; regional indicators of the institutional level as signs of meso rules)
Micro-	Group trust	Realization of values, goals, special interests of specific groups; equivalents of transitivity of a trade name; organizational context	Identification-based, organizational and systemic-interactionist contexts of goals, values, and interests of the specific groups
	Personality trust	Realization of values, goals, special interests of personality;	Identification of expectations, promises, preferences, limitations, intentions, obligations providing reciprocity ties

Luhmann), one of the versions of understanding sociology (M. Weber, G. Simmel) or versions of ethnomethodological approaches (H. Garfinkel) studying everyday standards and rules of behavior, the meanings of a language in the framework of everyday interaction or the desire for mutual understanding in social processes. Trust is differentiated by micro-, meso-, and macro-level with the analysis of specific processes of generation. Fundamental values in their possible differences are thematic, reflexive, rational, emotional, relational, business, and functioning type of trust (trust as action); between explicit and implicit forms or functions of trust. There are fundamental differences between interpersonal, institutional and systemic types of trust and their mutual relations with each other. The possible combinations of these features and types provide a variety of forms of trust representation. For example, at the micro-level, we have identified four systems of operationalization for sociology, psychology, economics, and related sciences *(Tab. 2)*. Economic literature identifies

Table 2. Examples of operationalization of micro-levels of trust and distrust

Differentiation of trust levels	Types of trust	System functions of trust (distrust)	Contexts of trust
"Us" – "them"	Trust on the basis of personal devotion or loyalty	Minimizing of existential risk; trust based on clan or religious (sect) affiliation or family connections;	Personal devotion; personal loyalty
Group level	Identity-based trust; interactionist-based trust	Identification with common goals, values, rules, norms; interactions and communications; cohesion; access to common resources social capital that is «owned collectively» and «generated collectively»	Identification-based and interactionist-based contexts of trust; access to social capital resources
	Distrust	Protection from excessive group cohesion, independent decision making, monitoring of processes; overcoming mutual distrust; own experience of discrimination leading to general distrust	Various types of protection against distrust
Level: trustor – trustee	Calculus-based trust; knowledge-based trust	Nucleus of competence for common projects and business models; barrier-free communication; normative guidance	Contexts of rational action models
Level of firms, level of entrepreneurs	Relation-based contracts; trust based on reputation effects	Patterns of trust: "norm of generalized reciprocity" leading to general expectation of feedback, which later returns to a "virtuous circle"; The cycle oif "*virtuous circle";* rewards from past interactions should help expand cooperation networks, which contributes to further cooperation	Firms with shared resources; pool institutions; reputation institutions; growing joint projects
	Opportunism; opportunistic behavior	Opportunistic behavior as achievement of own interests fraudulently, including explicit forms of lies: slyness, trickery, guile, theft, fraud, betrayal (O. Williamson)	Guarantees of relation-based contracts; reputation effects
	Trust as reducing uncertainty	Obligations of trust as a means of reducing uncertainty; building trust through creation of behavioral commitments, refusing other alternatives	Making important commitments as specific means of reducing uncertainty
	Trust as a leap of faith	Identifying the trust boundary, fixing different levels and quality of trust to make appropriate decisions	"Leap of faith" as a volitional overcoming of uncertainty
	Trust as a product	Determining the quality of trust as a "market product" for making appropriate decisions	Trust as a product
	Trust as risk	Risk making it possible to demonstrate its reliability	Situations of different types of risk

mechanisms that help the agent act according to the contract. The main mechanism is to include incentives in such a way that the utility of the agent increases if the contract is fulfilled. At this point there is an important issue of "conceptual differences" between the subject areas of economics and sociology: the tension of trust acts as an ambivalent property inherent in it between altruism (solidarity in terms of Durkheim) and self-interest coupled with self-interest, and the forms of control of this opposition.

In our opinion, G. Hosking's book *Trust: A History* is important for understanding the boundaries of trust [27]. Its central theme is "trust and distrust" in their social and historical dimensions where the key features of "trust and distrust" are highlighted in a wide variety of societies and in various historic periods. Hosking revealed the causes of the current crisis of trust in various spheres of social life, paying special attention to the historical background of modern problems [27, p. 7]. Although the title of the book contains the word "trust", it should be referred to more as a "history of distrust", reconsidering, for example, the period of Stalinism. Hosking recalls that Stalin said: "I do not trust anyone; I do not even believe myself" [27, p. 15]. For the author of the book Stalin's terror is a catastrophic breach of trust in the country and within state authorities.

Findings and preliminary conclusions

The research results can be presented at the level of "umbrella theory" which presents forms and types of trust from various subject areas, as well as individual cluster such as "binding trust" generating models of binding; "bridge-building trust" producing models of bridging; "coupling trust" generating models of coupling and other types. The peculiarities of the "umbrella effects" of trust are manifested, for example, in the advantages of flexibility in changing the demand for trust in certain local continuums; in the autonomy and independence of the trustees and the trustor; the differentiation of various products of a trusting relationship. Operationalization of trust as a choice helps solve the theoretical problems of a specific context, understanding the differences between the prospects of the trustor and the trustee; use the metaphors of "shadows of the future", vulnerability and opportunities due to the "leap of hope". The semantic load and substantial nature of trust is related to the problem of radical uncertainty of an individual; to tension as an ambivalent property between altruism (solidarity) and self-interest and control; what matters is the extent to which trust is measured and taken into account in a wide variety of institutional contexts.

Common shortcomings of empirical approaches have been revealed. Limited by quantitative measurements of attitudes and thus measuring only reflexive confidence, they are not perceived as relevant to behavior and are only of very specific interest in the subject of trust. The main difficulties in determining the interdisciplinary boundaries of *trust* have been identified. The ever-growing interest in trust and in related groups of concepts such as social capital, faith, respect, recognition, confidence, associativity, social cohesion, legitimacy, vulnerability, and civil society is closely connected to the widespread problems of late modernity: risks and security, complex societies, diminishing importance of state as a community based on common standards and values.

A number of significant events in recent decades have literally shaken people's trust – in each other, in institutions, organizations, and states. One of the unpleasant consequences of the global crisis of 2008 is the inertia of public cynicism towards the established moral

standards, public goods, cultural values, and trust. However, the current lack of public confidence cannot be attributed solely to the effects of the financial crisis as it has also increased due to many failures affecting governments, regulators, companies, and corporations.

A healthy society relies on the recognition that politics is not a natural environment for strong trust relations and therefore there is reasonable distrust towards others, especially those who are powerful and affluent. Progressive social systems provide citizens with many opportunities to supervise those who are endowed with such power and authority, thereby institutionalizing distrust. At the same time, public trust is a social building block of collective action. For this reason any public authority cannot survive without trust. Any public institutions depend on trust between citizens, sufficient for representation, resistance, and alternative forms of governance.

References

1. Edelman. *Edelman Trust Barometer.* New York: Edelman Associates. Expectations for CEOs, 2018.
2. Gallup. *Confidence in Institutions*, 2018.
3. Pew Research Center. *Trust in Government*. Washington, DC: Pew, 2018.
4. Bearman P., Hedström P. (Eds.). Cook K., Gerbasi A. Trust. *In: Handbook of Analytical Sociology.* Oxford University Press, 2009, pp. 218-245.
5. Colquitt J.A., Scott B.A., LePine J.A. Trust, trustworthiness, and trust propensity: A meta-analytic test of their unique relationships with risk taking and job performance. *Journal of Applied Psychology*, 2007 (92), pp. 909-927.
6. *Report of International Conference on Trust*. Institute of Social Sciences, Chuo University. November 18-20, 2017. Available at: http://global.chuo-u.ac.jp/english/news/2017/12/9833/.
7. Shockley E., Neal T.M.S., Pytlik Zillig L.M., Bornstein B.H. (Eds.). *Interdisciplinary Perspectives on Trust. Towards Theoretical and Methodological Integration.* University of Nebraska-Lincoln. Lincoln, NE, USA. 2016. 223 p.
8. *Trust at Risk: Implications for EU Policies and Institutions*. Report of the Expert Group "Trust at Risk? Foresight on the Medium-Term Implications for European. Research and Innovation Policies (Trust foresight)". Luxembourg: Publications Office of the European Union, 2017. 196 p.
9. Giddens A. *The Consequences of Modernity.* Stanford University Press, 1990. 186 p.
10. Lakoff G., Johnson M. *Metaphors we live by.* London: The University of Chicago press, 2003. 191 p.
11. Schütz A. *The phenomenology of the social world.* Evanston: Northwestern University Press, 1974. 255 p.
12. Coleman J. *Foundations of Social Theory.* Cambridge: Cambridge, Mass.: Belknap Press of Harvard University Press, 1990, xvi, 993 p.
13. Luhmann N. *Vertrauen. Ein Mechanismus der Reduktion sozialer Komplexität.* München. Die Originalausgabe erschien 1968 im F. Enke Verlag, Stuttgart. 5 Auflage. 2014. 128 p.
14. Luhmann N. *Trust and Power.* New York: John Wiley & Sons, 1979. 208 p.
15. Luhmann N. Vertrautheit, Zuversicht, Vertrauen: Probleme und Alternativen. *Vertrauen: Die Grundlage des sozialen Zusammenhalts.* Frankfurt a. M.; New York: Campus, 2001, pp. 143-160.
16. Luhmann N. Familiarity, confidence, trust: Problems and alternatives. In: Gambetta D. (Ed.). *Trust: Making and Breaking of Cooperative Relations.* Oxford: Basil Blackwell, 1988, pp. 94-107.
17. Giddens A. *The politics of climate change. Polity Press Reprinted, 2009*. 265 p.
18. Endreß M. *Vertrauen – Bielefeld: Transcript, Verl., der Reihe Einsichten,* 2002. 105 p.

19. Sztompka P. *Kapital spolecznv; teoria przestrzeni miedzyludzkiei. Krakow,* 2016. 350 p.
20. Sztompka P. *Trust: A Sociological Theory.* Cambridge, UK; New York, NY: Cambridge University Press, 1999. 214 p.
21. Sztompka P. Trust, distrust and two paradoxes of democracy. *European Journal of Social Theory*, 1998, no. 1 (1), pp. 19-32.
22. Uslaner E. *Corruption, Inequality, and the Rule of Law.* Cambridge University Press, 2008. 345 p.
23. Uslaner E. *The Moral Foundations of Trust.* Cambridge University Press, 2002. 312 p.
24. Seppanen R., Blomqvist K., Sundqvist S. Measuring inter-organisational trust: a critical review of the empirical research in 1990-2003. *Industrial Marketing Managemen*t, 2007, no. 36 (2), pp. 249-265.
25. Jalava J. *Trust as a Decision. The Problems and Functions of Trust in Luhmannian Systems Theory.* Department of Social Policy, University of Helsinki, 2006. 222 p.
26. White H. *Metahistory. The Historical Imagination in Nineteenth-Century Europe*. The Johns Hopkins University Press, 1973. 448 p.
27. Hosking G. *Trust: A History.* Oxford: Oxford University Press, 2014. 211 p.
28. Goffman E. *Frame Analysis: An Essay on the Organization of Experience*. Cambridge: Harvard, 1986. 586 p.
29. Seligman A. *The Problem of Trust.* Princeton: Princeton University Press, 1997. 231 p.
30. Stigler G., Becker G. De Gustibus Non Est Disputandum. *American Economic Review*, 1977, no. 67, pp. 76-90.
31. Hardin R. *Trust.* Cambridge, UK: Polity, 2006. 214 p.
32. Rousseau D.M., Sitkin S.B., Burt R.S., Camerer C. Not so different after all: a cross-discipline view of trust. *Academy of Management Review,* 1998, no.23 (3), pp. 393-404.
33. Sztompka P. *Trust in the Moral Space*. Report of International Conference on Trust (Institute of Social Sciences, Chuo University) (November 18-20, 2017). Available at: https://www.youtube.com/watch?v=6KXOfZaZBZs.
34. Williamson O. Calculativeness, trust, and economic organization. *Journal of Law and Economics*, 1993, no. 36 (April), pp. 453-486.
35. Bachmann R., Gillespie N., Pfriem R. Repairing trust in organizations and institutions: Toward a conceptual framework. *Organization Studies*, 2015, no. 36 (9), pp. 1123-1142.
36. Möllering G., Sydow J. Trust trap? Self-reinforcing processes in the constitution of inter-organizational trust. In: Sasaki M. (Ed.). *Trust in Contemporary Society.* Leiden: Brill, 10 March 2018. 24 p.
37. Möllering G. Cultivating the field of trust research. *Journal of Trust Research*, 2017, no. 7 (2), pp. 107-114.
38. Möllering G. *Trust: Reason, Routine and Reflexivity.* Oxford: Elsevier, 2006. 230 p.
39. Weingast B.R., Wittman D.A., Goodin R.E. (Eds.). *The Oxford Handbook of Political Economy*. Oxford: Oxford University Press, 2009. 1094 p.
40. Aghion P, Durlauf S. (Eds.). *Handbook of Economic Growth*. North-Holland: Elsevier, 2005. 1867 p.
41. Schotter A. (Ed.). *Microeconomics: A Modern Approach*. South-Western College Publishers, New York University, New First Edition, 2009. 743 p.
42. Varian H.R. *Intermediate Microeconomics: a Modern Approach*. W.W. Norton & Company, Inc, 2010. 806 p.
43. Altman M. (Ed.). *Handbook of Contemporary Behavioral Economics. Foundations and Developments.* Routledge, 2006. 784 p.
44. Menard C., Shirley M.M. (Eds.). *Handbook of New Institutional Economics.* Springer-Verlag Berlin Heidelberg, 2008. 885 p.
45. Wittek R., Snijders T.A.B., Nee V. (Eds.).*The Handbook of Rational Choice Social Research*, 2013. 624 p.

46. Morgan G., Campbell J., Crouch C., Pedersen O.K., Whitley R. (Eds.). *The Oxford Handbook of Comparative Institutional Analysis. Oxford,* 2010. 728 p.

47. *Bearman P., Hedström P. (Eds.). Handbook of Analytical Sociology.* Oxford University Press, 2009. 794 p.

48. Smelser N.J., Swedberg R. (Eds.). *The Handbook of Economic Sociology.* British Library Cataloging-in-Publication, 2005. 629 p.

49. Bradford B., Sargeant E., Murphy T., Jackson J. A leap of faith? Trust in the police among migrants in England and Wales. *British Journal of Criminology*, 2017, no. 57 (2), pp. 381-401.

50. Carrier J.G. (Ed.). *A Handbook of Economic Anthropology,* 2012. 662 p.

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"Live and Learn": Conceptual Discourse on People's Financial Literacy*

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Abstract. In modern social reality, well-being of individuals, including their financial well-being, is increasingly becoming a zone of personal responsibility. At the same time, in the Russian context, the majority of people remain almost entirely dependent on wages as the only source of income. This fact, along with a low level of financial literacy, is an actual risk for individuals and the financial system of the country. Consequently, the importance of adequate financial knowledge, skills and actions within the financial education and training system is increasing. This brings to the fore the task of revealing "weak spots" in financial literacy and identifying vulnerable population groups so as to develop effective management decisions; this can be done with the help of well-elaborated tools used to study financial literacy. The goal of our paper is to carry out critical analysis of available theoretical and methodological

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approaches to the study of people's financial literacy. It is done, first, to form a reference and information field suitable to be used in scientific and management activity, and second, to put forward a concept of our own methodology for assessing people's financial literacy. To achieve the goal, we review foreign and domestic studies on people's financial literacy, systematize approaches to the definition of this category and provide our own understanding of this category as a three-component structure. Moreover, we compare methods for its assessment and substantiate the concept of our own methodology for assessing people's financial literacy. A distinctive feature of our study is the fact that it appeals not only to widely used approaches to understanding financial literacy and its assessment techniques but also to modern methodological structures that take into account current trends in the development of financial literacy, a dynamic and heterogeneous phenomenon. The findings of our study can be used as a theoretical and methodological basis in scientific research, as well as in the practical activities of authorities and other interested actors involved in improving people's financial literacy and financial education.

Key words: financial literacy, financial knowledge, financial skills, monetary attitudes, sociological tools, international experience in assessing financial literacy.

Introduction

One of the main criteria of public administration efficiency in modern Russia is its ability to improve citizens' life quality, satisfying their interests on the basis of increasing real incomes and providing sustainable economic growth [1, p. 48]. In this regard, both in government programs, in separate Presidential decrees, concerning questions of national security of the country, considerable attention is paid to the task of assessing life quality of citizens and provision of a positive impact on it [2, p. 125]. In the global economy context, when changes in the financial intermediation system and the capital accumulation structure boost international investment activity, enhance financial globalization and lead to world economy financialisation [3, pp. 32-33], the financial sector begins to exert an increasing influence on the content and priorities of economic policy. In this context, as the Deputy Minister of Finance of the Russian Federation S.A. Storchak rightly noted, "to a great extent the growth of prosperity and the enhancement of well-being of citizens depend on the level of financial literacy of the general population, their readiness to make independent and carefully considered decisions related to the management of household budgets[1]".

The positive effect of financial literacy on various financial decisions and behavior models has been confirmed by repeated empirical evidence. Increased financial literacy has been shown to have a positive impact on pension and life planning (Clark et al., 2012), participation in the stock market (van Rooj et al., 2011), personal savings (Jappelli and Padula, 2013), proper use of debt (Stango and Zinman, 2009) and credit cards (Xiao et al., 2012; Norvilitis et al., 2006) [4]. A correlation between financial knowledge and wealth has been established (van Rooj et al., 2012) [4]. In other words, having sufficient financial knowledge and skills, people can receive significant benefits both in the short and long term [4].

[1] See: RF Ministry of Finance project "Promotion of Financial Literacy of the Population and Financial Education Development in the Russian Federation", vol. 1, 2011–2015: reference and information publication, 2016, p. 15. Available at: http://вашифинансы.рф/upload/medialibrary/Obzor_O_proekte.pdf (accessed August 28, 2018).

The surveys regularly conducted by the National Agency for Financial Studies (NAFI) show that moderate self-assessments of financial literacy prevail among the Russians – about a half assesses their knowledge and skills as satisfactory (44% in 2010, 51% in 2016, 47% in 2018), while the majority does not take into account revenues and expenditures (69% in 2010, 72% in 2016, 60% in 2018) and only a third compares terms of financial services (30% in 2010, 32% in 2016, 36% in 2018)[2]. International data prove the problem scale. According to the reports of the Organization for Economic Cooperation and Development (OECD), which reflect research results for the G20 countries (including Russia), the overall financial literacy level in these countries amounted to 12.7 points out of 21 possible points[3]. On average, less than half of adults (48%) in the G20 countries were able to correctly answer 70% of financial knowledge questions; only 3 out of 5 households (60%) indicated that they had a family budget; a small proportion of respondents (15%) noted that they used independent sources to compare financial products and organizations; a quarter of households (25%) did not always pay their bills on time; more than a third of those surveyed faced a situation where their living expenses exceeded their income in the last 12 months[4].

Financial literacy is a universal problem with no universal solution. On the one hand, "any healthy economy is interested in literate, and therefore prosperous and predictable consumers of financial services"[5]. Therefore, the vast majority of G20 countries are implementing national strategies to improve financial literacy (Canada, France, Turkey, India, Brazil), and some of them are already implementing updated strategies (Japan, Australia, USA, UK)[6]. On the other hand, despite long history of the research in the financial literacy phenomenon, in foreign and domestic science and practice there is no common understanding of its essence, standardized tool for its evaluation and clearly defined effective measures to improve it.

Measurement of the population's financial literacy level is included in the priority tasks of the countries seeking to develop effective national strategies and programs for its improvement, provide effective financial education and assess its impact at the national level. Thus, in the joint project of the RF Ministry of Finance and the World Bank "Promoting financial literacy of the population and the development of financial education in the Russian Federation" and in the "Strategy for improving financial literacy in the Russian Federation for 2017–2023" (approved by the RF Government Order No. 2039-p of September 25, 2017) the task of conducting a comprehensive large-scale assessment and

[2] The Russians began to higher assess their level of financial literacy. NAFI. Available at: https://nafi.ru/analytics/rossiyane-stali-vyshe-otsenivat-svoy-uroven-finansovoy-gramotnosti/ (accessed November 19, 2018).

[3] See in more detail: G20/OECD INFE Report on Adult Financial Literacy in G20 Countries, 2017. Available at: http://www.oecd.org/daf/fin/financial-education/g20-oecd-infe-report-adult-financial-literacy-in-g20-countries.htm (accessed August 17, 2018).

[4] *Ibidem*.

[5] N. Soren's opinion – coordinator of social programs of the World Bank in Russia (see RF Ministry of Finance project "Promotion of Financial Literacy of the Population and Financial Education Development in the Russian Federation", vol. 1, 2011–2015: reference and information publication, 2016, p. 28. Available at: http://вашифинансы.рф/upload/medialibrary/Obzor_O_proekte.pdf (accessed August 28, 2018).

[6] G20/OECD INFE Report on Adult Financial Literacy in G20 Countries, 2017. Available at: http://www.oecd.org/daf/fin/financial-education/g20-oecd-infe-report-adult-financial-literacy-in-g20-countries.htm (accessed August 17, 2018).

monitoring of the level of financial literacy and financial behavior of the population is an essential condition for achieving the main goal – creation of an integrated infrastructure and a system of quality financial education to encourage financially literate behavior of the population as a necessary condition for households well-being and sustainable economic growth provision. The program documents thoroughly prove the relevance of the work to improve financial literacy of the population, define the category of "financial literacy" and disclose a list of basic indicators to assess its level.

In our view, the problem is not that in the scientific literature and management, financial literacy as an economic category does not contain a unified definition and a single measurement tool that would have acceptable reliability[7]. The tasks, relevant and significant in theoretical and practical terms, are the following: search, comparison and identification of the most objective and reliable definitions and methods to measure financial literacy, improve comparability of various surveys results on the basis of universal indicators and measurement methods.

The aim of the study is to identify and critically analyze theoretical and methodological approaches to understanding the nature and measurement of financial literacy. This makes it possible to form a kind of reference and information field for further work on this issue (in particular, for the development of the author's tools for assessing financial literacy of the population for the purpose of interregional research). It should be made clear that the study undertaken seeks to consider key approaches, i.e., our research interest is focused on those developments that 1) have proven themselves and found multiple applications in scientific and management activities, 2) are well documented (i.e., methodological materials are in the public domain), 3) have features of novelty (i.e., contain either new methods of measurement, or new approaches to the operationalization of the concept, etc.), 4) are aimed at studying personal finance and/or household finance.

Naturally, the economic literature has various reviews of theoretical and methodological foundations of the research in financial literacy[8]. But in a rapidly changing economic context, some of the used issues (i.e., aspects of financial literacy under consideration), first, may become unnecessary and do not correspond to real conditions, and second, they may change their content and be incorrectly interpreted by research participants. In addition, taking into account the emergence of new needs and new financial tools, new issues and indicators should be supplemented, commented on, tested and put right. There is another important point, especially relevant in the Russian reality: in the absence of a single national monitoring and choice of the research tools available to regional authorities, expert communities and researchers a "fresh" look at methodological approaches to the measurement of financial literacy will be very useful, namely

[7] This situation is quite acceptable in the context of pluralism of scientific concepts, the interpenetration of theoretical and methodological approaches of related sciences (economics, sociology, psychology, etc.), the variety of research and practical goals and objectives.

[8] Example, see: Kuzina O.E. Financial literacy and financial competence: definition, measurement methods and analysis results in Russia. *Economic Issues*, 2015, no. 8, pp. 129-148; Alifanova E.N., Evlakhova Yu.S. Finance and credit analysis of methodological approaches to the development of indicators of financial literacy of the population. *Finance and Credit*, 2013, no. 12 (540), pp. 18-26.; Huston S.J. Measuring financial literacy. *The Journal of Consumer Affairs*, 2010, no. 2, vol. 44, pp. 296-316; Hung A.A., Parker A.M., Yoong J.K. Defining and measuring financial literacy: *RAND Corporation Working Paper No. 708,* 2009. Available at https://www.rand.org/content/dam/rand/pubs/working_papers/2009/RAND_WR708.pdf

for regulators and private initiatives that deal with issues of improving financial literacy of the population, develop and implement programs of financial education, based on sociological surveys of the population.

Financial literacy of the population: essence and factors

Conceptualization of the term is the most important stage in the construction of methods to measure an economic phenomenon. At the same time, one of the features of analyzed financial literacy studies is that in many of them the term is not conceptually defined, but is derived from the context of empirical research as a set of several components. For example, according to the meta-analysis of 71 studies on financial literacy conducted by the Professor at Texas Tech University, S. Huston (2010), almost three quarters of the studies did not specify the term; others used definitions with different elements (e.g., knowledge, ability, skill, action, result) [5, p. 303].

Another feature is that most researchers use a broad approach to the definition of financial literacy, implying "knowledge and skills in the finance sphere to be applied in daily life and bring positive financial results" [6, p. 131-132]. This implies a third feature: along with a broad approach, studies have narrower definitions that reveal certain aspects of financial literacy and are often used interchangeably (e.g. financial knowledge, financial competencies, financial capability, financial awareness, financial education[9]). Researchers from the USA and Australia use the category "financial literacy", scientists from the UK and Canada, as well as specialists from the World Bank – the category "financial capability" [7; 8]. In Russian studies, as well as in works of the Organization for Economic Cooperation and Development (OECD), the category "financial literacy" (FL) in its broad interpretation prevails. On the one hand, the lack of a single FL concept limits the possibility of comparative analysis both for individual components and the overall level of financial literacy. This is a kind of critical barrier, as all other tools development stages depend on the availability of a clearly defined concept [5, p. 305]. On the other hand, the creation of a unified concept of financial literacy is objectively difficult due to the complexity of the phenomenon itself, the diversity of initial theoretical prerequisites and research tasks. Therefore, in our opinion, the task to develop a common interpretation of financial literacy, used for empirical studies of different levels and directions, seems archaic, while the formation of conceptually homogeneous and internally consistent theoretical and methodological approaches to the study of financial literacy of the population is a very relevant area of scientific research.

Summarizing, we note that, according to most researchers, financial literacy is not limited to simple knowledge and understanding of some financial notions and concepts, general awareness of certain financial products and the situation in the economic sphere. It involves presence of real experience and applied skills in the financial market, certain attitude to money and other assets and conscious understanding of financial goals and objectives. The most commonly used conceptual and operational definitions of financial literacy are given in *Table 1.*

The table presents approaches to the definition of financial literacy. Another "pole", especially in foreign studies, is financial capability, the concept, originally elaborated in the UK and currently actively developed by

[9] See. a detailed review of these categories in the article: Kuzina O.E. Financial literacy and financial competence: definition, measurement methods and analysis results in Russia. *Economic Issues*, 2015, no. 8, pp. 129-148.

Table 1. Interpretation of the category "financial literacy" (FL)

Approach	Author	Definition
Cognitive (FL as certain knowledge)	O.E. Kuzina, 2012	FL – knowledge and skills in the field of finance to be applied in everyday life and bring positive financial results.
	J. Kim, 2001	FL – basic knowledge that people need to survive in modern society.
	L.J. Servon, R. Kaestner, 2008	FL – person's ability to understand and use financial terms.
	A.M. Lusardi, 2008	FL – knowledge of basic financial concepts, such as calculation of compound interest, difference between nominal and real values, risk diversification.
Activity (FL as a set of actions / competencies)	Jelley, 1958; Noctor et al., 1992	FL – person's competence in the field of money management; ability to make effective and reasonable decisions regarding the use and management of money.
	Graham, 1980; Danes, Haberman, 2007	FL – ability to interpret, summarize, calculate, and develop independent judgments about monetary resources and take measures to thrive in a complex financial world.
	Johnson, Sherraden, 2007	FL – financial opportunities, financial competence – competences, ability to act on the basis of existing knowledge and ability to act in the economic system in order to simply survive or ensure a full life.
	A.M. Lusardi, O.S. Mitchell, 2007	FL – a process, when consumers can gather financial information, develop skills and confidence, understand risks and opportunities, explore appropriate resources for assistance, and take action to improve their financial situation.
	A.M. Lusardi, O.S. Mitchell, 2014	FL – people's ability to process economic information and make reasonable decisions about financial planning, wealth accumulation, debts and pensions.
	L. Mandell, 2007	FL – ability to evaluate new and complex financial tools and make sensible judgments both on the choice of tools and the extent of their use in accordance with long-term interests.
	A.V. Zelentsova et al., 2012	FL – individuals' ability to manage their finances and make effective short-term and long-term financial decisions.
Complex	D.L. Remund, 2010	FL combines 5 components: 1) knowledge of financial concepts; 2) ability to discuss financial issues; 3) inclination to manage personal finances; 4) ability to make financial decisions; 5) confident effective planning to achieve financial goals. FL means the level at which a person understands key financial concepts, has the ability and confidence to manage personal finances through short-term solutions and long-term planning, taking into account economic events and changing conditions.
	V. Kardashov; NAFI Research Center	FL – understanding of key financial concepts, knowledge about financial institutions and their products, ability to use them and make reasonable decisions to achieve life goals and ensure personal well-being, as well as understanding of consequences of person's actions.
	Organization for Economic Cooperation and Development (OECD)	FL – a combination of awareness, knowledge, skills, attitudes and behavior related to finance and necessary to make informed financial decisions and ultimately achieve personal financial well-being.
	L.Yu. Ryzhanovskaya, 2010	FL – inseparable from the human ability to consciously participate in social reproduction as an investor, which, with a reasonable and responsible approach to the choice of financial tools, should generate income or, at least, provide a knowledge holder with financial stability.
	Strategies for improving financial literacy in the Russian Federation for 2017–2023	FL – a result of the financial education process, which is defined as the combination of awareness, knowledge, skills and behavioral patterns required to make successful financial decisions and ultimately to achieve financial well-being.

Sources: compiled by the authors on the basis of the works [6, 8, 9, 10, 11, 12, 13].

the World Bank in the framework of the project Russia Financial Literacy and Education Trust Fund. Financial capability means a person's ability to live within means and make appropriate financial decisions (see: Financial Services Authority; Atkinson, McKay, Kempson, & Collard, 2006; HM Treasury, 2007) [14, p. 344]. Experts explain the use of "financial capability" by the fact that, unlike literacy (which they consider as an aspect of financial capability in terms of knowledge and understanding of financial concepts and specific products), it helps monitor both directly the observed aspects of actions and the interaction between actions (competencies) and environment[10]. The greatest attention is usually paid to four competencies: "living within means"(adequate management of available financial resources); "monitoring" (control over personal financial condition); "short- and long-term planning" (financial measures taken for the near and long-term future); "being informed / being aware" (habit to monitor current economic events) [14, p.344].

The financial literacy concept includes several aspects: financial knowledge (ANZ, 2005; Hung et al., 2009; FINRA, 2010; Gallery, 2010; Huston, 2010; Remund, 2010; OECD, 2013); financial experience (Orton, 2007; FINRA, 2010; OECD, 2013); ability to use various financial concepts and tools (Hung et al., 2009; Huston, 2010; Remund, 2010); ability to make adequate financial decisions (Remund, 2010; OECD 2013); attitudes to the use of financial tools (Orton, 2007); people's trust in financial transactions (Huston, 2010; Remund, 2010; OECD, 2013); real financial behavior (Orton, 2007; Huston, 2010) [7, pp. 38-39]. There are various groups of presented spheres: for example, A. Zait and P.E. Bertea (2014) group them under five measures: (1) knowledge of financial concepts and products (variable "financial knowledge"); (2) communication skills regarding financial concepts (variable "financial communication"); (3) ability to use knowledge for making necessary financial decisions (variable "financial ability"); (4) effective use of various financial tools (variable "financial behavior"); (5) people's confidence in their previous financial decisions and actions (variable "financial trust") [7, p. 39].

The synthesis of research and authors' contemplations help form conceptual understanding of financial literacy (*figure*) and single out its components:

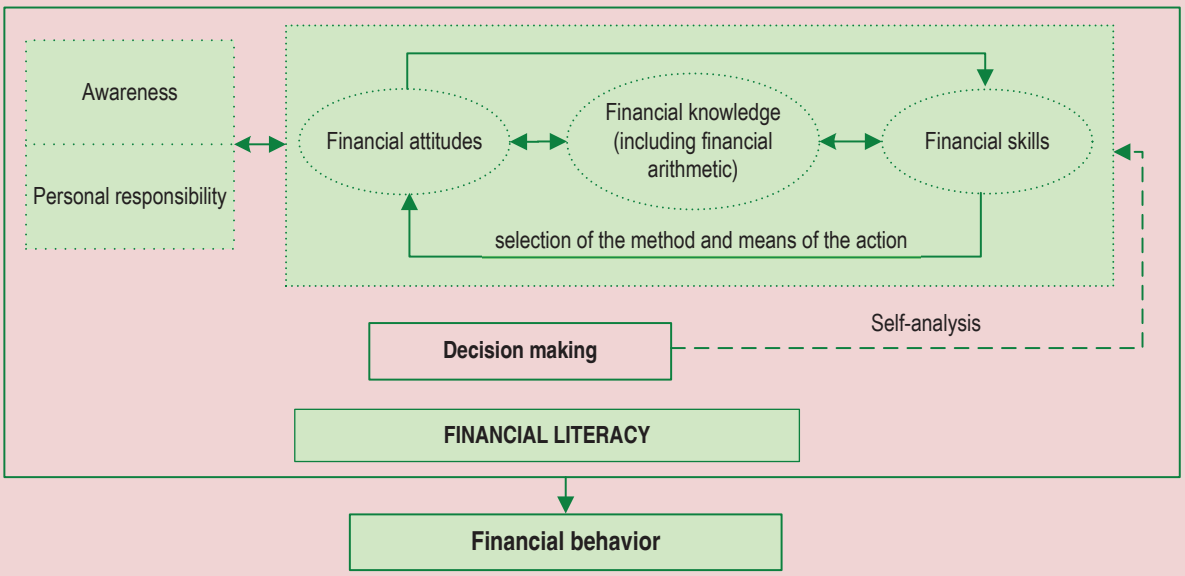
• financial knowledge (basic and specific/advanced) – information about the financial system and related aspects, "fixed in person's memory and consciously perceived" [15];

• financial skills – actions to manage monetary and other financial resources for specific tasks, formed through repetition and characterized by a high degree of development;

• financial attitudes – predisposition to the perception and behavior in relation to objects and situations, associated with personal finance [16, p.19]. They are responsible for the formation of people's needs in financial services and understanding of the consequences of their actions [9, p. 94]. Attitudes depend on

[10] For example, knowledge or cognitive skills are directly measured: if a respondent has relevant knowledge, he/she will respond correctly. On the other hand, skills related to money management cannot be manifested independently of external factors, such as a level of resources and availability of financial products. For example, even if a person is able to plan his/her old age, he/she may not do so, because his/her income is too low even to meet current needs. For this reason, measuring attitudes (e.g. reasons to do/not to do anything) helps get a more accurate picture of a person's capability. Other external factors that may affect financial competence include financial resources, social norms and commitments, financial infrastructure, and existing financial and consumer protection legislation (see: *Making Sense of Financial Capability Surveys around the World. A Review of Existing Financial Capability and Literacy Measurement Instruments.* International Bank for Reconstruction and Development. The World Bank, 2013. Available at http://hdl.handle.net/10986/16251; https://openknowledge.worldbank.org/handle/10986/16251 (accessed August 17, 2018)).

Figure. Conceptual scheme of financial literacy



Source: compiled by the authors.

situational and circumstantial factors, are less stable than individual features [14, p. 344].

Thus, we will define financial literacy as a person's ability to combine knowledge, skills and attitudes, as well as awareness, responsibility and relations, which helps him/her to make sensible financial decisions to ensure his/her own material well-being[11]. Therefore, financial literacy, combining cognitive, activity and value-motivation components, is manifested in specific financial decisions and actions, collectively forming financial behavior.

Qualitative study of the FL measurement method requires consideration of the factors (independent explanatory variables) that affect its level and implemented financial behavior. Including these factors in the FL measurement tools helps make a more reliable assessment and determination of the points of management efforts application (for example, in the framework of financial education programs or increasing financial products availability for specific population groups). It is best to present possible factors through empirically established relationships.

It is quite natural that the strongest relationships are found between FL and income and education levels. The poorest strata of society are at the greatest risk of adverse financial events, as, having little or no financial "reserves", they are most vulnerable to the consequences of economic crises and shocks [17]. For example, in the UK repossession cases are more likely to occur in areas with the lowest employment rates and lower middle income level[12]. In the US people with a low socio-

[11] The adopted definition reflects the most common approach to understanding financial literacy of the population, developed by OECD specialists and used in many foreign and domestic studies.

[12] Atkinson A., Messy F. Measuring financial literacy: results of the OECD. International Network on Financial Education (INFE) Pilot Study. *OECD Working Papers on Finance, Insurance and Private Pensions No. 15.* OECD Publishing, Paris, 2012. URL: http://dx.doi.org/10.1787/5k9csfs90fr4-en).

economic status often have to sale mortgaged property, than their richer fellow citizens [14, p. 345; 17].

When the level of education increases, financial literacy goes up [18]. According to researches, college graduates are more likely to form savings and less likely to use expensive borrowing [12]. Bernheim, Garrett and Maki (2001) show that the presence of school financial education significantly raises households' savings and an overall wealth level over a lifetime [19; 20, p. 971].

Demographic factors have a significant impact on financial literacy. The studies of Lusardi and Mitchell (Lusardi and Mitchell, 2014) disclose an undulating relationship between age and financial literacy, which implies a lower level in the young and older age and a higher level in middle age [12; 21, p. 48]. For example, the survey carried out among older people (60+ years) by FINRA indicate that more than half of them have made unsuccessful investments, and every fifth has been misled or deceived, when interacting with financial agents [12].

There are interesting findings in terms of gender: women are more emotional about money and less "rational" in their financial behavior [22, p. 707], and, according to Chen and Volpe (2002), Lusardi et al. (2010) and Agarwalla et al. (2015), have lower levels of financial literacy compared to men [21, p. 48].

There is a positive impact of marital status on financial literacy, as married people try to manage their finances and be sensible, when spending money [21, p. 49].

Since people receive financial knowledge not only from official educational networks, but also from interaction with socialization agents, such as friends, family and the media, it is quite natural that the processes of primary and secondary socialization have an important impact on people's attitude to money and their financial literacy level. In particular, children acquire many monetary habits from their parents, but in general a parental factor (level of education, social and political values) affects children's practice of savings in adulthood [22, p. 707, 711]. The family has a strong influence on financial knowledge [23]. College students who describe their parents as an important source of financial information tend to have strong financial knowledge and best financial practices. [4]

Financial literacy is affected by cognitive and behavioral variables, such as cognitive and mathematical abilities, financial socialization (Shim et al., 2009; Hira et al., 2013; Grohmann et al., 2015) [21, p. 49]. Gerardi, Goette, and Meier (2013) estimate that population groups with highest mathematical abilities are about 20% less likely to default on mortgages than those with lowest mathematical abilities [12]. According to Christelis et al. (2010), who studied relations between cognitive abilities and equity capital, the tendency to directly or indirectly invest in stocks (through mutual funds and retirement accounts) is closely related to mathematical abilities, verbal skills (i.e. ability to clearly express thoughts), and fluent use of special terminology [24; 25, p. 2780].

Thus, it can be stated that studies of financial behavior and financial literacy often do not make a clear and unambiguous distinction between knowledge, literacy, abilities and capability, since these concepts are closely interrelated and are therefore primarily used as equivalents. Financial literacy and financial capability studies are the most common. Focusing on the tradition of research in the sphere of personal finance and financial literacy established in the national science, as well as taking into account the approved

Strategy for improving financial literacy in the Russian Federation for 2017–2023, in our study we rely on a broad approach to understanding financial literacy and believe that it covers financial knowledge, skills, attitudes, personal responsibility, implemented in certain financial actions in order to ensure material well-being. Nevertheless, it should not be forgotten that differences in the definitions of concepts imply potential problems with the interpretation and comparison of individual studies results.

Methods for measuring financial literacy of the population

The first measure of financial literacy was conducted not long ago – in the early 1990s. Today world practice has various methods for assessing financial literacy, aggregated indicators and synthesis indices are used to compare results. At the same time, the lack of a unified interpretation and a standard financial literacy indicator encourages researchers to create new approaches and tools for its evaluation.

In accordance with the results of S. Huston's research (2010), nine out of every ten reviewed studies do not disclose a generalized indicator of the financial literacy level and the rest (less than 20%) present individual parameters of financial literacy and a system for results interpretation [5, p. 304]. In this case, mainly four aspects are analyzed (in one or another content): basic knowledge, money management, savings and investments, and risk management. All four aspects of financial literacy are monitored in only 25% of the studies [21].

The key objective of the research in financial literacy of the population (as well as financial capability) is to obtain a consolidated assessment of its "weak areas" and determine target population groups for identification of the need for financial education. Additionally, it is possible to identify weak areas in financial behavior and appropriate (the least financially capable) population groups, as well as topics for financial education and potential channels of financial information provision.

One of the most well-known and widely used methods for assessing financial literacy is developed by Lusardi and Mitchell. It includes 3 aspects: (1) ability to perform calculations related to interest rates (in particular, compound interest calculation); (2) understanding of inflation; (3) understanding of risk diversification [12; 26]. The idea of this approach is as follows: these aspects form the basis of individual decisions on the optimal distribution of income between consumption and savings within the life cycle. The scientists developed a standard set of questions (*tab. 2*) and firstly tested it in 2004 on a sample of respondents from the United States (aged 50 years and older) in the framework of the U.S. Health and Retirement Study. The method was subsequently used in other studies in the United States, including the 2007–2008 NLSY survey (for young respondents aged 23–28), the RAND American Life Panel, and the Financial Capability Study in 2009 and 2012 [12].

Currently, the described method is widely used in international and national studies, and it is often supplemented by several country-specific issues[13].

In 2010–2011 the *OECD presented an international financial literacy survey*, organized to help governments and public authorities to "identify national levels of financial literacy",

[13] Example, see: Anderson A., Baker F., Robinson D.T. Precautionary savings, retirement planning and misperceptions of financial literacy. *Journal of Financial Economics,* 2017, vol. 126, pp. 383-398; Klapper L., Lusardi A., Oudheusden P. *Financial Literacy around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey.* Standard & Poor's, 2015. Available at http://gflec.org/wp-content/uploads/2015/11/3313-Finlit_Report_FINAL-5.11.16.pdf?x87657

Table 2. Method for measuring financial literacy developed by Lusardi and Mitchell (2014)

Measured aspect	Clarification	Question wording
Calculation of interest	Measures mathematical literacy i.e. skills of working with data and basic calculations (ability to make calculations related to the calculation of simple and complex percentages).	Suppose you had 100 US dollars in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: [more than 102 US dollars, exactly 102 US dollars, less than 102 US dollars? Do not know, refuse to answer]
Understanding of inflation	Measures basic understanding of the time value of money.	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy: [more than, exactly the same as, or less than today with the money in this account? Do not know; refuse to answer]
Understanding of risk diversification	A complex issue, since it involves knowledge of both financial tools themselves and distribution of risks.	Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund" [Do not know; refuse to answer]
Source: compiled by the authors on the basis of the work [12].		

Table 3. Method for measuring financial literacy developed by the OECD (OECD)

Aspect	Measured elements	Explanation
Financial knowledge (at least 6 correct answers to be considered financially literate)	Designed to test knowledge of financial terms, principles and processes: - one question is aimed at assessing the skills to perform mathematical calculations related to the time value of money; - three questions determine the ability to calculate interest rates; - two questions relate to the relationship between the value of money and inflation; - two questions measure knowledge of the relationship between risk and return in financial investment strategies.	Basic knowledge of financial concepts and ability to apply accounting skills in the financial context ensures that consumers can act autonomously to manage their financial issues and respond to news and events that may have implications for their financial well-being.
Financial behavior	A number of positive and negative behavior forms: - maintaining a family budget; - active savings; - deliberate purchase; - timely bill payment; - monitoring of financial transactions; - definition of long-term financial objectives; - selection of financial products	Consumer behavior is what ultimately shapes their financial position and well-being in both the short and long term. The focus here is on the specific financial choices people make, not the context of the action.
Attitudes to money and funancing	Three questions about attitudes to money and long-term financial planning.	Even if a person has sufficient knowledge and ability to act in a certain way, his financial attitudes will influence decisions about whether to act or not.
Source: compiled by the authors on the basis of: Measuring Financial Literacy / OECD. URL: http://www.oecd.org/daf/fin/financial-education/measuringfinancialliteracy.htm		

"provide with basic indicators and benchmarks for national [educational] strategies", and "identify population's needs, groups with the greatest needs and gaps" [27]. The OECD questionnaire consists of four main parts: the first part includes general socio-demographic and economic issues; the rest three parts focus on measuring financial literacy through financial knowledge, financial behavior and attitudes to money and finance (*tab. 3*).

The initial version of the toolkit was tested in the international pilot study in 2010 in 14 countries; the last detailed report was published in 2017 and compared the data from 30 countries[14].

In accordance with the international method developed during the project, *the Russia Financial Literacy and Education Trust Fund (under the auspices of the World Bank)* calculated the *indices of financial capability* by ten components[15]:

1. Budgeting.
2. Living within means.
3. Monitoring expenses.
4. Using information.
5. Not overspending.
6. Saving.
7. Covering unexpected expenses.
8. Attitude towards the future.
9. Not being impulsive.
10. Achievement orientation.

In the *Russian Federation* during the implementation of the project "Promotion of financial literacy of the population and development of financial education in the Russian Federation" the "system of basic competencies" or the "set of financial literacy "standards" was formed, which included: ability to live within means, monitor the state of finances, plan future income and expenses, choose right financial products, search for information and be able to analyze it, understand financial issues[16]. This was followed by the system (framework) of financial competencies for the RF adult population, consisting of nine subject areas: (1) income and expenses; (2) financial planning and budget; (3) personal savings; (4) lending; (5) investment; (6) insurance; (7) risks and financial security; (8) consumer's rights protection; (9) general knowledge of Economics and basics of financial arithmetic[17].

Based on these developments, the questionnaire of the all-Russian survey was worked out in 2012 and tested in August 2013 (performed by JSC "Demoscope" and JSC "Prognostic solutions"). It is based on the achievements of the project to create a universal method for measuring financial literacy of the Russian Trust Fund and OECD method, as well as the questions asked in some previous Russian studies of financial literacy (knowledge of financial tools, trust in financial institutions and attitudes to paternalism/individualism). As a result, the formed operational model of financial literacy included the following blocks[18]:

1) money management;
2) planning;
3) choosing between alternatives;

[14] See in detail: G20/OECD INFE *Report on Adult Financial Literacy in G20 Countries,* 2017. Available at: http://www.oecd.org/daf/fin/financial-education/g20-oecd-infe-report-adult-financial-literacy-in-g20-countries.htm

[15] See in detail: *Financial Literacy and Education – Russia Trust Fund.* World Bank. Available at: http://responsiblefinance.worldbank.org/news-and-events/financial-literacy-and-education-russia-trust-fund; Kuzina O.E. Financial literacy and financial competence: definition, measurement methods and analysis results in Russia. *Economic Issues,* 2015, no. 8, pp. 129-148.

[16] RF Ministry of Finance project "Promotion of Financial Literacy of the Population and Financial Education Development in the Russian Federation", vol. 1, 2011–2015: reference and information publication, 2016, p. 60-61. Available at: http://вашифинансы.рф/upload/medialibrary/Obzor_O_proekte.pdf (accessed August 28, 2018).

[17] RF Ministry of Finance project "Promotion of Financial Literacy of the Population and Financial Education Development in the Russian Federation", vol. 1, 2011–2015: reference and information publication, 2016, p. 63. Available at: http://вашифинансы.рф/upload/medialibrary/Obzor_O_proekte.pdf (accessed August 28, 2018).

[18] RF Ministry of Finance project "Promotion of Financial Literacy of the Population and Financial Education Development in the Russian Federation", vol. 1, 2011–2015: reference and information publication, 2016, p. 75-76. Available at: http://вашифинансы.рф/upload/medialibrary/Obzor_O_proekte.pdf (accessed August 28, 2018).

4) raising awareness;

5) test questions on knowledge about financial products and services;

6) contextual variables (a psychological block – attitudes to money, impulsivity, self-esteem);

7) contextual variables (an institutional block – trust, paternalism);

8) knowledge and skills needs, preferred forms of training;

9) socio-demographic and economic profile of respondents.

Numerous "*private" methods to assess financial literacy of the population* also find practical application; some of them are presented in *Table 4*.

Summarizing the studied methods for FL assessment, it is necessary to highlight the following points. First, the vast majority of methodological approaches to measuring financial literacy are developed and tested under national financial education programs or pension schemes; they essentially estimate FL in a broad sense, that is, as a set of financial knowledge, skills, attitudes and their implementation in specific behavioral practices, in other words, financial literacy is expanded to financial capability. Second, all methods are based on the use of sociological tools and involve the elaboration of questionnaires of varying degrees of detail. Third, the most frequently researched subject areas of FL

Table 4. Private methods to assess financial literacy

No.	Author	Measured indicators
1.	Zait A., Bertea P.E. (2014)	Five indicator variables: (1) financial knowledge; (2) financial communication ability; (3) ability to use financial knowledge for making decisions; (4) actual use of financial tools (financial behavior); and (5) financial trust. Four subject areas: (a) personal budgeting, (b) savings, (c) loans, (d) investments. Three–five questions are considered for each measurement.
2.	Kiliyanni A.L., Sivaraman S. (2016)	Four financial literacy indicators: (1) basic knowledge, (2) capital management, (3) savings and investments, (4) risk management. The test of 34 questions is used: 18 multiple-choice questions to assess respondents' knowledge of 4 specified indicators (subject areas), 1 question for self-assessment of financial literacy, 2 questions to determine respondents' opinion on the need for financial education; 13 additional questions to determine demographic and socio-economic characteristics of respondents.
3.	Vashchenko T.V., Ivanova Ya.Ya. Sokol'nikova I.V. (2017)	Six elements that form financial literacy are estimated: (1) knowledge of basic financial concepts and definitions, belonging to the finance sphere; (2) ability to orientate in the main products offered by the modern financial market; (3) ability to use modern technologies for obtaining and analyzing information available on the Internet; (4) skills in cash management and execution of necessary operations through mobile banking and Internet banking systems; (5) knowledge of key market indicators and financial indicators to assess the effectiveness of financial transactions and products; (6) ability to identify possible risk factors and consequences of risk situations. The criteria test is used for assessment, on the basis of its results 4 degrees of financial literacy are determined: Degree 1 (less than 20 points) – almost complete absence of FL; Degree 2 – 20-45 key) – low level of FL; Degree 3 (46-80 points) – average level of FL; Degree 4 (more than 80 points) – high level of FG.
Sources: compiled by the authors on the basis of [7, 21, 28].		

are basic knowledge of money management (budget and financial planning, understanding of inflation and interest); features of financial products and their use (deposits and savings, investments, loans); risks and protection against them. Fourth, as a way to measure the components of financial literacy and financial capability there are used either criteria (check) tests or self-assessment, but most often they complement each other and are used together. In addition, they make it possible to calculate private (by FL components) and composite (FL general level) indices, thereby increasing the visibility of results interpretation.

Concept of the author's method to assess financial literacy of the population

Before disclosing the concept of the author's method to assess financial literacy, we consider it necessary to pay attention to correlation of the concepts "literacy" and "capability". According to the Large Encyclopedic Dictionary, literacy means a "degree of proficiency in reading and writing in accordance with grammatical norms of the native language. With regard to characteristics of the population, it is one of the basic indicators of its socio-cultural development"[19]. Literacy interpretation in foreign studies is identical: "Literacy involves the use of printed and written information to function in society, achieve goals and develop cognitive capacity" [5, p. 306].

"The specific content of literacy is historically variable, tends to expand with the growth of social requirements to the development of an individual: from the basic skills of reading, writing, counting – to the possession of a set of different socially necessary knowledge and skills that allow a person to consciously participate in social processes"[20]. According to the Higher School of Economics experts, "modern literacy" consists of basic instrumental literacy, based on the use of communication tools, and basic special knowledge and skills relevant to human activity spheres (e.g., legal "literacy", environmental "literacy", "literacy" in the health field) [29, p. 18].

Capability is considered as the ability to effectively mobilize (choose and use most appropriate) knowledge and skills to solve specific problems [29, p. 15]. Capability as a specific personal quality forms and develops in the process of social activities [30, p. 143]. In addition, capability is a situational category, as it is expressed in the willingness to carry out any activities in specific situations [31, p. 11].

We have previously noted that financial literacy is conceptualized through two aspects – understanding (knowledge of personal finance) and skills ("automatic", basic actions based on knowledge), while financial capability means not the automatic, but conscious ability to manage financial resources and use financial services, so as to best meet individual needs in the existing socio-economic conditions.

In accordance with the author's concept of financial literacy, presented in the figure, financial literacy is defined as a measurement of how well a person knows, understands and applies financial information, taking into account motivational and value aspects (i.e. financial attitudes), objectively influencing any human behavior. In other words, we operationalize financial literacy through three components – knowledge, skills, attitudes, putting aside specific financial actions that make up financial behavior in their totality.

[19] Literacy. *Large Encyclopedic Dictionary*. Available: https://www.vedu.ru/bigencdic/16168/ (accessed August 13, 2018).

[20] *Ibidem*.

Table 5. Concept of the author's method for assessing financial literacy of the population

No	Subject area of FL	Component of FL	Clarification
1.	Income and expense	Knowledge	Understanding how to use income and distribute it to savings and consumption, how to keep financial records, make payments and keep the money safe. Basic knowledge of inflation.
		Skills	Targeted income distribution.
		Attitudes	Attitude to money (purpose of life or means of life) and wealth, impulsiveness, propensity to save.
2.	Family budget and financial planning	Knowledge	Understanding how to maintain a budget and what is financial planning, understanding of the need to have funds "for a rainy day".
		Skills	Storage of financial documents, a chosen method of maintaining a family budget, "ability to live within person's means", setting of financial goals.
		Attitudes	Attitude to the future (i.e. focus on "life today" or long-term planning), presence of long-term goals, desire to achieve goals.
3.	Savings and deposits	Knowledge	Understanding of the essence and features of the use of bank deposits; knowledge of the definition of "interest", knowledge of a deposit insurance system.
		Skills	Interest calculation, bank selection criteria.
		Attitudes	Conscious saving, or saving by residual principle, targeted saving or non-targeted saving.
4.	Lending	Knowledge	Understanding of the essence and features of the use of bank credit, credit discipline, annuity payments, knowledge of the criteria for choosing a loan.
		Skills	Calculation of credit payment, compliance with credit discipline, use of loans.
		Attitudes	Propensity to borrow.
5.	Investments and taxes	Knowledge	Understanding of investment principles, knowledge of the ratio of risk and return, knowledge of the types of tax deductions.
		Skills	Calculation of personal income tax, use of investment services, registration of tax deduction.
		Attitudes	Presence of long-term goals, desire to achieve goals.
6.	Insurance and pensions	Knowledge	Understanding of the basics of pension provision, knowledge of possible ways to accumulate for old age, knowledge of insurance products.
		Skills	Financial provision for old age (income planning), use of insurance products.
		Attitudes	Paternalism or self-reliance, propensity for future planning and investment.
7.	Risks and financial security	Knowledge	Knowledge of financial risks existence, knowledge of financial pyramid features, knowledge of the ways to reduce risks (diversification), knowledge of human rights organizations.
		Skills	Safe use of bank cards, careful reading of contracts, comparison of services, use of various information sources.
		Attitudes	Propensity to deliberate or risky behavior; desire to get information.
8.	Consumer rights protection	Knowledge	Knowledge of human rights organizations.
		Skills	Experience in filing a complaint against a financial institution.
		Attitudes	Orientation to be informed; life position (active, i.e. it is possible to influence what is happening, or passive, i.e. "everything is determined in life").
9.	Basics of financial arithmetic	–	Financial and mathematical literacy, i.e. ability to use standard mathematical skills in the context of financial resources management, particularly for the calculation of interest, taxes, credit payments, etc.

Source: compiled by the authors.

We select the category "literacy" instead of "capability" due to several circumstances. First, it is a tradition that has developed in most Russian studies that assess literacy. Second, the approved Strategy and the ongoing joint project of the Ministry of Finance and the World Bank use this category. Third, the terminological phrase "financial literacy of the population", in our opinion, has become firmly established in everyday life, is widely recognized and, in addition, compared with financial capability, intuitively more understandable to an ordinary consumer of financial services. We emphasize that the adopted definition does not contradict the definitions of "literacy" as such existing in the literature and is consistent with the constructions of "financial literacy" used in other studies.

The choice of specific questions to measure FL components and the development of the method for its assessment should be based on a number of principles:

- questions should be sufficient, i.e. fully disclose the subject area and the relevant component of FL;
- questions should be measurable;
- some questions should be "common", i.e. repeated in surveys conducted in other regions or in national surveys;
- questions should be equally applicable to all population groups.

We use the tools to assess financial literacy developed and used by the OECD[21]. Subject areas are singled out on the basis of the framework of financial capability of the RF adult population proposed by the RF Ministry of Finance (*tab. 5*). For each area (with the exception of financial arithmetic) three structural components of FL are measured, such as: financial knowledge, financial skills, and financial attitudes. In order to clarify population's decisions taken on the basis of financial literacy, it is expected to include questions about savings and credit behavior, use of other financial products, as well as issues related to financial education.

In addition to the main questions to measure financial literacy, the questionnaire includes "explanatory variables": age, gender, marital status, education, financial situation, employment status.

The questionnaire is compiled using open and closed questions, ordinal and interval scales (for example, the Likert scale) and qualitative questions.

To carry out a generalized assessment, based on selected components, we calculate several indices of FL: financial knowledge index, financial skills index, financial arithmetic index. Calculation of the financial attitudes index is not provided, as questions on attitudes will be used for in-depth analysis, in particular, selection of population groups in accordance with features of value-motivational attitude to money and other financial resources.

The application of our proposed method for assessing financial literacy of the population is aimed at solving several problems:

- identification of "weak areas" of financial literacy of the population in the context of three components (knowledge, skills and attitudes), as well as weak areas of financial behavior;
- determination of target population groups for financial education programs and least financially capable population groups for promotional events development;

[21] See: Atkinson A., Messy F. Measuring financial literacy: results of the OECD. International Network on Financial Education (INFE) Pilot Study. *OECD Working Papers on Finance, Insurance and Private Pensions No. 15.* OECD Publishing, Paris, 2012. URL: http://dx.doi.org/10.1787/5k9csfs90fr4-en

• assessment of the need to provide financial information in the context of specific topics, as well as identification of the most preferred forms / methods for obtaining such information;

• study of the features of financial literacy and financial behavior in terms of socio-demographic groups;

• study of the relationship between components of financial literacy and financial behavior.

Moreover, if a financial literacy survey is conducted on a permanent basis, it is possible to monitor changes in the level of financial literacy and determine the impact of financial education programs on financial behavior.

Conclusion

People's financial goals are individual, they are motivated by a life situation and their socio-economic status[22]. Therefore, there is considerable heterogeneity in both financial behavior and financial literacy. Economic studies of financial literacy pursue quite obvious goals to identify weak areas in financial knowledge and skills of the population and identify the least financially capable population groups in order to develop effective programs of financial education. However, it is always necessary to remember that it is impossible and even undesirable to make every person a financial expert.

The development of a coherent concept of financial literacy involves a clear interpretation of the term and its corresponding assessment method. The definition of such a complex economic category as "financial literacy" is difficult because of the content itself, the diversity of opinions and research tasks. Therefore, the work on the development of its universal interpretation for the use in empirical studies of different levels and directions seems archaic, while the formation of internally consistent theoretical and methodological approaches to the study and measurement of financial literacy of the population is a very urgent scientific task.

In our study, we propose to consider *financial literacy* as a person's ability, involving a combination of knowledge, skills and attitudes, as well as awareness and responsibility, which helps him/her to make informed financial decisions to ensure their own material well-being. The proposed interpretation does not contradict the definitions of "literacy" as such existing in the scientific literature and is consistent with the constructions of "financial literacy" used in other studies.

The key objective of the empirical assessment of financial literacy of the population is to obtain information about its "weak areas" and identify target groups in need of training by financial education programs. These actions can be implemented by analytical structures of regional executive authorities (departments of strategic planning, finance or economic development), research organizations (universities, research institutions, sociological companies) and directly by financial organizations, as well as in the format of interaction of these structures.

The method used to estimate financial literacy should be consistent with the definition and should cover all the components. According to the author's approach, financial literacy of the population is operationalized through three components – knowledge, skills, attitudes (cognitive, activity and value-motivational components),

[22] Stakhovich L.V. Need to improve financial literacy of young people as the most important priority of the state policy. *Children and the Youth: E-Internet Conference*. Available at: https://iq.hse.ru/more/finance/neobhodimost-povisheniafinansovoj-gramotnosti (accessed August 8, 2018).

while specific financial actions that make up financial behavior are set aside. The method for assessing financial literacy developed and applied by the OECD is adopted as a model. Subject areas are singled out on the basis of the framework of financial capability of the RF adult population offered by the RF Ministry of Finance. The method helps obtain composite sociological information on individual components of financial literacy and calculate several private indices of FL (financial knowledge index, financial skills index, financial arithmetic index).

It should be noted that, despite the national monitoring of financial literacy, the implementation of private (local and interregional) studies is very significant. The study of financial literacy based on a regional survey is a more detailed supplement to national and international studies. First, there is an opportunity to pay more attention to certain aspects of financial literacy or certain groups of the population that have unique socio-economic, demographic or professional characteristics. Second, under "local" studies you can ask narrower, specific questions about the phenomenon under analysis. Third, such studies focus on features that are specific to a local community, largely determine a financial literacy level and are lost in national surveys. Fourth, this kind of research can become regular, i.e., with the interest of regional authorities and the high efficiency of conducted surveys, the latter can be conducted on a permanent basis (with a certain periodicity). Fifth, such research help solve the problem of filling the empirical array of financial literacy of the population with qualitative data, which is a valuable addition to "dry" quantitative indicators.

References

1. Ilyin V.A., Povarova A.I. Problems of regional development as a reflection of public administration effectiveness. *Ekonomika regiona=Economy of Region*, 2014, no. 3 (39), pp. 48-63. (In Russian).
2. Rossoshanskii A.I. Methodology for the index assessment of the quality of life in Russian regions. *Problemy razvitiya territorii=Problems of Territory's Development*, 2016, no. 4 (84), pp. 124-137. (In Russian).
3. Khesin E.S. Modern world economy: finances and capital accumulation. *Dengi i kregit=Money and Credit*, 2016, no. 8, pp. 31-36. (In Russian).
4. Hanson T.A., Olson P.M. Financial literacy and family communication patterns. *Journal of Behavioral and Experimental Finance*, 2018. Available at: https://doi.org/10.1016/j.jbef.2018.05.001 (accessed August 13, 2018).
5. Huston S.J. Measuring financial literacy. *The Journal of Consumer Affairs*, 2010, no. 2, vol. 44, pp. 296-316.
6. Kuzina O.E. Financial literacy and financial competence: definition, measurement methods and analysis results in Russia. *Voprosy ekonomiki=Economic Issues*, 2015, no. 8, pp. 129-148. (In Russian).
7. Zait A., Bertea P.E. Financial literacy – conceptual definition and proposed approach for a measurement instrument. *Journal of Accounting and Management*, 2014, vol. 4, no. 3, pp. 37-42.
8. Remund D.L. Financial literacy explicated: the case for a clearer definition in an increasingly complex economy. *The Journal of Consumer Affairs*, 2010, no. 44 (2), pp. 276-295.
9. Belekhova G.V., Kalachikova O.N. Financial literacy of young people (case study of the Vologda Oblast). *Problemy razvitiya territorii=Problems of Territory's Development*, 2016, no. 5 (85), pp. 90-106. (In Russian).
10. Zelentsova A.V., Bliskavka E.A., Demidov D.N. *Povyshenie finansovoi gramotnosti naseleniya: mezhdunarodnyi opyt i rossiiskaya praktika* [Improving Financial Literacy: International Experience and Russian Practice]. Moscow: KNORUS, 2011. 108 p.

11. Lusardi A., Mitchell O.S. Financial literacy and retirement preparedness: evidence and implications for financial education. *Business Economics*, 2007, no. 42 (1), pp. 35-44.
12. Lusardi A., Mitchell O.S. The economic importance of financial literacy: *Theory and Evidence*. *Journal of Economic Literature*, 2014, vol. 52 (1), pp. 5-44. Available at: http://dx.doi.org/10.1257/jel.52.1.5
13. Hung A.A., Parker A.M., Yoong J.K. Defining and measuring financial literacy. *RAND Corporation. Working Paper-708*, 2009. Available at: https://www.rand.org/content/dam/rand/pubs/working_papers/2009/RAND_WR708.pdf
14. Stumm S., O'Creevy M.F., Furnham A. Financial capability, money attitudes and socioeconomic status: risks for experiencing adverse financial events. *Personality and Individual Differences*, 2013, vol. 54, pp. 344-349.
15. Ivanina A.I., Chulanova O.L., Davletshina M.Yu. Modern directions of theoretical and methodological developments in the field of management: the role of soft-skills and hard skills in professional and career development of employees. *Naukovedenie: internet-zhurnal=Science Studies: E-Journal*, 2017, no. 1, vol. 9. Available at: http://naukovedenie.ru/PDF/90EVN117.pdf (accessed August 27, 2018). (In Russian).
16. Alifanova E.N., Evlakhova Yu.S. Finance and credit analysis of methodological approaches to the development of indicators of financial literacy of the population. *Finansy i kredit=Finance and Credit*, 2013, no. 12 (540), pp. 18-26. (In Russian).
17. Pollack C., Lynch J. Health status of people undergoing foreclosure in the philadelphia region. *American Journal of Public Health*, 2009, no. 99, pp. 1833-1839.
18. Grohmann A., Kouwenberg R., Menkhoff L., 2015. Childhood roots of financial literacy. *Journal of Economic Psychology*, 2015, vol. 51, pp. 114-133.
19. Bernheim B.D., Garrett D.M., Maki D.M. Education and saving: the long-term effects of high school financial curriculum mandates. *Journal of Public Economics*, 2001, vol. 80, pp. 435-465.
20. Sohn S.-H., Joo S.-H., Grable J.E., Lee S., Kim M. Adolescents' financial literacy: the role of financial socialization agents, financial experiences, and money attitudes in shaping financial literacy among South Korean youth. *Journal of Adolescence*, 2012, vol. 35, pp. 969-980.
21. Kiliyanni A.L., Sivaraman S. The perception-reality gap in financial literacy: evidence from the most literate state in India. *International Review of Economics Education*, 2016, vol. 23, pp. 47-64. Available at: http://dx.doi.org/10.1016/j.iree.2016.07.001 (accessed August 17, 2018).
22. Furnham A., Wilson E., Telford K. The meaning of money: the validation of a short money-types measure. *Personality and Individual Differences*, 2012, vol. 52, pp. 707-711. DOI:10.1016/j.paid.2011.12.020
23. Shim S., Xiao J.J., Barber B.L., Lyons A.C. Pathways to life success: a conceptual model of financial well-being for young adults. *Journal of Applied Developmental Psychology*, 2009, vol. 30 (6), pp. 708-723.
24. Christelis D., Jappelli T., Padula M. Cognitive abilities and portfolio choice. *European Economic Review*, 2010, vol. 54 (1), pp. 18-38.
25. Jappelli T., Padula M. Investment in financial literacy and saving decisions. *Journal of Banking & Finance*, 2013, vol. 37, pp. 2779-2792.
26. Lusardi A., Mitchell O.S. (Eds.). Financial literacy and planning: implications for retirement wellbeing. In: Lusardi A., Mitchell O.S. *Financial Literacy: Implications for Retirement Security and the Financial Marketplace*. Oxford, Oxford University Press, 2011. Pp. 17-39.
27. Atkinson A., Messy F. Measuring financial literacy: results of the OECD. International Network on Financial Education (INFE) Pilot Study. *OECD Working Papers on Finance, Insurance and Private Pensions No. 15*. OECD Publishing, Paris, 2012. Available at: http://dx.doi.org/10.1787/5k9csfs90fr4-en
28. Vashchenko T.V., Ivanova Ya.Ya., Sokol'nikova I.V. Financial literacy: assessment and analysis. *Konkurentosposobnost' v global'nom mire: ekonomika, nauka, tekhnologii=Competitiveness in the Global World: Economics, Science*, *Technology*, 2017, no. 9 (p.3), pp. 18-21. (In Russian).

29. Frumin I.D., Dobryakova M.S., Barannikov K.A., Remorenko I.M. *Universal'nye kompetentnosti i novaya gramotnost': chemu uchit' segodnya dlya uspekha zavtra. Predvaritel'nye vyvody mezhdunarodnogo doklada o tendentsiyakh transformatsii shkol'nogo obrazovaniya* [Universal Competencies and New Literacy: What to Teach Today for Success Tomorrow. Preliminary Findings of the International Report on School Transformation Trends]. National Research University Higher School of Economics, Institute of Education. Moscow: NIU VShE, 2018. 28 p.
30. Lugovaya A.V. Proficiency and competence: about the problem of phenomena comparison and definition. *Vestnik Voronezhskogo instituta FSIN Rossii=Proceedings of Voronezh Institute of the Russian Federal Penitentiary Service*, 2013, no. 2, pp. 142-144. (In Russian).
31. Sergeev A.G. *Kompetentnost' i kompetentsii: monografiya* [Competency and Competences: Monograph]. Vladimir: Izd-vo Vladimirskogo gosudarstvennogo universiteta, 2010. 107 p.

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Performance-Based Pay – a New (Mixed) Payment Scheme for Russian Civil Servants

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Abstract. We have developed a fundamentally new approach to the provision of financial incentives (bonuses) to civil servants, which does not contradict the concept of new public management (NPM) and has a certain similarity with the corporate (Asian) performance-based type of remuneration system. In the context of our study, "performance" means socio-economic development of Russian regions. We

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develop and test our methodology in two successive stages: first, we carry out a retrospective assessment of the level of development of Russia's constituent entities (according to regional statistics), and then we calculate the amount of bonuses paid to civil servants according to their performance. Based on the level of socio-economic development, we solve the problem of clustering of Russian regions with the use of neuromodeling. The prognostic function is implemented on the basis of neural network technologies (through the development of appropriate Bayesian ensemble of dynamic neuromodules). This is the basis for the application of collective material incentives for civil servants of L-type, since the calculation of performance-based bonuses for civil servants is based on a pre-developed (by expert evaluation) progressive scale (index of socio- economic development of Russian regions – level of bonus payments paid to civil servants). The approach to bonus payments for employees based on their performance, which we propose in the framework of our work, will help coordinate the work of ministries and agencies in Russia' constituent entities by linking collective incentive payments to the level of socio-economic development of Russia's regions. Besides, the application of this approach in practice will help strengthen the control of the target expenditure of Russian budget funds. The method is universal and in case of its adaptation (variation of the system of socio-economic indicators of development of the country's regions) can be used in any country with a federal structure.

Key words: evaluation of public administration efficiency, socio-economic development, constituent entities of the Russian Federation, neuromodeling, performance-based remuneration of civil servants, progressive scale, budget expenditures.

Introduction. The global trend is to reform national public administration systems by observing the key principle (management and performance-based remuneration of civil servants) of the New Public Management paradigm (NPM) [1]. The analysis of Russian and foreign studies on performance-based public administration systems indicates the presence of both positive [2] and negative [3] effects of their implementation. However, the latter does not imply a decreased interest of the leadership of the world countries and their regions (Russia is not an exception) in the NPM, i.e. introducing the reform of the current performance-based public administration system [4]. At present, the amount of incentive payments (bonuses) to Russian civil servants is at best determined on the basis of assessed individual performance indicators without taking into account collective "results" of the activity [5]. Moreover, the considered above amount in Russia is "not tied" to the achieved level of country's socio-economic development, ensuring the effectiveness of the public administration system.

The novelty of the study and its results is as follows:

1) effectiveness of the modern public administration system in Russia is evaluated;

2) foreign experience of reforming the civil service is studied by briefly considering several most well-known public administration paradigms;

3) features of different types of foreign remuneration systems of civil servants and their main shortcomings are singled out;

4) key theoretical and methodological features of the author's method of performance-based remuneration of Russian civil servants are disclosed;

5) testing of this method is carried out on the data of regional statistics of Russia for the period of 2011–2016[1].

[1] Regions of Russia. Socio-Economic Indicators. 2017: Statistics Digest, Moscow: Rosstat, 2017.

Evaluation of the effectiveness of the modern Russian public administration system. The study tries to assess the effectiveness of the modern Russian public administration system on the basis of results of theoretical and empirical studies, including foreign ones.

The relevance of this assessment is confirmed by numerous, including interdisciplinary, researches of Russian political scientists, sociologists and economists. V.A. Ilyin and M.V. Morev in their work [6] identify and analyze a wide range of key problems of the modern Russian public administration system by determining cause-and-effect relations. According to the study results, these co-authors make a conclusion about "the need for the President to make tough decisions to enhance the efficiency of the public administration system".

At first we consider the Russian public administration performance in terms of the new ranking (key sub-ratings), the Legatum Prosperity Index[2] (*Fig. 1*). Annually published by the Legatum Institute, the British analytical center, this index comprises 149 world countries. The choice of the rating is not accidental, as it is widely popular abroad and, in our opinion, characterized by methodological elaboration of the index (sub-indices) formation. The Legatum Prosperity Index is determined on the basis of 104 socio-economic indicators, united in 9 groups (sub-ratings): economy, entrepreneurship, public administration, personal freedoms, social capital, security, education, health and environment. It is a composite indicator, as it is based not only on statistical analysis, but also on sociological research and expert assessments of survey participants.

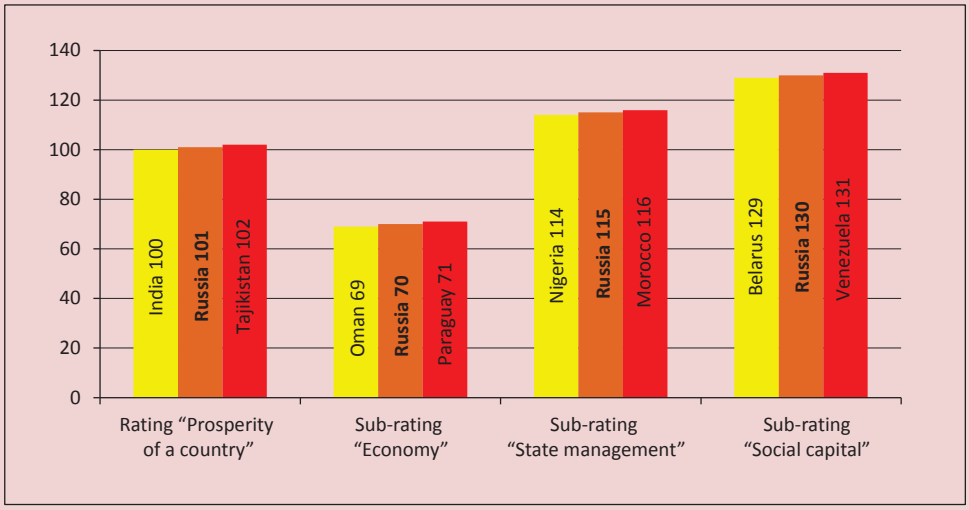
According to the figure, Russia occupies places between India (100th place) and Tajikistan (102nd place), which can not be described as prosperous countries with effective public administration systems, developed economies and a high degree of social protection of their population. It should be noted that the Russian Federation ranks 70th by the key sub-rating, such as economy with the above average development level, i.e. the country occupies a much higher place than in the final ranking (101st place). As for the other two main sub-ratings (state management and social capital), the reversed situation is observed in our country. Thus, according to the sub-ratings, public administration and social capital in the Russian Federation are characterized by a low development level, and the country ranges only 115th and 130th, respectively.

If we question the international experts' assessment of Russia's prosperity due to the politicization of its place in the Legatum Prosperity Index, the low public administration performance in Russia is confirmed by the results of quantitative and qualitative analysis of such a system.

In particular, it should be noted that the modern hierarchical system of public administration in Russia, unlike all world countries, is not two-tier (country – regions), but three-tier (country – macro-regions – RF subjects). So, nowadays all the subjects are united in 8 federal districts (macro-regions). The presence of an additional level in the public administration structure indirectly indicates its low efficiency and the state authorities' attempt to adequately respond to numerous "challenges" in the socio-economic sphere due to the extensive development way of the civil service. This is indicated by the federal government structure, formed not only on the functional, but also on the geographical basis.

[2] The Legatum Prosperity Index 2017 (2016). URL: http://www.prosperity.com/about/resources.

Figure 1. Russia's place in the Legatum Prosperity Index



Source: compiled by the authors according to the Legatum Prosperity Index.

Thus, currently its composition includes the Ministries for the Development of the Far East and the North Caucasus[3].

The main quantitative analysis results based on the calculated and interpreted coefficients (bureaucratization and remuneration) of the civil service efficiency by the method of G.A. Borshchevskii [7] are presented in the work [8]. Therefore, in the current study we just supplement this analysis by calculating and interpreting at least two more informative coefficients (expenditure and utility) of the civil service performance according to the above method. The data of the Russian statistics for 2011–2016 is the information base of the quantitative analysis of the national public administration system[4].

The first coefficient (expenditure) shows a share of budget costs on the civil service in the total budget expenditure of the country. In 2011–2012 and 2015–2016, the indicator increased from 22 to 22.4% and from 23.9 to 24.4%, respectively. In 2013–2014 the cost ratio was fixed at the same level – 22.9%. Hence, it is clear that the growth in the indicator dynamics during both the two sub-periods and the entire period under analysis means a rise in the burden on the budget in terms of financing civil service. This trend cannot be considered positive in terms of civil service efficiency.

The second coefficient (utility) is determined by means of the matrix of the dynamics of budget expenditures on civil service and GDP per capita. In 2011–2016 there was an annual growth in GDP per capita against the background of increased budget expenditures on public service (both indicators are expressed in current prices). This corresponds to the second matrix quadrant, which indicates an intermediate state of civil service performance, i.e. there are not only real opportunities to improve civil service efficiency, but also risks of its decline in the future.

[3] RF Government. Available at: http://government.ru/ministries/.

[4] Russian Statistical Yearbook. 2017: Statistics Digest. Moscow: Rosstat, 2017.

Hence, the calculation and interpretation of two more coefficients (expenditures and utility) of civil service performance also allows us to state the presence of certain serious problems and significant risks in this sphere. According to the research team, the country's leadership needs to boost and reconsider the process of reforming civil service. In our opinion, in modern Russia the first priority is to solve the problem of transition from extensive to intensive development of national civil service, paying special attention to enhancement of personnel reserve quality, "reasonable" optimization of a civil servants number, and also to their material incentives, an important tool to ensure and improve public administration performance in a market economy.

Brief overview of the relevant literature. At present, not only the New Public Management paradigm is developing, but also fundamentally different concepts (paradigms) are actively forming. There are several popular paradigms alternative to the NPM in foreign countries, such as Good Governance – GG and Responsible Cosmopolitan State – RCS. At the same time, it should be noted that the boundaries between modern public administration paradigms are not clear, i.e. they are mixed by interpenetration and transformation of a number of key functions. Therefore, we briefly describe the development (evolution) of the above three paradigms.

The "Good Governance belongs to the modern era, characterized by the beginning and development of the administrative crisis. It is the reason why this paradigm has been of practice-oriented character since the very beginning of its development" [9]. Its principles are still described on the basis of the well-known UNESCO report.

"Nevertheless, the GG theoretical constructions stipulate the recognition of joint responsibility of the state, citizens and public organizations to solve modern public life problems" [10]. The "neoliberal solution" of the problems is to integrate various organizations into a state management system [11]. In this case, the state refuses to monopolize a number of functions; public organizations (so-called network interaction of actors) are actively involved in the management process [12], even including public services provision [13]. The work [9], in our opinion, describes a role of the state in the framework of the GG paradigm quite accurately. "The state acts as a regulatory (through the achievement of public consent), but not autonomous, part of this interaction network" [9].

Another paradigm, the RCS, appeared as an attempt to solve the problem of poorly structured national public administration systems. Indeed, at present there are different hierarchical management systems with serious organizational problems, expressed in the absence of a clear division of powers even within a certain ministry and department, the duplication of functions performed by such organizations, and, ultimately, the weak coordination of their actions, the inability to work as a single team. The paper [14] provides a fundamental requirement of the RCS paradigm, stipulating the need to build well-structured hierarchical management systems in different world countries with a possibility to form a so-called "global world state" in the future. Another study [15] specifies a mechanism to implement the above requirements: the effective functioning of such national administration systems should be achieved through compliance with certain general principles to guide the coordinated action of various ministries and departments in the framework of established regulations of organizations activities. It should be noted that

today the RCS paradigm is actively applied in the practice of public administration in various countries, for example, New Zealand, Finland and Estonia. It helps solve a wide range of tasks, such as "establishment of clear coordination of the work of public authorities, introduction of multi-purpose allocations to achieve common goals, elimination of duplication of powers and "unnecessary" state bodies" [9].

With a number of different paradigms, it is the NPM concept that prevails in most prosperous (mostly European) countries of the world (e.g. Austria, Great Britain, Germany, Denmark, Italy, the Netherlands, Norway, Finland, France and Sweden). This conclusion can be made after analyzing works of foreign and Russian scientists involved in assessing the effectiveness of national public administration systems. There is a striking example of such studies, the monograph [16], "devoted to the comparative assessment of the impact of administrative reforms in European countries, focused on the ideas of new public management (NPM)" [17].

The NPM emergence was due to the state's need to support (to overcome the crisis) large industrial corporations using traditional production technologies by transferring to an innovative way of development. Therefore, at first under this paradigm, the state management system was to provide high-quality public services and business – to actively introduce innovations [18]. In modern conditions, the role and functions of the state are being rethought in many world countries in order to adequately respond to numerous "demands" of civil society. The main goal of the NPM at present is to ensure sustainable socio-economic development of territories through the so-called "economy liberalization" (the minimum possible regulatory impact on business), as well as the enhancement of quality and the expansion of a range of public services provided to citizens [19; 20]. The paper [9] characterizes the evolution of NPM theories. Within the framework of the study, we will specify key directions of their modifications. New NPM theories "build an improved hierarchy of functions of the state, highlighting cost efficiency improvement, supervision functions strengthening, programs and sectoral policies management, and regulatory functions enhancement" [9].

The NPM development, in turn, led to the evolution of performance-based civil servant remuneration systems in different countries. Currently, there is no single generally accepted classification of such systems. The research team's stance on this issue is closest to the opinion of T.A. Zhuravleva, who, relying on a number of classification features, considers it possible to distinguish three types of remuneration systems for civil servants: career (Romano-German), corporate (Asian) and positional (Anglo-Saxon) [21]. Within the framework of the study, we describe their features briefly, emphasizing the main shortcomings.

The Romano-German civil servant remuneration system (used, for example, in Germany, France and Japan) is of grading character (civil servants, based on their positions, are combined into grades). The official salary size for each position is approved centrally (by the federal government) and reflected in the fixed wage schedule. Under this system, the salary size of a civil servant depends mainly on the position and experience. In this case, career prospects, i.e. an increase in social status over time, are the main incentive for effective activity of civil servants.

The Anglo-Saxon system of civil servant remuneration (used, for example, in Australia, the United Kingdom, Canada, New Zealand

and the United States), unlike the previous type, is characterized by a high degree of decentralization, when determining salary of civil servants. Thus, authorities of ministries and departments, as well as their structural units, make decisions on the amount of official salaries and bonuses that, as a rule, are "tied' to individual performance indicators, with the size of a relevant budget being the only limitation.

Finally, the Asian civil servant remuneration system (applied, for example, in Singapore and South Korea). This system is mixed (hybrid), i.e. it includes elements of the Romano-German and Anglo-Saxon systems. In this case, on the one hand, salary of a civil servant depends not only on the individual performance, but also on the level of socio-economic development of a country.

At the same time, it should be noted that each type of the civil servant remuneration system has certain drawbacks. For example, the career remuneration system has practically no material incentives for civil servants to work hard for task achievement. The positional system is characterized by a lack of economically justified incentive payments to certain civil servants. Often their amount does not depend on the performance, but is dictated by political factors [22]. Thus, there are cases, when gender and racial (ethnic) differences influence the size of awards to civil servants in the Anglo-Saxon countries [22; 23].

The shortcomings of different types of civil servant remuneration systems boost their evolution.

At the same time, not all attempts to form mixed (combining elements of different types) remuneration systems for civil servants, in our opinion, can be considered successful. Thus, the system in China is a vivid example of an atypical system. The work [24] reflects key cause-and-effect relations of the Chinese leadership's failed attempt to reform the civil service within the NPM paradigm. "due to a lack of specific indicators, it is difficult to ensure performance-based remuneration, which includes a significant share of informal income ... such a factor, as a lack of material incentives for civil servants, does not promote the formation of conditions for work focused on result achievement" [24].

It should be noted that currently, mainly abroad, considerable experience has been accumulated in awarding (material incentives) to civil servants, based on the assessment of their individual performance [25]. Collective performance-based civil servant remuneration with regard to socio-economic development of a country and its regions is another matter. There are several reasons for this. So, in particular, the introduction of foreign experience in the Russian management practice, according to G.A. Borschevskii, "is hindered by the insufficient understanding of how to assess a certain employee's contribution to the state body functioning, and authorities' attempts, in turn, to achieve development priorities of a region and a country as a whole. It becomes obvious that without the introduction of performance-based management at the public service system level, it is impossible to transfer to the assessment and performance-based remuneration at the individual employee level" [26].

With regard to the Russian citizens' mentality and the formed political system, in our opinion, the Singapore civil servant remuneration system, based on binding individual performance indicators to the country ones, can be considered as a positive foreign experience. Surely, the necessary adaptation of this approach to the Russian reality is required. We briefly argue such a statement.

Due to the ongoing reforms, Lee Kuan Yew managed to transform Singapore from a third world country into one of the most prosperous countries in the world with a developed economy. Thus, in the new Legatum Prosperity Index[5], Singapore ranks 17th, two places higher than the previous year. At the same time, according to international experts, Singapore has the second economy in the world, lagging behind only Sweden. According to A.I. Tatarkin's opinion, which we share, "such transformations are possible only in the conditions of structural crises and when there is a high level of public trust in state bodies and confidence that the reforms are carried out competently and improve lives of most population" [27].

In our earlier published work we identified a critical complex task, which successful solution would contribute to the accelerated economic development of Russia. "We need to create such an economic structure that would be insured against any turbulence in the oil market. And this is a complex task that unites different policies – structural, technological, financial, regional, demographic. Here everything is so interconnected that it is impossible to do without close coordination of actions of different departments" [28].

Based on the above, the study set and solved the problem of developing a new (mixed) system of Russian civil servant remuneration in terms of collective incentive payments on the basis of positive foreign experience of performance-based awarding. At the same time, in our opinion, the main target setting for Russian civil servants is to ensure the work of different ministries and departments as a single team of managers (coordination of their activities is necessary).

[5] The Legatum Prosperity Index 2017 (2016). URL: http://www.prosperity.com/about/resources.

Elaboration and testing of the author's method of Russian civil servant performance-based remuneration. The method is intended for economically reasonable calculation of the amount of collective stimulating payments (performance-based awards) to employees of regional executive bodies. We consider the situation in regions, as the lion's share of employees of state executive bodies belongs to the regional, not federal level of government, according to official data of the Federal State Statistics Service of the Russian Federation (Rosstat)[6]. In different years of the analyzed period, the indicator value varied from 94 to 97% of the total number of such employees.

It should be noted that at present the country's leadership took certain steps in the field of assessing a socio-economic development level through the elaboration and approval of the appropriate methodology[7]. However, in our opinion, it has numerous methodological shortcomings [29], which hinder correct estimation of socio-economic development of Russian regions.

Therefore, the research team developed an alternative (in relation to the government) methodology. This method was tested on the data of regional statistics for 2011–2015 [29]. It helped identify a competitive position of any RF subject, but only for a certain year.

The work was continued and the express assessment of the public administration development in Russia was carried out. Based on the method of G.A. Borschevskii, two coefficients of the civil service efficiency (bureaucratization and remuneration) were calculated and analyzed. Most importantly,

[6] Russian Statistical Yearbook. 2017: Statistics Digest. Moscow: Rosstat, 2017.

[7] On measures for the implementation of the Decree of the RF President of August 21, 2012 No. 1199 "On assessment of performance of executive authorities of RF": Order of the RF Government of November 3, 2012 No. 1142.

the author's approach to the performance-based awarding of civil servants working in RF subjects, based on the alternative (in relation to the state) method to assess socio-economic development of regions, was disclosed. However, in contrast to the previous work, this methodology was improved by expanding the system of indicators, with cost indicators expressed in comparable prices (constant prices of a base year). And this, in turn, also helped correctly determine changes in the level of socio-economic development of each Russian region in the dynamics for a number of years.

This work is a final article of the cycle of authors' research devoted to the evaluation and improvement of the Russian civil service performance through the elaboration and testing of the method for calculating the economically justified amount of collective incentive payments to civil servants working in regions of the country.

The development and testing of the method is carried out in two successive stages (and several sub-stages) [8].

The first stage includes a quantitative and qualitative assessment of socio-economic development of Russian regions.

At the first sub-stage a system of socio-economic indicators of Russian regions is formed. The key problems in socio-economic development of the country and its regions are caused by the low efficiency of public administration. The scientific literature [28; 30–35] identifies the following problems: 1) pronounced export-raw material orientation of the economy; 2) deindustrialization (in our opinion, its essence is characterized by the so-called 4 "D" effect, the concept introduced into scientific circulation by S.D. Bodrunov); 3) low speed of economy transition to the innovative development path; 4) considerable part of the self-employed population which is the precariat ("an essentially new social layer fixing the alienation of considerable social groups, experiencing especially sophisticated forms of operation of their work, knowledge and qualification, not only from labor results, but also from society"); 5) developed shadow economy; 6) highest degree of population differentiation by the level of the monetary income. Nowadays the situation is aggravated by external pressure on the Russian economy – initiated by the US and supported by the EU sectoral sanctions against Russian organizations. Such sanctions limit the access of Russian economic entities not only to financial and investment resources, but also to advanced technologies.

Based on the above, two variants (the extended and main list of private indicators) of the system of socio-economic indicators of the country's regions are formed; they are respectively presented in the works [8; 36]. Under the study the methodology was tested according to the second variant of the indicators system. We briefly describe its structure.

Thus, of all indicators the 8 indicator group characterizing activities of the key economic sectors, such as industry, trade, construction, agriculture and transport, is identified.

In addition, two significant groups of 6 and 5 indicators comprise indicators characterizing, respectively, the state of science, the innovative development of economy and the life quality of population in the country's regions.

In turn, the first of the above two groups of indicators includes indicators that assess the innovative activity of organizations and the effectiveness of their investment activities in the country's regions. The second group includes indicators characterizing the living standard of key social strata of Russia (working population, including the self-employed and pensioners). This group also comprises indicators that reflect the extent of poverty in the country (a proportion of the population

with monetary income that does not reach the subsistence minimum) and the development of shadow economy (a share of other monetary incomes). Thus, according to Rosstat[8], illegal (not officially recorded) salary of organizations employees comprises the lion's share of other monetary incomes of population (about 92–93% of their total value in different years of the analyzed period).

Thus, in our case, the system of 33 indicators combined into several groups is used to objectively assess socio-economic development of the country's regions.

At the second sub-stage, the values of private indicators revealing socio-economic development of the Russian regions are normalized. In the framework of the study, we use not a variable (by year), but a constant comparison base for the normalization of each socio-economic indicator throughout the analyzed period.

The third sub-stage carries out a quantitative assessment of socio-economic development of the Russian regions. Nowadays the scientific community is still debating the use of differentiated weighting coefficients of private indicators to calculate an index or sub-indices. In order to ensure the objectivity of evaluation and the simplification of auxiliary calculations, the research team considers it appropriate to calculate aggregated indicators in the conditions of equivalence of private socio-economic indicators.

The calculations are carried out in the space-time section, i.e. for each country's region for a certain year. The results of such calculations and their interpretation are presented in the work [36].

[8] Russian statistical compilations use different methods to reflect hidden (not officially recorded) salary of organization employees. So, if in "Russian Statistical Yearbook" it is included in the remuneration structure, in the collection "Regions of Russia. Socio-Economic Indicators" it is included in other monetary income of the population.

At the fourth sub-stage the qualitative assessment of socio-economic development of the Russian regions is carried out. Relying on cluster analysis and applying neural network technologies, we group all RF subjects by the achieved level of socio-economic development (index) and values of three sub-indices (key economic sectors; science and innovation; living standard of region's population) for 2011–2016. The clustering problem is solved by Kohonen's method of self-organizing maps (SOM) in the software product Deductor Studio Lite 5.1. Automatically all RF subjects are united in 4 clusters. Other conditions for solving the clustering problem are set both by a researcher and automatically. We briefly describe such conditions. During the adjustment of the Kohonen map learning parameters, the researcher accepts the following conditions: the method of initial initialization of the map from the training set and the Gaussian neighborhood function. In this case, the speed and radius (at the beginning and end) of the learning, as well as the number of epochs through which one wants to mix the lines are set automatically.

In *Table 1* the results of qualitative assessment of socio-economic development of the Russian regions are presented.

We briefly describe results of the cluster analysis. Thus, due to the reduced number of regions included in the cluster with a below-average development level from 29 in 2011 to 17 in 2016 there was a decrease in the share of relevant RF subjects (of their total number) by 15 points. We should also note a significant increase in the total share of Russian regions belonging to the clusters with very low and low levels of socio-economic development from 51.3 to 66.3%, i.e. by 15 points for the same period of time. In the relatively stable period (2011–2013) there was an annual decrease in the share of Russian regions that are part of the

Table 1. Qualitative assessment of socio-economic development of the Russian Federation for 2011–2016

Cluster	RF subject	Number of RF subjects in the cluster		Level of socio-economic development of RF subjects
		units	in % to the total	
2011				
First	Cities of Moscow and Saint Petersburg, republics of Mordovia and Tatarstan, Lipetsk, Moscow, Nizhny Novgorod, Tyumen, Magadan and Sakhalin oblasts	10	12.5	Average
Second	Belgorod, Vladimir, Voronezh, Kaluga, Kursk, Orel, Tula, Leningrad, Novgorod, Orenburg, Penza, Samara, Sverdlovsk, Chelyabinsk, Irkutsk, Kemerovo, Novosibirsk and Amur oblasts, republics of Karachay-Cherkessia, Udmurtia and Chuvashia, Stavropol, Krasnoyarsk, Perm Krai and Primorsky Krai, republics of Bashkortostan, Buryatia, Khakassia, Jewish Autonomous Oblast	29	36.3	Below average
Third	Yaroslavl, Vologda, Murmansk and Tomsk oblasts, republics of Karelia, Komi and Sakha (Yakutia), Kamchatka Krai, Khabarovsk Krai, Chukotka Autonomous Okrug	10	12.5	Low
Fourth	Bryansk, Ivanovo, Kostroma, Ryazan, Smolensk, Tambov, Tver, Arkhangelsk, Kaliningrad, Pskov, Astrakhan, Volgograd, Rostov, Kirov, Saratov, Ulyanovsk, Kurgan and Omsk oblasts, republics of Adygea, Kalmykia, Dagestan, Ingushetia, North Ossetia-Alania, Chechnya, Mari El, Altai, Tuva, Kabardino-Balkaria, Krasnodar Krai, Altai Krai, Zabaikalsky Krai	31	38.8	Very low
Total	x	80	100	x
2012				
First	Belgorod, Moscow, Tyumen, Magadan and Sakhalin oblasts, cities of Moscow and Saint Petersburg	7	8.8	Average
Second	Vladimir, Kaluga, Lipetsk, Tula, Yaroslavl, Nizhny Novgorod, Samara, Sverdlovsk, Novosibirsk and Tomsk oblasts, Stavropol Krai, Primorsky Krai, republics of Mordovia, Tatarstan, Buryatia, Udmurtia and Chuvashia	17	21.3	Below average
Third	Republics of Karelia, Komi and Sakha (Yakutia), Arkhangelsk, Vologda, Leningrad and Murmansk oblasts, Krasnoyarsk Krai, Kamchatka Krai and Khabarovsk Krai, Chukotka Autonomous Oblast	11	13.8	Low
Fourth	Bryansk, Voronezh, Ivanovo, Kostroma, Kursk, Orel, Ryazan, Smolensk, Tambov, Tver, Kaliningrad, Novgorod, Pskov, Astrakhan, Volgograd, Rostov, Kirov, Orenburg, Penza, Saratov, Ulyanovsk, Kurgan, Chelyabinsk, Irkutsk, Kemerovo, Omsk and Amur oblasts, republics of Adygea, Kalmykia, Dagestan, Ingushetia, North Ossetia-Alania, Bashkortostan, Mari El, Altai, Tuva and Khakassia, Krasnodar Krai, Perm Krai, Altai Krai, Zabaikalsky Krai, republics of Kabardino-Balkaria, Karachay-Cherkessia and Chechnya, Jewish Autonomous Oblast	45	56.3	Very low
Total	x	80	100	x
2013				
First	Belgorod, Moscow, Tyumen and Sakhalin oblasts, cities of Moscow and Saint Petersburg	6	7.5	Average
Second	Kaluga, Lipetsk, Yaroslavl, Leningrad, Nizhny Novgorod, Samara, Sverdlovsk, Novosibirsk, Tomsk and Magadan oblasts, republics of Mordovia and Tatarstan, Khabarovsk Krai	13	16.3	Below average
Third	Vladimir, Voronezh, Kursk, Orel, Ryazan, Tambov, Tver, Tula, Arkhangelsk, Vologda, Kaliningrad, Murmansk, Novgorod, Pskov, Orenburg, Penza, Saratov, Chelyabinsk, Irkutsk and Amur oblasts, republics of Karelia, Komi, Bashkortostan, Khakassia, Sakha (Yakutia), Krasnodar Krai, Stavropol Krai, Perm Krai, Krasnoyarsk Krai, Kamchatka Krai, Primorsky Krai, republics of Udmurtia and Chuvashia, Jewish Autonomous Oblast, Chukotka Autonomous Okrug	35	43.8	Low
Fourth	Bryansk, Ivanovo, Kostroma, Smolensk, Astrakhan, Volgograd, Rostov, Kirov, Ulyanovsk, Kurgan, Kemerovo and Omsk oblasts, republics of Adygea, Kalmykia, Dagestan, Ingushetia, North Ossetia-Alania, Mari El, Altai, Buryatia and Tuva, Kabardino-Balkaria, Karachay-Cherkessia and Chechnya, Altai Krai, Zabaikalsky Krai	26	32.5	Very low
Total	x	80	100	x

End of Table 1

Cluster	RF subject	Number of RF subjects in the cluster		Level of socio-economic development of RF subjects
		units	in % to the total	
2014				
First	Belgorod, Lipetsk, Moscow, Tyumen and Sakhalin oblasts, cities of Moscow and Saint Petersburg, Republic of Tatarstan, Chukotka Autonomous Okrug	9	11.3	Average
Second	Vladimir, Kaluga, Yaroslavl, Nizhny Novgorod, Penza, Samara, Sverdlovsk, Novosibirsk, Tomsk and Magadan oblasts, Stavropol Krai, Perm Krai, Khabarovsk Krai, republics of Mordovia, Altai, Buryatia and Chuvashia	17	21.3	Below average
Third	Voronezh, Kursk, Orel, Ryazan, Tambov, Tula, Vologda, Kaliningrad, Leningrad, Murmansk, Novgorod, Volgograd, Orenburg, Chelyabinsk, Irkutsk and Amur oblasts, republics of Komi, Bashkortostan and Sakha (Yakutia), Krasnodar Krai, Krasnoyarsk Krai, Kamchatka Krai	22	27.5	Low
Fourth	Bryansk, Ivanovo, Kostroma, Smolensk, Tver, Arkhangelsk, Pskov, Astrakhan, Rostov, Kirov, Saratov, Ulyanovsk, Kurgan, Kemerovo and Omsk oblasts, republics of Karelia, Adygea, Kalmykia, Dagestan, Ingushetia, North Ossetia-Alania, Mari El, Tuva and Buryatia, Kabardino-Balkaria, Karachay-Cherkessia, Chechnya and Udmurtia, Altai Krai, Zabaikalsky Krai, Primorsky Krai, Jewish Autonomous Okrug	32	40.0	Very low
Total	x	80	100	x
2015				
First	Belgorod, Lipetsk, Moscow, Tyumen, Magadan and Sakhalin oblasts, cities of Moscow and Saint Petersburg, Chukotka Autonomous Okrug	9	11.3	Average
Second	Vladimir, Kaluga, Yaroslavl, Murmansk, Nizhny Novgorod, Sverdlovsk, Novosibirsk and Tomsk oblasts, republics of Mordovia, Tatarstan, Sakha (Yakutia) and Chuvashia, Kamchatka Krai, Khabarovsk Krai	14	17.5	Below average
Third	Voronezh, Kostroma, Kursk, Orel, Ryazan, Tambov, Tula, Vologda, Kaliningrad, Leningrad, Novgorod, Pskov, Rostov, Orenburg, Penza, Samara, Saratov, Chelyabinsk, Irkutsk and Amur oblasts, republics of Karelia, Komi, Adygea, Bashkortostan, Mary El, Buryatia and Khakassia, Krasnodar Krai, Stavropol Krai, Perm Krai, Krasnoyarsk Krai, Republic of Udmurtia	32	40.0	Low
Fourth	Bryansk, Ivanovo, Smolensk, Tver, Arkhangelsk, Astrakhan, Volgograd, Kirov, Ulyanovsk, Kurgan, Kemerovo and Omsk oblasts, republics of Kalmykia, Dagestan, Ingushetia, North Ossetia-Alania, Altai and Tuva, Kabardino-Balkaria, Karachay-Cherkessia and Chechnya, Altai Krai, Zabaikalsky Krai, Primorsky Krai, Jewish Autonomous Okrug	25	31.3	Very low
Total	x	80	100	x
2016				
First	Belgorod, Lipetsk, Moscow, Tyumen, Magadan and Sakhalin oblasts, cities of Moscow and Saint-Petersburg, Republic of Tatarstan, Chukotka Autonomous Okrug	10	12.5	Average
Second	Voronezh, Kursk, Ryazan, Tula, Vologda, Kaliningrad, Leningrad, Murmansk, Novgorod, Chelyabinsk, Irkutsk and Kemerovo oblasts, republics of Karelia, Komi and Sakha (Yakutia), Krasnoyarsk Krai and Kamchatka Krai	17	21.3	Below average
Third	Vladimir, Kaluga, Kostroma, Orel, Tambov, Tver, Yaroslavl, Rostov, Nizhny Novgorod, Penza, Saratov, Sverdlovsk, Novosibirsk and Tomsk oblasts, Krasnodar Krai, Stavropol Krai, Perm Krai and Khabarovsk Krai, republics of Bashkortostan, Mordovia, Udmurtia and Chuvashia	22	27.5	Low
Fourth	Bryansk, Ivanovo, Smolensk, Arkhangelsk, Pskov, Astrakhan, Volgograd, Kirov, Orenburg, Samara, Ulyanovsk, Kurgan, Omsk and Amur oblasts, republics of Adygea, Kalmykia, Dagestan, Ingushetia, North Ossetia-Alania, Mari El, Altai, Buryatia, Tuva, Khakassia, Karachay-Cherkessia, Kabardino-Balkaria and Chechnya, Altai Krai, Zabaykalsky Krai, Primorsky Krai, Jewish Autonomous Oblast	31	38.8	Very low
Total	x	80	100	x

Source: compiled by the authors.

cluster with an average level of socio-economic development. For the entire turbulent period of the national economy (2014–2016), on the contrary, there was a slight increase in the share of RF subjects belonging to the above mentioned cluster. As a result, only in 2016 the share of regions with an average socio-economic development level reached the 2011 value. It should also be noted that in the analyzed period there was a high degree of variation in the total share of the Russian regions included in the clusters with a very low and low level of socio-economic development. For example, in 2013 the indicator value was the highest – 76.3%. Hence, the cluster structure of Russian regions based on the level of socio-economic development deteriorated during the period under analysis. At the same time, in 2011–2016 even the leading regions could not achieve an above average socio-economic development level. Therefore, it can be concluded that currently almost all Russian regions are characterized by significant reserves in the socio-economic sphere.

At the fifth sub-stage the short-term forecast for socio-economic development of the Russian regions is made. In the conditions of possible auditory shadowing of the regional statistics data, it is advisable to use neural network technologies. However, at this sub-stage, unlike the previous one, we solve two other problems, such as approximation and forecasting, by forming an adequate Bayesian ensemble of dynamic neural models in the special software product Neuro Solution for Excel 6.0.

Table 2 presents background information and basic terms of neural network modeling.

To ensure high accuracy of neural network modeling, "hard" boundary values of all three neural model adequacy indicators are set: the normalized mean-square error of the resulting indicator (NMSE) is less than 5%, the correlation coefficient between actual and theoretical (obtained during neural network modeling) values of the outcome variable (r) is more than 0.98 and the frequency criterion of resulting indicator quality (P^*) is not less than 90%. Moreover, if the first two indicators are determined automatically in the software product, the latter indicator is calculated by the researcher under the condition of a relative error (approximation error) of no more than 5 and 8% for each observation from the testing sample.

Verification of the neural models helps specify their specification. In our case, the actual values of the socio-economic development index of the Russian regions are approximated by a nonlinear function:

$$\hat{Y} = f(X_1, X_2, X_3, X_4, X_5), \qquad (1)$$

where X_1-X_3 – the generalizing (aggregated) indicators characterizing sub-indices values: key economic sectors, science and innovation, living standard of region's population; X_4 – the time factor (calculated as a ratio of the serial number of

Table 2. Background and basic terms of neural network modeling

Name of basic terms	Description of basic terms
Training sample	An array of data, including 320 randomly distributed observations (values of the index and three sub-indices for 2012–2015, as well as a lag variable for 2011–2014 in all RF subjects
Testing sample	A data set consisting of 80 observations (similar to the training sample initial data for all country's regions, but respectively for 2016 and 2015)
Neuromodel topology	Multilayer perceptron (MLP)
The greatest (maximum) number of iterations (epochs) of synaptic scales modification	1000
Source: compiled by the authors.	

a year to the number of years, taking into account a forecasting period) [37]; X_5 – the lag endogenous variable, which is a value of the index revealing socio-economic development of a region for the previous year.

Table 3 discloses the architecture of the Bayesian ensemble of dynamic neural models (taking into account varied parameters – a number of hidden layers and a number of neurons in them).

On the basis of special features of the software product the number of neurons is varied in one hidden layer (within the limits set by the researcher) and constant in the other (fixed) during neural network modeling.

The activation function in the hidden layers and the output layer (hyperbolic tangent and linear, respectively) remains unchanged.

Table 4 shows verification results of the generated Bayesian ensemble of dynamic neural models.

The value of each indicator of the adequacy of the Bayesian ensemble of neural models from Table 4 is calculated by a simple arithmetic mean.

Verification of the neural network modeling results, i.e. analysis of the main indicators of the adequacy of the Bayesian ensemble of dynamic neural models, reveals the high accuracy of approximation of regional statistics data.

Therefore, an adequate Bayesian ensemble of dynamic neural models can also be used to predict socio-economic development of the Russian regions with a high degree of accuracy. As part of the study, we will make a short-term forecast (for 2017) for the leading regions and the Republic of Bashkortostan (*tab. 5*).

In the study the short-term forecast of the incoming parameters of neural models (three sub-indices) is formed on the basis of average growth rates for 2011–2016 with regard to the assumption of their invariability in 2017.

Table 3. Architecture of the Bayesian ensemble of dynamic neural models

Neural network model	Hidden layers number	Discrete variable number of neurons (in increments of 1)		Optimal number of neurons	
		in the first hidden layer	in the second hidden layer	in the first hidden layer	in the second hidden layer
First neural network model (NNM1)	1	1-10	-	9	-
Second neural network model (NNM2)	1	1-5	-	5	-
Third neural network model (NNM3)	1	7-15	-	7	-
Fourth neural network model (NNM4)	2	-	1-10	7	9
Fifth neural network model (NNM 5)	2	1-10	-	9	5
Source: compiled by the authors.					

Table 4. Verification results of the Bayesian ensemble of dynamic neural models

Neural network model	NMSE	r	N*		P*	
			ε=5%	ε=8%	ε=5%	ε=8%
NNM1	0.035	0.988	75	80	93.75	100
NNM2	0.043	0.981	73	80	91.25	100
NNM3	0.026	0.989	77	80	96.25	100
NNM4	0.039	0.982	75	79	93.75	98.75
NNM5	0.037	0.986	72	79	90	98.75
Bayesian ensemble of neural network models	0.036	0.985	74	80	93	99.5
Source: compiled by the authors.						

Table 5. Results of the short-term (for 2017) forecasting of socio-economic development of Russian leading regions and the Republic of Bashkortostan

RF subject	Forecasted values			
	Index of socio-economic development of the region	Sub-index "key economic sectors of the region"	Sub-index "science and innovations of the region"	Sub-index "Living standard of the region's population"
City of Moscow	0.517	0.497	0.410	0.712
City of Saint-Petersburg	0.490	0.546	0.330	0.648
Republic of bashkortostan	0.349	0.306	0.214	0.545
Tyumen Oblast	0.420	0.326	0.177	0.738
Sakhalin Oblast	0.425	0.327	0.151	0.779
Source: compiled by the authors.				

The forecast value of the socio-economic development index of RF subjects is the arithmetic mean of the outcome variable of the Bayesian ensemble of dynamic neural models.

Comparing the forecast values of the resulting indicator with the actual ones, we should note that, along with unchanged average growth rates of three sub-indices in 2017, the socio-economic development index of the city of Moscow, a leading Russian region, is expected to decrease to the lowest for the last 7 years. As a result of a 1.1% decrease in the sub-index "key economic sectors" even in the conditions of a 3.1% increase in the sub-index "living standard of population of the country's capital", the forecasted decline in the resulting index amounts to 0.517, i.e. 0.8 and 3.4% compared to 2015–2016. An even more intensive decline in the socio-economic development index in 2017 is expected in leading regions, such as the Tyumen and Sakhalin oblasts, due to a decrease, respectively, in the sub-index "key sectors of region's economy" by 3.2% and the sub-index "science and innovation of a region" by 11.4%, despite a rise in the value of the third main sub-index. So, for the above reasons, a short term reduction in the resulting indicator by 6.7 and 5.6% for the Tyumen Oblast and 6.9 and 6.5% for the Sakhalin Oblast compared to 2015–2016. The opposite situation is expected in another leading region, the city of Saint Petersburg. As a result of a 1.7% growth in the sub-index "living standard of region's population" with less than 1% of multidirectional changes in the values of two other sub-indices in 2017, the socio-economic development index is expected to increase to 0.490, i.e. by 6.8 and 1.9% compared to 2015–2016. Also, due to a growth in the sub-indices "key economic sectors" and "living standard of region's population" by 1.1 and 2.8%, respectively, in the short term, an increase in the resulting indicator in the Republic of Bashkortostan is projected to be 0.349, i.e. by 5 and 2.8% compared to 2015–2016. However, the "gap" in the index value between the Republic of Bashkortostan and leading regions will remain quite significant. This is due to the fact that, despite the relatively favorable socio-economic conditions, this RF subject is not expected to significantly develop science and improve the efficiency of innovation in the short term. Therefore, in modern conditions it is critical for the Republic to accelerate the transition of the regional economy to an innovative development trajectory.

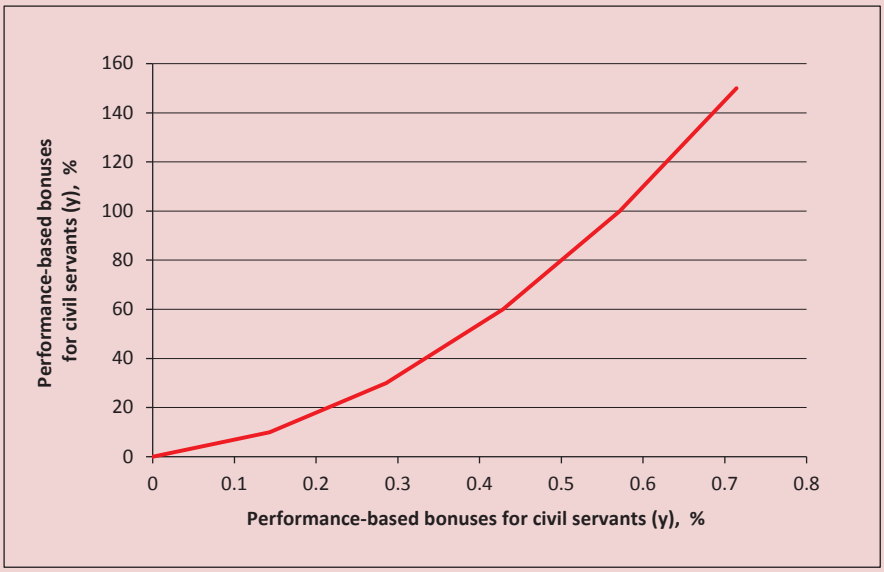
Thus, summarizing the above, we can note that in 2017 some convergence of RF subjects by the level of socio-economic development is expected. However, this can not be clearly recognized as a positive trend, which is largely

due to the projected weakening of competitive positions of leading regions in this area in the short term.

At the second stage the amount of performance-based bonuses for Russian civil servants is determined.

At the sixth sub-stage the progressive performance-based remuneration scale is developed. The scale helps solve two important tasks: first, ensure civil servants' interest in achieving results of their activity, expressed in socio-economic development of the country's regions, and second, in the effective spending of limited budgetary funds to pay wages to them. Using the analysis of existing collective wage systems [38] and taking into account the opinion of the Nobel Prize laureate R. Coase on the nature of transaction costs (he considers internal laws of functioning in commercial organizations and public institutions to be the same) [39], we propose to use L-type incentives for Russian civil servants, which means increased bonuses for civil servants in the country's region as a result of the transition of the RF subject to another (with a higher socio-economic development level) cluster. Based on the above, the progressive scale is developed: the index of socio-economic development of the country's regions – a level of civil servant performance-based bonuses, expressed as a percentage of the official salary. Taking into account retrospective assessment results, clustering and short-term forecasting, it is advisable (taking into account the possibility for Russian leading regions to transfer to a cluster with a higher socio-economic development level) to single out 5 (of 7 possible) equal-width intervals of the index values, which correspond to a certain level of socio-economic development of the country's regions. The method of expert assessments (chief and leading researchers of the Institute of Social and Economic Research of the Ufa Federal Research Center of the RAS served as experts) determines upper limits of the level of bonuses for civil servants for each index interval

Figure 2. Graphical presentation of the progressive scale of performance-based bonuses for civil servants



Source: compiled by the authors.

characterizing socio-economic development of the Russian Federation. The application of the game-theory approach reduces the subjectivity in the calculation of values of such boundaries. Graphically the progressive scale is shown in *Figure 2*.

In a formalized form it is described by a system of piecewise linear functions:

$$y = \begin{cases} 70x, x \in [0; 0{,}143]; \\ 140x - 10, x \in [0{,}143; 0{,}286]; \\ 210x - 30, x \in [0{,}286; 0{,}429]; \\ 280x - 60, x \in [0{,}429; 0{,}571]; \\ 350x - 100, x \in [0{,}571; 0{,}714]. \end{cases} \quad (2)$$

The level of performance-based bonuses for civil servants for all RF subjects for 2011–2016 is calculated on the basis of earlier received results of the retrospective assessment of social and economic development of the Russian regions and the developed progressive scale.

In the work we make calculations for leading Russian regions and the Republic of Bashkortostan (*tab. 6*).

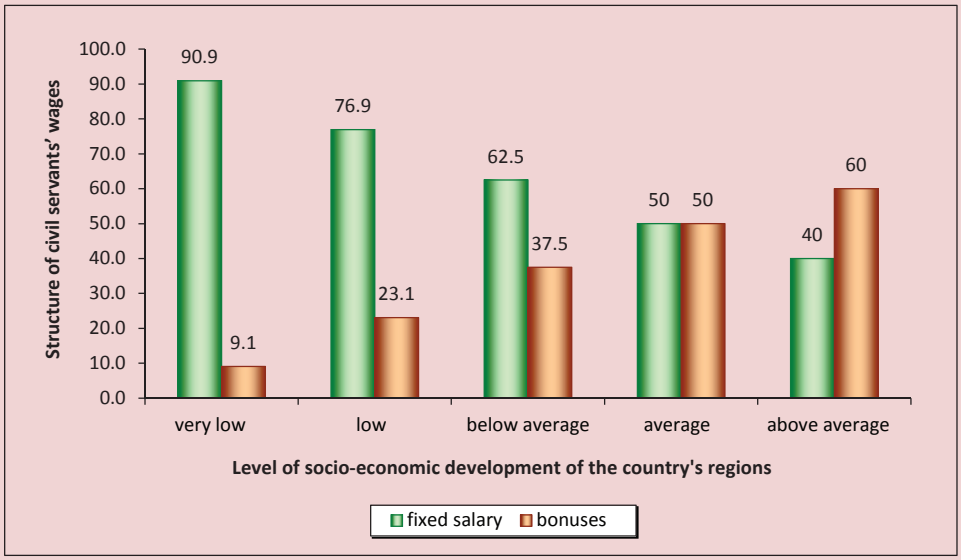
Then the amount of performance-based bonuses for civil servants in the Russian regions is determined in comparable prices of the base year (2011).

Table 6. Level of performance-based bonuses for civil servants in leading Russian regions and the Republic of Bashkortostan in 2011–2016

RF subject	Level of performance-based bonuses for civil servants, % (of the fixed salary)					
	2011	2012	2013	2014	2015	2016
City of Moscow	88.3	91.1	87.7	87.4	86.1	90.0
City of Saint-Petersburg	72.2	73.4	73.1	71.9	68.5	74.6
Republic of Bashkortostan	37.9	40.0	41.0	40.8	39.7	41.3
Tyumen Oblast	65.9	68.4	69.2	68.9	66.0	64.4
Sakhalin Oblast	67.5	71.5	72.6	74.1	67.9	67.4

Source: compiled by the authors.

Figure 3. Structure of civil servants' wages depending on the level of socio-economic development of the country's regions



Source: compiled by the authors.

Finally, the amount of their bonuses is calculated in current prices of the respective year.

Figure 3 presents the structure of civil servants' salaries in the Russian regions on condition of their performance-based awarding, according to the author's method.

Such a structure for each level of socio-economic development of the country's regions is relevant provided that the upper limit of the corresponding percentage of bonuses (from the salary) of civil servants is achieved. In case of performance-based bonuses of civil servants the share of the constant part (fixed salary) of their wages decreases, when a country's region transfers to a cluster with a higher socio-economic development level.

This will make it possible to really get civil servants of the Russian regions "interested" in raising the level of their social and economic development. Also, effective spending of limited budget funds will be ensured under the new wage system.

It should be noted that in Russia the above method can be successfully implemented in practice only in case of curbed corruption. The corruption suppression mechanism on the basis of game-theory models on the example of tax inspection activity is disclosed in the work [40]. If adapted, this approach can be implemented in the practice of most Russian ministries and departments.

Conclusion. The first step of the radical solution to the problem of low efficiency of the public administration system, in our opinion, is to apply the author's approach within the NPM concept (which has some similarities with the Asian remuneration system) in terms of collective material incentives for executive bodies employees in the country's regions (performance-based bonuses) and to strengthen control over target expenditure of budgetary funds (through the elaboration and implementation of game-theory models in the practice of various ministries and departments).

The relevant method is developed and applied in several successive stages. The objectivity of retrospective assessment of the level of socio-economic development of the RF subjects is ensured due to their clustering on the basis of neural network technologies. Due to similar technologies, high accuracy of short-term forecasting is also achieved. The results of these sub-stages of the method serve as the basis for application of L-type collective material incentives for civil servants. In turn, the calculation of performance-based bonuses for civil servants is carried out on the basis of the preliminarily (within the key sub-step of the method) developed (by the method of expert estimates) progressive scale (the index of socio-economic development of the Russian regions – the level of bonuses for civil servants).

The fundamentally new (combined) Russian civil servant remuneration system with L-type collective stimulation will facilitate the coordination of activities of ministries and departments in RF subjects due to "binding" collective incentive payments to the level of socio-economic development of the country's regions. The practical application of this approach will also make it possible to strengthen control over targeted spending of the Russian budget.

The implementation of the author's approach in the practice of public administration can act as a scientific basis for the realization of a systematic approach in terms of providing effective performance-based incentives to Russian civil servants. Thus, the proposed method to calculate the collective amount of bonus payments to civil servants

in the Russian subjects will help develop the effective mechanism of budgetary funds distribution between regional ministries and departments (taking into account features of organizations functioning), as well as transfer to the correct determination of individual performance-based incentives to Russian civil servants with regard to the specifics of their activities.

The universality of the approach makes it possible to apply the author's method in almost any federated state. In this case, if necessary, it can be adapted, the composition of socio-economic indicators can be changed.

References

1. Yuzhakov V.N. Result-based public management: the Russian model. *Voprosy gosudarstvennogo i munitsipal'nogo upravleniya=Public Administration Issues*, 2016, no. 2, pp. 165-174. (In Russian).
2. Gerrish E. The impact of performance management on performance in public organizations: a meta-analysis. *Public Administration Review*, 2016, vol. 76, pp. 48-66.
3. Kerpershoek E., Groenleer M., de Bruijn H. Unintended responses to performance management in Dutch hospital care: bringing together the managerial and professional perspectives. *Public Management Review*, 2016, vol. 18, pp. 417-436.
4. Kalgin A.S., Dvinskikh D.Yu., Parfent'eva D.S. Do performance management systems increase the civil servants' job satisfaction? *Voprosy gosudarstvennogo i munitsipal'nogo upravleniya=Public Administration Issues*, 2017, no. 3, pp. 129-148. (In Russian).
5. Pryazhnikov N.S., Polevaya M.V., Kamneva E.V. The main problems of the existing systems of labor motivation of civil servants and the prospects for overcoming them. *Upravlencheskie nauki=Management Science*, 2017, no. 4, pp. 72-79. (In Russian).
6. Ilyin V.A., Morev M.V. Revisiting the issue concerning the future of russian statehood... *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes*: Facts, Trends, Forecast, 2018, no. 5, pp. 9-29. (In Russian).
7. Borshchevskii G.A. Objective assessment indicies of public administration efficiency. *Upravlencheskie nauki=Management Science*, 2016, no. 4, pp. 33-43. (In Russian).
8. Gubarev R.V., Dzyuba E.I., Tyulenev Yu.V., Faizullin F.S. Performance bonuses for Russian public officers. *Finansy=Finance*, 2018, no. 5, pp. 51-58. (In Russian).
9. Barabashev A.G. Crisis of state governance and its influence on basic administrative paradigms of state and bureaucracy *Voprosy gosudarstvennogo i munitsipal'nogo upravleniya=Public Administration Issues*, 2016, no. 3, pp. 163-194. (In Russian).
10. Osborne S. The New Public Governance? *Public Management Review*, 2006, vol. 8, no. 3, pp. 377-387.
11. Shultz D. The idea of the "state" in contemporary public administration theory. *RUDN Journal of Public Administration*, 2014, no. 1, pp. 90-102.
12. Osborne S., Radnor Z., Strokosch K. Co-production and the co-creation of value in public services: a suitable case for treatment? *Public Management Review*, 2016, vol. 18, no. 5, pp. 639-653.
13. Van Eijk C., Steen T. Why engage in co-production of public services? Mixing theory and empirical evidence. *International Review of Administrative Sciences*, 2016, vol. 82, no. 1, pp. 28-46.
14. Brown G. Bringing the state back into cosmopolitanism: the idea of responsible cosmopolitan states. *Political Studies Review*, 2011, vol. 9, no. 1, pp. 53-66.
15. Pollitt C. *Government for the Future*. Ministry of Finance. Helsinki. 2013. Available at: https://www.vm.fi/vm/fi/04_julkaisut/08_muut_julkaisut/20131119/govern/government_for_the_future/ pdf.
16. Hammerschmid G., Van de Walle S., Andrews R., Bezes P. (Eds.). *Public Administration Reforms in Europe. The View from the Top*. UK; Northampton MA, USA: Edward Elgar Publishing, 2016. 304 p.

17. Kupryashin G.L. A kaleidoscope of administrative reforms in europe: experiences and views from top civil service executives. *Voprosy gosudarstvennogo i munitsipal'nogo upravleniya=Public Administration Issues*, 2018, no. 1, pp. 197-205. (In Russian).
18. Gehlbach S. What is a Big Bureaucracy? Reflections on rebuilding Leviathan and Runaway. *Czech Sociological Review*, 2008, vol. 44, no. 6, pp. 1189-1197.
19. De Vries M., Nemec J. Public sector reform: an overview of recent literature and research on NPM and alternative paths. *The International Journal of Public Sector Management*, 2013, vol. 26. no. 1. pp. 4-16.
20. Denhardt J.V., Denhardt R.B. The new public service revisited. *Public Administration Review*, 2015, vol. 75, no 5, pp. 664-672.
21. Zhuravleva T.A. The system of remuneration and motivation of public civil servants: a review of international practice. *Gosudarstvennoe upravlenie: elektronnyi vestnik=E-journal. Public Administration*, 2017, no. 64, pp. 331-345. (In Russian).
22. Vorob'eva E.S., Panina O.V. New Zealand's best practices to improve the performance of public civil servants. *Innovatsionnaya ekonomika: informatsiya, analitika, prognozy=Innovative Economy: Information, Analytics, Forecasts*, 2014, no. 3, pp. 22-24. (In Russian).
23. Zhigun L.A. Modern models of US civil servant remuneration. *Upravlencheskie nauki=Management Science*, 2014, no. 3, pp. 48-55. (In Russian).
24. Krasil'nikov D., Sivintseva O. New public management in China: conservative version of administrative reforms. *Mirovaya ekonomika i mezhdunarodnye otnosheniya=World Economy and International Relations*, 2016, no. 8, pp. 85-95. (In Russian).
25. Van Ryzin G.G. Outcomes, process, and trust of civil servants. *Journal of Public Administration Research and Theory*, 2011, vol. 21, no. 4, pp. 745-760.
26. Borshchevskii G.A. Assessment of trends in civil service: methodological issues. *Voprosy gosudarstvennogo i munitsipal'nogo upravleniya=Public Administration Issues*, 2017, no. 1, pp. 103-128. (In Russian).
27. Tatarkin A.I. New industrialization of the Russian economy: need for development and/or challenges of the time. *Ekonomicheskoe vozrozhdenie Rossii=The Economic Revival of Russia*. 2015. No. 2. C. 20-31. (In Russian).
28. Grinberg R.S. Russian way out of the crisis: originality versus universal trend. *Zhurnal novoi ekonomicheskoi assotsiatsii=The Journal of the New Economic Association*, 2015, no. 2, pp. 190-196. (In Russian).
29. Gagarina G.Yu., Dzyuba E.I., Gubarev R.V., Faizullin F.S. Forecasting of socio-economic development of the Russian regions. *Ekonomika regiona=Economics of Region*, 2017, no. 4, pp. 1080-1094. (In Russian).
30. Aganbegyan A.G. Socio-economic development of Russia: analysis and forecast. *Problemy prognozirovaniya=Studies on Russian Economic Development*, 2014, no. 4, pp. 3-16. (In Russian).
31. Bodrunov S.D. Re-industrialization: socio-economic parameters of reintegrating production, science and education. *Sotsiologicheskie issledovaniya=Sociological Studies*, 2016, no. 2, pp. 20-28. (In Russian).
32. Glazyev S. On alternative policy of sustainable socio-economic development of Russia. *Mir peremen=World of Changes*, 2013, no. 1, pp. 89-95. (In Russian).
33. Ivanter V.V., Komkov N.I. Status and prospects of development Russian innovation sphere the program of the Presidium of Russian Academy of Sciences. Analysis and forecast of long-term scientific trends and technological development: Russia and the World". *MIR (Modernizatsiya. Innovatsii. Razvitie)=MIR (Modernization. Innovation. Research)*, 2016, no. 1, pp. 76-83. (In Russian).
34. Tatarkin A.I. Regional orientation of economic policy of the Russian Federation as an institute of spatial arrangement of territories. *Ekonomika regiona=Economics of Region*, 2016, no. 1, pp. 9-27. (In Russian).
35. Toshchenko Zh.N. Precariat – a new social class. *Sotsiologicheskie issledovaniya=Sociological Studies*, 2015, no. 6, pp. 3-13. (In Russian).
36. Faizullin F.S., Dzyuba E.I., Gubarev R.V. Clustering of Russian regions by the level of socio-economic development. In: *Innovatsionnye tekhnologii upravleniya sotsial'no-ekonomicheskim razvitiem regionov Rossii: Materialy X Vserossiiskoi nauchno-prakticheskoi konferentsii s mezhdunarodnym uchastiem* [Innovative

Technologies to Manage Socio-Economic Development of Russian Regions: Proceedings of the 10th All-Russian Research-to-Practice Conference with International Participation]. Ufa: ISEI UFITs RAN, 2018. Pp. 128-141. (In Russian).

37. Bukaev G.I., Bublik N.D., Gorbatkov S.A., Satarov R.F. *Modernizatsiya sistemy nalogovogo kontrolya na osnove neirosetevykh informatsionnykh tekhnologii* [Modernization of the Tax Control System on the Basis of Neural Network Information Technologies]. Moscow: Nauka, 2001. 344 p.
38. Zalozhnev D.A., Novikov D.A. *Modeli Sistem Oplaty Truda* [Models of Remuneration Systems]. Moscow: PMSOFT, 2009. 192 p.
39. Kouz R. *Firma, rynok i pravo* [Firm, Market and Law]. Moscow: Novoe izdatel'stvo, 2007. 224 p.
40. Vasin A.A., Nikolaev P.V., Urazov A.S. On the optimal organization of the management structure. *Doklady Akademii nauk=Academy of Sciences Reports*, 2012, no. 3, pp. 262-265. (In Russian).

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The Need for Workforce in Constituent Entities of the Arctic Zone of the Russian Federation*

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Abstract. In the first quarter of the 21st century, the Arctic and everything connected with it remains a popular topic in the humanitarian, socio-economic and political spheres. It is especially relevant for Russia, which has the largest polar sector in the world. An integrated approach to the study and analysis of development prospects of the Arctic territories can create conditions for sustainable socio-economic development not only in the Arctic zone of Russia, but also in Russia as a whole. One of the elements of this approach is the need for skilled workforce at the enterprises of the Arctic zone of the Russian Federation; this topic is considered in the paper. The relevance of the topic stems from the need to implement large-scale investment projects for development of mineral resources and transport infrastructure (megaprojects), the need to address long-term tasks of socio-economic development of the Russian Arctic and ensure national security in the region. All these points are contained in the strategy for development of the Arctic zone of the Russian Federation until 2020. Statistical evaluation of demographic processes indicates a continuous outflow of population from the majority of subjects of the Arctic zone of Russia. This happens both due to natural reasons and as a result of emigration, including the emigration of working age individuals. Scientific novelty of the paper consists in its comprehensive approach: using analytical and sociological methods, we analyze the need for labor force in the real sector of the economy in the Russian Arctic. We consider the possibilities of the higher education system to meet such needs. It is established that the emigration of able-bodied population from the subjects of the Russian Arctic and the launch of megaprojects can be considered as factors in the formation of the need for labor resources in the subjects of the Arctic zone of Russia. Further scientific search in the chosen topic consists in the following points: development of methods for long-term forecasting of the needs of economic entities in labor force against the background of its outflow from the Arctic zone, additional substantiation of the medium-term need and the possibility of its implementation through higher education, and search for an alternative to corporate data on the need for workforce.

Key words: Arctic zone of Russia, development strategy, workforce, need for personnel, education.

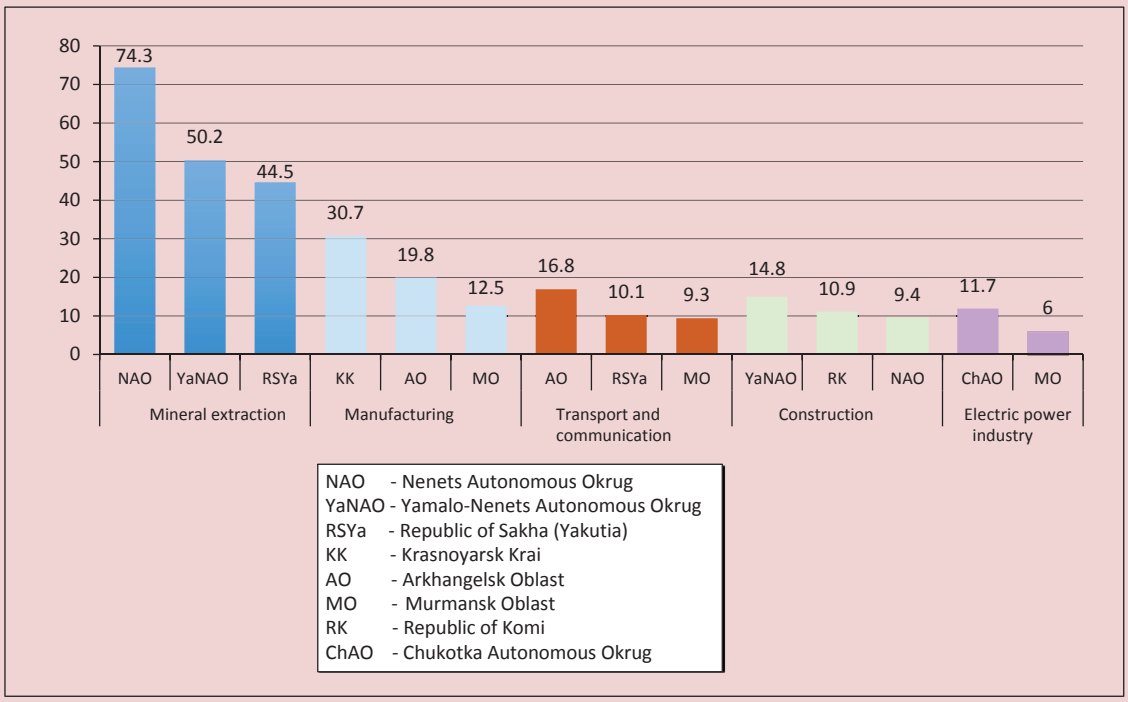
Introduction. Mankind has been actively exploring the Arctic for more than 80 years. During this time, several models of the Arctic economy have been developed: the US, Canadian, Russian and European (continental and insular) [1, p. 502].

In 2015, GDP of the Arctic was about 300 million US dollars. Almost a third of its volume is created in the resources sector. The share of added value of extractive industries in the Russian Arctic reaches 60%, in The Far North of the U.S. and Canada – 30%, in Iceland and the Arctic circle in Norway, Finland and Sweden – 15%[1]. The manufacturing industry and the services sector in the Arctic region have never been significant. Examples include metalworking and mechanical engineering (shipbuilding and ship repair) and the food industry. The latter was developed in settlements on the coast of the Arctic Ocean on the basis of fishing for aquatic biological resources and reindeer husbandry among indigenous peoples [2].

The Arctic zone of Russia contains the natural resource potential (worth several trillion US dollars), technological and production potential, which is involved in the production of 10–12% of GDP and creates about 25% of national exports [3, 4]. *Figure 1* shows the share of the leading sectors of the economy in the gross regional product (GRP) of the subjects of

[1] GDP per capita in the Arctic region. Available at: http://www.arcticstat.org/ (accessed 07.02.2018).

Figure 1. Leading sectors and their share in the GRP of the subjects of the Arctic zone of Russia, 2015, %



Source: Federal State Statistics Service. Regions: socio-economic indicators 2015. Available at: http://www.gks.ru/bgd/ (accessed July 22, 2018).

the Arctic zone of Russia for 2015, calculated according to official statistics.

The special status of the Arctic region is recognized in Russia and abroad. In 2014, the composition of the land territories of the Arctic zone of Russia was established[2]. The possibility of creating an executive body on "Arctic" issues in the structure of the Russian Government is being considered, in addition to the working State Commission on the development of the Arctic, which has existed since 2015. In 2008–2013, the President of Russia approved the Fundamentals of Russia's state policy in the Arctic for the period up to 2020 and for the future and the Strategy for development of the Arctic zone of the Russian Federation and national security for the period up to 2020. In 2013–2015, the program for development of the Arctic zone of the Russian Federation – a financial instrument for the implementation of the national Arctic strategy – was adopted [5].

The purpose of the Russian Arctic strategy is to ensure innovative modernization of the local economy and social sphere based on the use of intellectual resources and advanced knowledge[3]. In order to develop the natural resources of the Russian Arctic effectively, it is recommended to focus on the elements, the progress in the use of which will provide a synergetic effect in the implementation of the entire range of priorities for the development

[2] About land territories of the Arctic zone of the Russian Federation. Decree of the President of Russia of May 2, 2014 No. 296. Available at: http://www.kremlin.ru/acts/bank/38377 (accessed 22.07.2014).

[3] Strategy for development of the Arctic zone of the Russian Federation and national security for the period up to 2020. Available at: http://government.ru/info/ (accessed 22.02.2017).

of the Arctic zone of the Russian Federation. One of these elements is human resources that possess knowledge about the changing trends in environmental, socio-environmental and socio-economic systems and are able to effectively face the challenges in the Arctic. Human resources are a key link in the development of the Arctic. They ensure the implementation of projects envisaged by the development Strategy of the Arctic zone of the Russian Federation for the development of natural resources and transport infrastructure (primarily the Northern Sea Route, NSR). This is particularly noticeable in the Western sector of the Russian Arctic, in contrast to the areas located to the east of the Kara Sea, where in recent decades not a single project for the extraction of minerals and development of transport infrastructure has been launched. This can be explained by the lack of ready-made infrastructure and (which is more important) personnel trained to solve ambitious tasks in this region. In the Western sector of the Russian Arctic, on the land and continental shelf of the Arctic Ocean, it is planned to begin production of mineral resources and fuel (Pavlovskoye field on Novaya Zemlya, Prirazlomnoye oil field), which will entail the development of infrastructure, will contribute to the increase of cargo transportation along the NSR, promote the development of personnel support of navigation, staffing the services in the field of environmental management and climate change forecasting. In the framework of Russia's Arctic strategy, it is planned to construct the Belkomur railway and Severny deepwater district of Arkhangelsk port. The implementation of transport projects, considered in the context of mineral extraction, will have a comprehensive impact on the long-term socio-economic development of the Northern territories and will be accompanied by the creation of new jobs.

Research methodology. At the state level and in the academic community in Russia and abroad, much attention is paid to the training of labor resources and their provision to the sectors of the Arctic economy. The Fundamentals of the state policy of the Russian Federation in the Arctic provides for "…a sufficient level of fundamental and applied scientific research on the accumulation of knowledge and creation of modern scientific and geo-information bases for management of the Arctic territories, including the development of tools for solving problems of defense and security, as well as reliable functioning of life support systems and production activities in the natural and climatic conditions of the Arctic"[4]. This document prescribes the provision of training of specialists in the system of higher and secondary special education to work in the Arctic conditions, including the improvement of educational programs for the indigenous population, clarification of state social guarantees and compensation for persons working and living in the Arctic zone. Since 2007, an international group of scientists in the Arctic Council has been preparing a report on the state of human capital in the Arctic, its socio-economic and demographic development, distribution and reproduction of labor resources [6]. Factors influencing the dynamics of population and human resource development, foreign experience in migration policy to consolidate labor resources in the Far North, the need for modernization of the state policy in relation to the population residing in the North are considered in the works of M.M. Panikar and A.E. Shaparova [7], T. Heleniak [8], A. Semenova, and I.M. Popelnitskaja [9, 10], D.B. Smakova [11], I.P. Povarich

4 Fundamentals of the state policy of the Russian Federation in the Arctic for the period up to 2020 and for the further perspective. Available at: http://www.rg.ru/2009/03/30/ (accessed 10.08.2018).

and A.P. Harchenko [12], M.L. Belonozhko, A.N. Silin and O.M. Barbakov [13], M.A. Giltman [14]. The state of human resources in the subjects of the European part of the Arctic region, the dynamics of their changes, the impact on the demographic structure of natural and mechanical factors, the forecast and assessment of human resources are described in the monograph prepared by B.A. Revich, T.L. Khar'kova, E.A. Kvasha and others [15]. Comparing the list of shortage occupations in demand in the Arctic and the specifics of training on the example of Petrozavodsk University, S.V. Shabaeva, I.S. Stepus' and I.A. KHhteeva come to the conclusion that staff shortage in dome professions will increase in the medium term in the Arctic region, and the universities, including those located in the sub-Arctic region, will be able to reduce the shortage [16]. Retrospective analysis with the use of "general methods of scientific knowledge", the analysis of formation of human resources in the Arctic zone of Russia on the example of the Murmansk Oblast is given in the work of D.P. Belyaev, T.V. Belevsky, A.G. Bakhtina [17]. M.V. Ivanova and E.S. Klyukina wrote a paper [18] based on studying the condition of labor resources in the Murmansk Oblast in 2010–2016, where the outflow of the economically active population in recent years was the largest among the constituent entities of the Russian Arctic. They conclude that the reason for the decline in the population up to 25 years of age lies in migration processes caused not only by the "group specifics of youth (its mobility)", but also by specifics of conditions for self-realization. Finland's experience in the management of labor resources, which is of practical interest to the Russian Federation (this conclusion can be made when comparing the directions of economic development of the Northern territories of the two countries) is described in the article of E.A. Korchak. General issues of attracting labor resources to the development of natural-resource potential of the Russian Arctic, the problems and prospects of personnel training, the forecast for demand for labor force in the Arctic economy are highlighted in the articles by M.Sh. Karapetyan, A.R. Kutlubaeva, G.Yu. Obruch [20], A. Matveev [21], S.V. Sigova, I.S. Stepus' [22], E.A. Pitukhin, D.M. Moroz, A.M. Astafyev [23]. Complex issues of providing the subjects of the Russian Arctic with labor resources and concerning the problems of their reproduction are covered in the works of scientists of the Institute of Economic Problems of the Kola Scientific Center of RAS, who worked under the supervision of RAS Corresponding Member Professor G.P. Luzin, representatives of other institutions (Institute of Economic Forecasting, Institute of Demography of NRU HSE, RAS Institute of Geography), in the reports of the Ministry of Labor of Russia [24, 25].

The analysis of literature sources on the topic of our publication shows that in most cases they are devoted to the study of labor resources from the standpoint of assessing the demographic potential of a particular territory of the Arctic zone of the Russian Federation. The works of domestic scientists, with the exception of monographic works of specialists of the Kola Scientific Center, contain generalized data on human potential, labor resources of the subjects of the European North of Russia; they contain very little information about the demand for labor resources by enterprises and executive authorities of the Arctic zone. In 2016, Lomonosov Northern (Arctic) Federal University (NARFU, Arkhangelsk) conducted a study to expand the understanding of the labor resources of the Arctic zone of Russia, assess the current (currently observed) and medium-term (until 2022) needs of employers (that are engaged in economic activities in

the subjects that according to the Presidential Decree belong to the Arctic zone of the Russian Federation) for labor resources. The materials that have been collected and processed using the sociological method helped develop ways of providing information-analytical and methodological support to decision-making on the development of state policy of Russia in the field of personnel training. The assessment and forecast of the need for labor resources were carried out on the basis of data provided by the enterprises of the subjects of the Russian Arctic. Thus, we have identified the need for labor resources with higher education depending on the level of training (bachelor, specialist, master). One hundred and twenty seven employers were interviewed, 50 enterprises belonging to the category of major (over 5,000 people) and big (from 1,000 to 5,000 people) provided the necessary information.

Two hundred and three educational institutions of higher education, among which five universities are located directly in the Arctic zone of the Russian Federation, participated in the section of the study devoted to the possibilities of educational institutions of the Arctic zone of the Russian Federation to meet the staffing needs of enterprises, as well as in the analysis of factors affecting the formation of such needs. When making a sample in each university and its branch, the following techniques of the sociological method were used: cluster method and mechanical (step-by-step) method. The target group of the study was 3,000 respondents enrolled in programs of the Arctic orientation. Such universities include NARFU and Northern State Medical University (Arkhangelsk), Murmansk Arctic State University and Murmansk State Technical University.

The results of the study have a scientific and practical value, they develop an idea of the training of labor resources in the Arctic zone of Russia and forecasting the needs for them. Comparison of the results of this study with foreign analogues can be carried out only in a meaningful context and on a structural basis with expert and analytical materials of the University of the Arctic, the Arctic Council, the working group on education and science of the Barents Euro-Arctic Council. The research materials were tested at the following all-Russian and international scientific conferences organized in NARFU in 2016–2018: "Monitoring and evaluation of development of the Arctic zone", "Training for the Arctic: from problems to solutions", "The Arctic – a national megaproject: staffing and scientific support".

Results and discussion. In the course of the study, we can conclude that the staffing needs of enterprises engaged in economic activity in the Arctic region are heterogeneous both in the number and in the skills of labor resources.

The current need for employees with higher education is 6,198 people (including 3,680 bachelors, 1,364 specialists, 1,145 masters). Medium-term (up to 2022) demand is 8,261 people (including: 4,658 bachelors, 1,836 specialists, 1,753 masters). In the regional context, the greatest demand for labor resources is observed in the Murmansk Oblast, Yamalo-Nenets Autonomous Okrug, and the Komi Republic. Nenets and Chukotka autonomous okrugs and the Republic of Sakha (Yakutia) show the lowest indicators of demand for personnel *(Fig. 2)*.

Taking into account the delayed nature of many megaprojects, it is important to consider the medium-term prospective staffing needs calculated until 2020–2021. It is revealed that the greatest need for personnel will be typical for manufacturing, metalworking, engineering, power, mining, telecommunications sectors and education *(Fig. 3)*. The predominance of staffing needs not related to resource industries

Figure 2. Current personnel demand of constituent entities of the Arctic zone

can be explained by the diversification of the sectoral structure of the economy in the most populated regions of the Arctic zone – in the Murmansk and Arkhangelsk oblasts where more than 1 million people live and where conditions are created for the implementation of major megaprojects for the development of the Arctic zone.

Considering the need for labor resources, it should be noted that not all subjects of the Arctic zone of the Russian Federation and enterprises located on their territory are engaged in forecasting the long-term need for labor resources. Based on the available data, the following conclusions can be drawn.

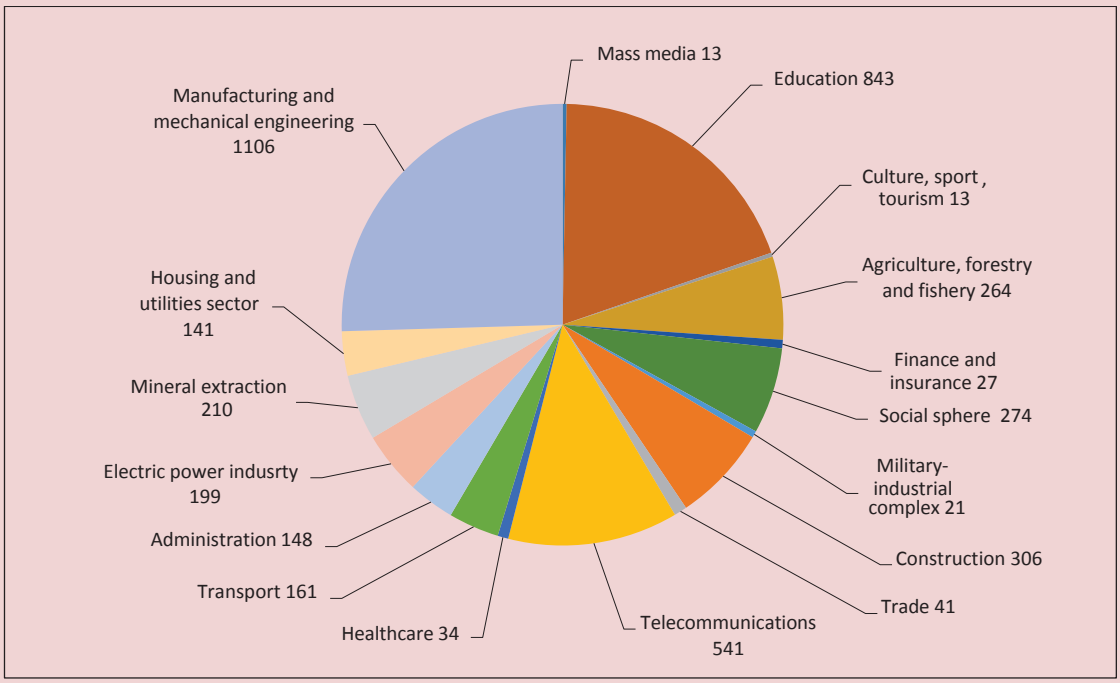
The Murmansk Oblast is fully included in the Arctic zone and demonstrates the highest current (2,829 people) and prospective (4,342 people) demand for labor resources among the subjects of the Arctic zone of the Russian Federation. In the medium term, a high demand for employees with higher education (1,513 people) is predicted. Analysis of the survey data shows that the sectors of the economy experiencing the greatest need for labor resources are manufacturing, mining, construction, communications, education and the social sphere *(Fig. 4)*.

The Murmansk Oblast is turning into an outpost for the study and development of the Arctic. In the Oblast, it is planned to modernize the enterprises of the processing industry (shipbuilding, fish processing and electric power), to build a mining and processing plant (GOK) on the basis of apatite-nepheline ore deposits, to establish a center for construction of large-capacity marine facilities; and a powerful reserve of scientific substantiation of nature management in high latitudes has been created.

The executive authorities of the Arkhangelsk Oblast and the enterprises located in the territories classified as the Arctic zone indicate low current staffing needs (398 people) despite the fact that these territories have second largest population among the territories of the Arctic zone of the Russian Federation. In the medium term, it is forecasted that there will be the highest increase in the need for personnel with higher education by 77%, up to 704 people in relative terms among the Arctic regions. There is a demand for specialists in

Figure 3. Perspective demand of the Arctic zone of the Russian Federation for labor resources, broken down by economic sectors

Figure 4. Perspective personnel demand of the Murmansk Oblast, broken down by economic sectors



the manufacturing industries, as well as for workers in the sphere of transport and mining *(Fig. 5)*. The revealed trends are explained by the location of the enterprises of the United Shipbuilding Corporation in the territory of the Arctic municipalities of the Arkhangelsk Oblast, by the formation of an innovative territorial shipbuilding cluster, fisheries and tourism clusters.

Prospective staffing needs of the subjects of Krasnoyarsk Krai included in the Arctic zone of the Russian Federation are 340 people, which exceeds the current need (297 people; *Fig. 6*).

As in the above examples, the demand for personnel in the Arctic zone of Krasnoyarsk Krai is formed by mining, manufacturing, transport and education. The formation of the need for labor resources is facilitated by the

Figure 5. Prospective staffing needs in the Arkhangelsk Oblast, broken down by economic sectors

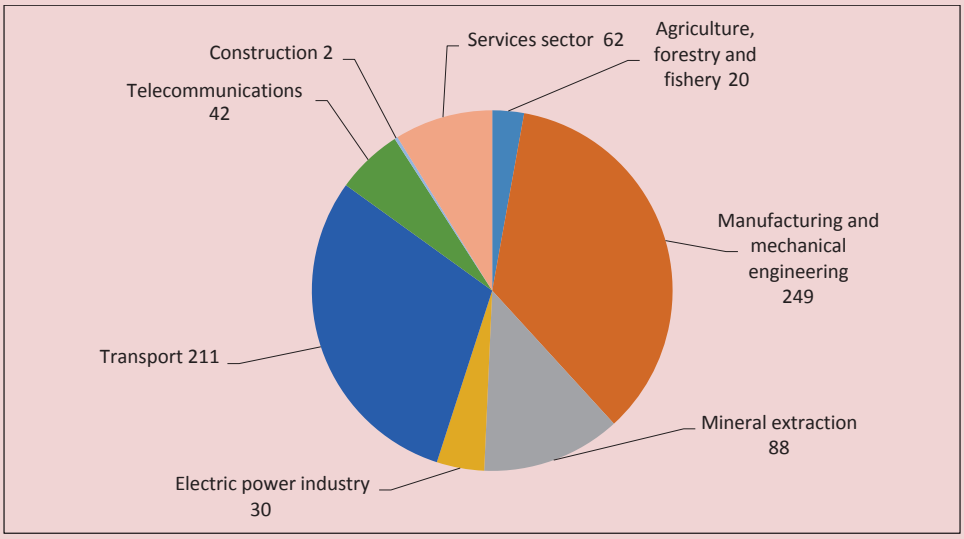
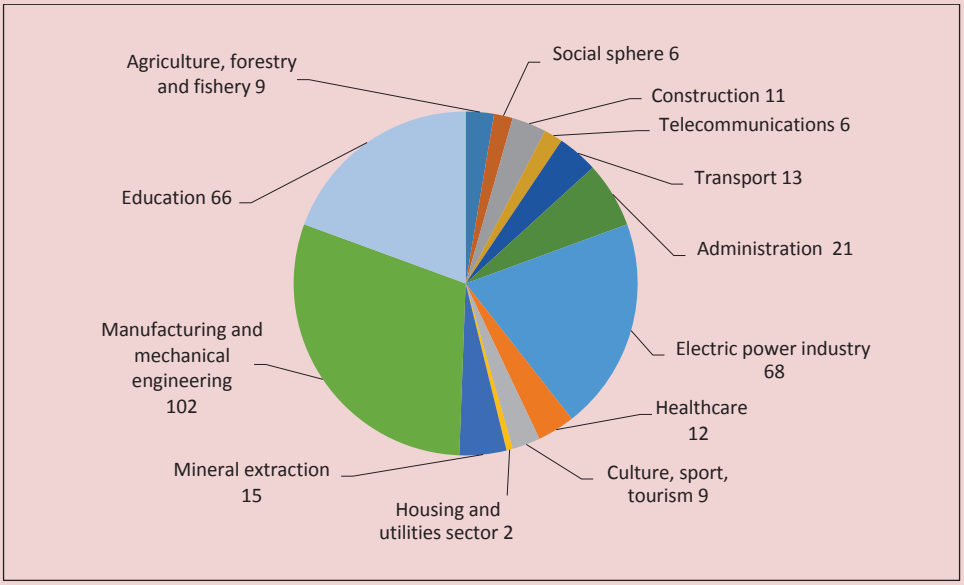


Figure 6. Perspective staffing needs of Krasnoyarsk Krai, broken down by economic sectors



fact that MMC Norilsk Nickel – the backbone enterprise of Norilsk – has developed a strategy for sustainable development of the enterprise, which involves upgrading the mining and metallurgical complex, and the development of urban and industrial infrastructure.

Among the Arctic regions, Nenets Autonomous Okrug has the lowest values of current and future staffing needs: 91 and 109 people, respectively *(Fig. 7)*. The survey of enterprises did not reveal a significant need for labor resources even in the extractive industry, despite its leading role in the economy of the subject (by analogy with Yamalo-Nenets Autonomous Okrug). Industries with the greatest staffing need are the transport sphere and the telecommunications sphere. Specialists will be required for the implementation of the following projects under the Arctic Strategy of Russia: reconstruction of the Naryan-Mar airport; construction of the Sosnogorsk–Indiga railway, the Naryan-Mar–Usinsk highway (currently only a winter road is functioning), and the deep-sea port of Indiga.

The current staffing need of the urban district "Vorkuta" in the Republic of Komi is 557 people *(Fig. 8)*.

A characteristic feature of the perspective personnel demand is the predominance of non-productive sectors: healthcare, management, education, social sphere. By 2020–2021, according to the results of the study, it is forecasted to grow by 31.4%, up to 732 people. Taking into account the implementation of long-term projects for the development of coal deposits in the Pechora basin, the demand for specialists in the mining industry is expected to increase.

Despite the fact that there are about 26 thousand people living in the territories of the Republic of Sakha (Yakutia) included in the Arctic zone, this region has great economic potential, which determines the current needs in the labor force (246 people) and medium-term needs (350 people) *(Fig. 9)*.

Plans for the development of diamond deposits, establishment of Taimylyr fuel and energy complex – the first and only in the Russian Arctic ("Arktik-Uglesintez" company) on the basis of coal deposits of Bulunsky District; plans for the extraction and processing of non-ferrous metals and development of navigation form the demand for specialists in the fields of mining, manufacturing and electric power industry.

Figure 7. Perspective personnel demand of Nenets Autonomous Okrug, broken down by economic sectors

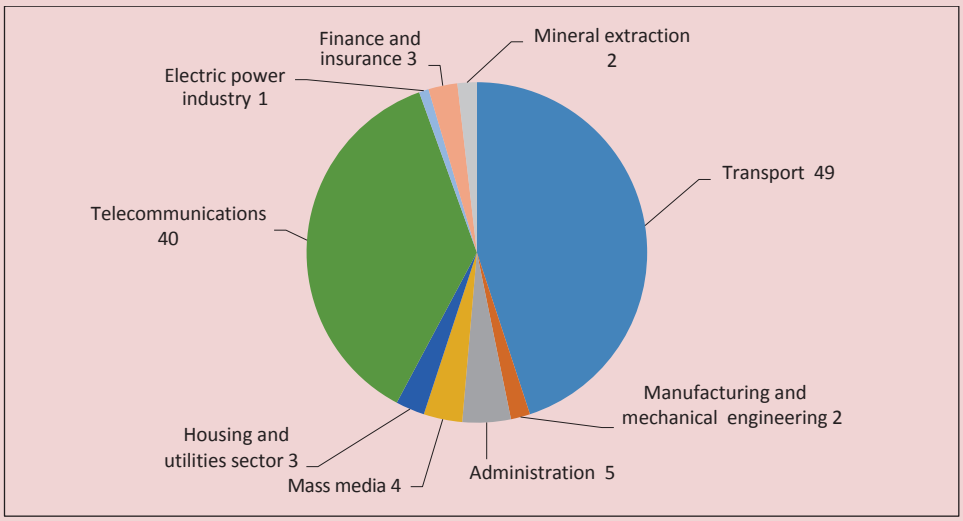


Figure 8. Perspective personnel demand of the urban district "Vorkuta", broken down by economic sectors

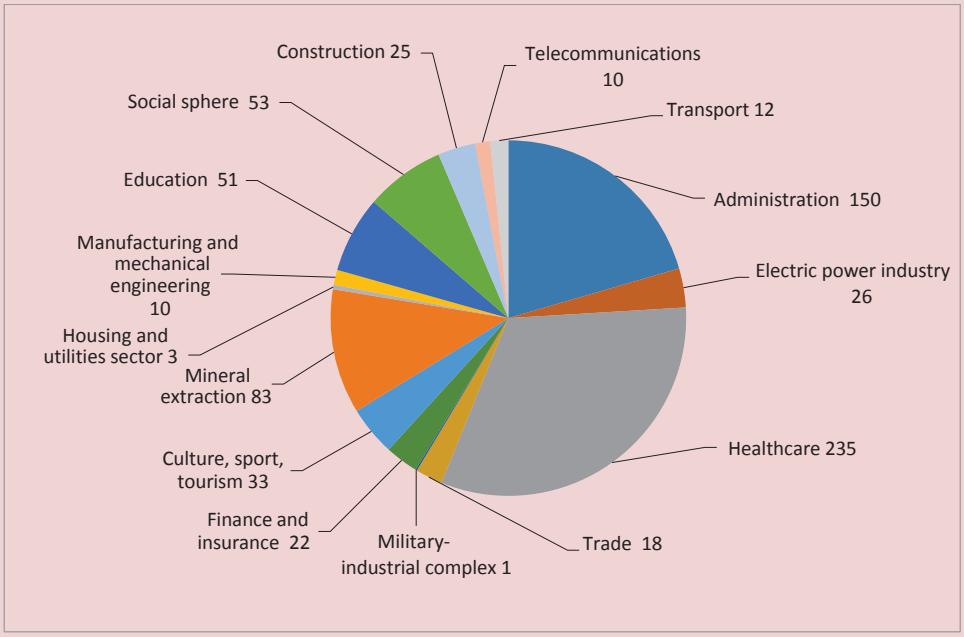
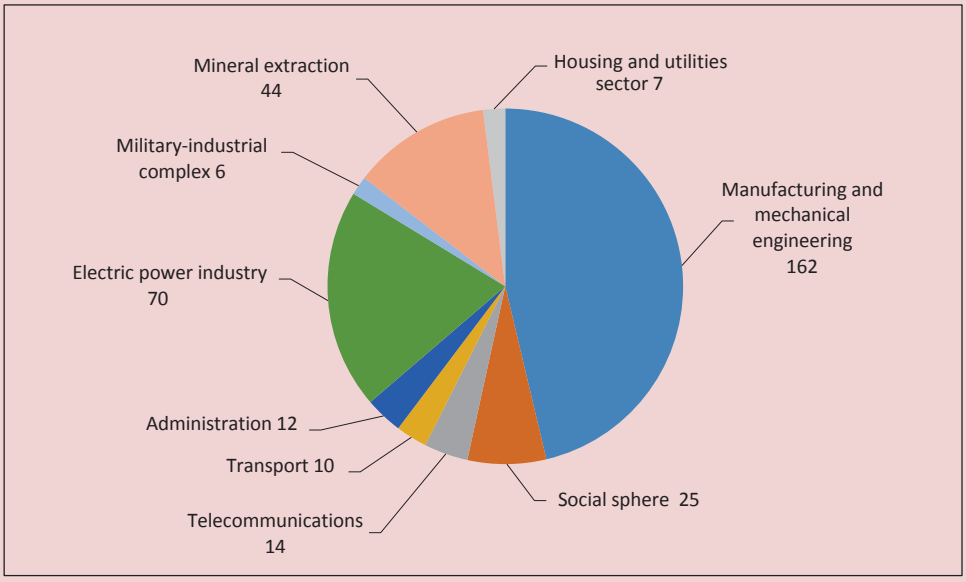


Figure 9. Perspective personnel demand of the territories of the Republic of Sakha (Yakutia), broken down by economic sectors



The current demand for personnel with higher education at enterprises in Chukotka Autonomous Okrug in the medium term will grow slightly, from 173 to 198 people *(Fig. 10)*. The need for specialists in the electric power industry can be explained by the planned commissioning of a floating nuclear power plant to replace the Bilibino NPP. The need for personnel in the agricultural sector is associated with modernization of agricultural enterprises and development of local greenhouse facilities. A significant part of the current and future

demand also falls on non-productive sectors: education and social sphere.

Yamalo-Nenets Autonomous Okrug ranks second after the Murmansk Oblast according to the number of required labor resources. The peculiarity of the staffing need in this subject is that in the medium term (1,486 people) it is less than the current need (1,607 people) *(Fig. 11)*. By 2021, almost 70% of the total personnel needs will be in the mineral extraction sector, processing industries and infrastructure; this fact is associated with the implementation of the international project "Yamal LNG" for the development of the Bovanenkovo gas field, construction of the port of Sabetta and a plant for the liquefaction of natural gas, and development of land transport and energy infrastructure.

The demand of enterprises for labor resources and their training are interrelated. Meeting the request of companies for specialists is facilitated by educational and scientific organizations that ensure the implementation of the state order (within the framework of targeted admission, as well) for training. Murmansk Arctic State and Technical universities are functioning in the Murmansk Oblast; there are NARFU and Ammosov North-Eastern Federal University in the Arkhangelsk Oblast and Republic of Sakha (Yakutia), respectively. The autonomous districts have branches of universities, some of which are located outside the Arctic zone. Therefore, training "on site" for the purpose of meeting the needs of enterprises is practically not organized [26].

The study shows that the universities of the Arctic zone of Russia provide training in programs of the Arctic orientation in accordance with the approved development programs *(Fig. 12)*. *Figure 13* shows the distribution of students in educational programs. Graduates are considered as labor resources of the Arctic zone.

Successful job search and consolidation of personnel at enterprises is facilitated by the fact that in the Murmansk and Arkhangelsk oblasts and in Krasnoyarsk Krai, universities and enterprises jointly participate in the training

Figure 10. Prospective personnel demand in Chukotka Autonomous Okrug, broken down by economic sectors

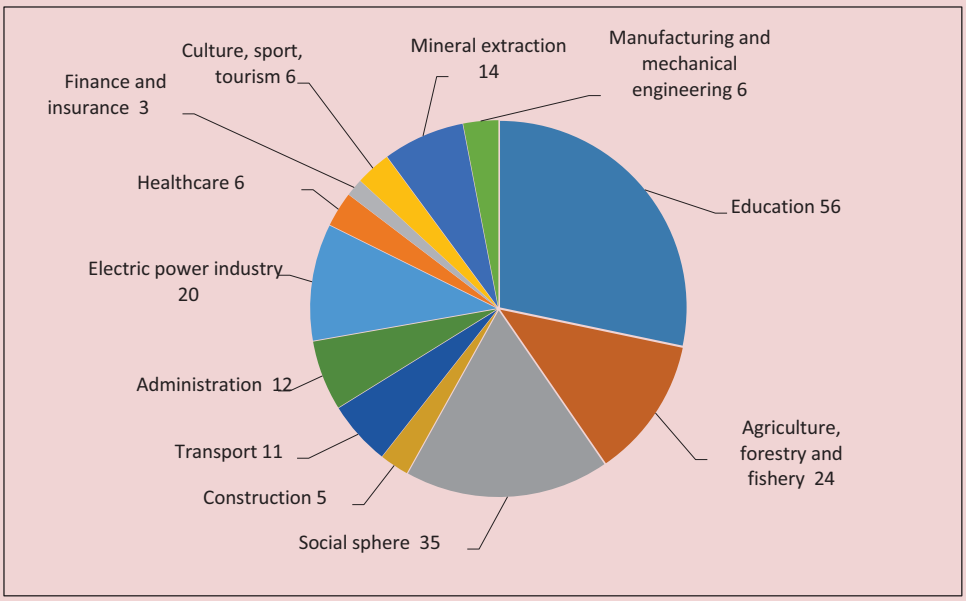
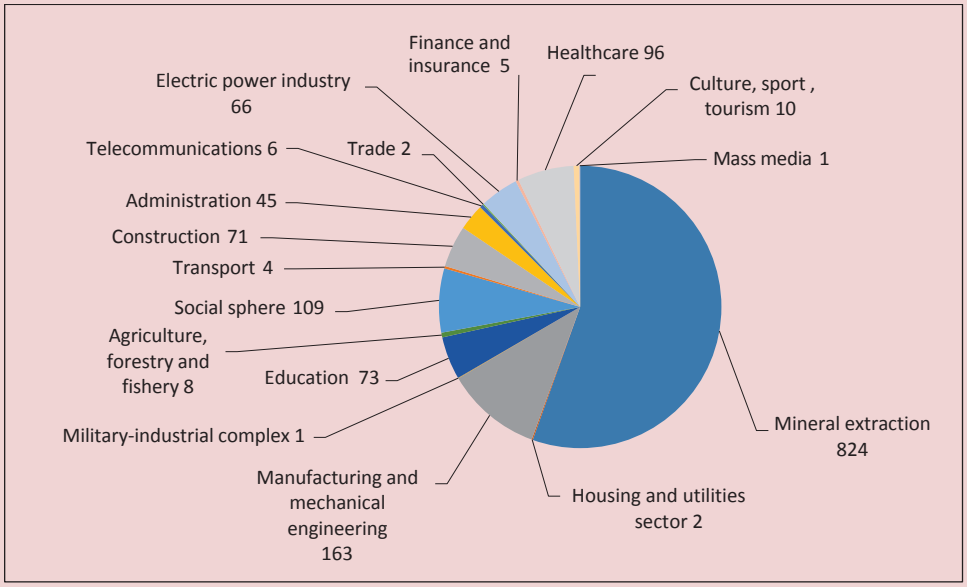


Figure 11. Prospective personnel demand in Yamalo-Nenets Autonomous Okrug, broken down by economic sectors



of students and undergraduates within the territorial clusters and basic departments. As a result, 71–75% of graduates of universities in the Arctic zone of Russia find jobs at local enterprises. Enterprises of the Russian Arctic employ about 17% of students who have graduated from universities located outside the Arctic zone *(Fig. 14)*.

Summing up, we note that the staffing needs of the economy of the Russian Arctic by 2021 will be 8,261 people (Yamalo-Nenets Autonomous Okrug – 1,486, Arkhangelsk Oblast – 704, Murmansk Oblast – 4,342, Krasnoyarsk Krai – 340, Komi Republic – 732, Nenets Autonomous Okrug – 109, Chukotka Autonomous Okrug – 198 and the Republic of Sakha (Yakutia) – 732), among them: 4,658 bachelors, 1,753 masters, and 1,836 specialists.

In the medium-term planning (up to 2020–2012), the greatest personnel demand is observed in the following economic sectors of the Arctic zone of Russia: manufacturing and engineering (1,800 people), mining (1,280 people), education (1,089 people), communications (659 people), social sphere (564 people). The forecasted growth in staffing needs in these sectors is due to the launch of investment projects for development of mineral resources and transport infrastructure and the need to address long-term challenges of socio-economic development of the Russian Arctic and national security in the region.

Based on the results of the study, the information concerning the training of labor resources in the Arctic zone was systematized and supplemented with the use of statistical and analytical methods. It should be noted that there still exist certain problems in the system of forecasting staffing needs and the process of personnel training. They are as follows:

1. Executive authorities of the subjects of the Arctic zone have no system for monitoring long-term need for specialists in the leading economic sectors of the Arctic zone.

2. The balance of migration of the able-bodied population is negative, despite the high share of employment of graduates from the universities located in the Arctic macro-region. Analyzing the data of official statistics, we can conclude that all subjects of the Russian Arctic

Figure 12. Educational programs that provide training in the interests of development of the Arctic zone

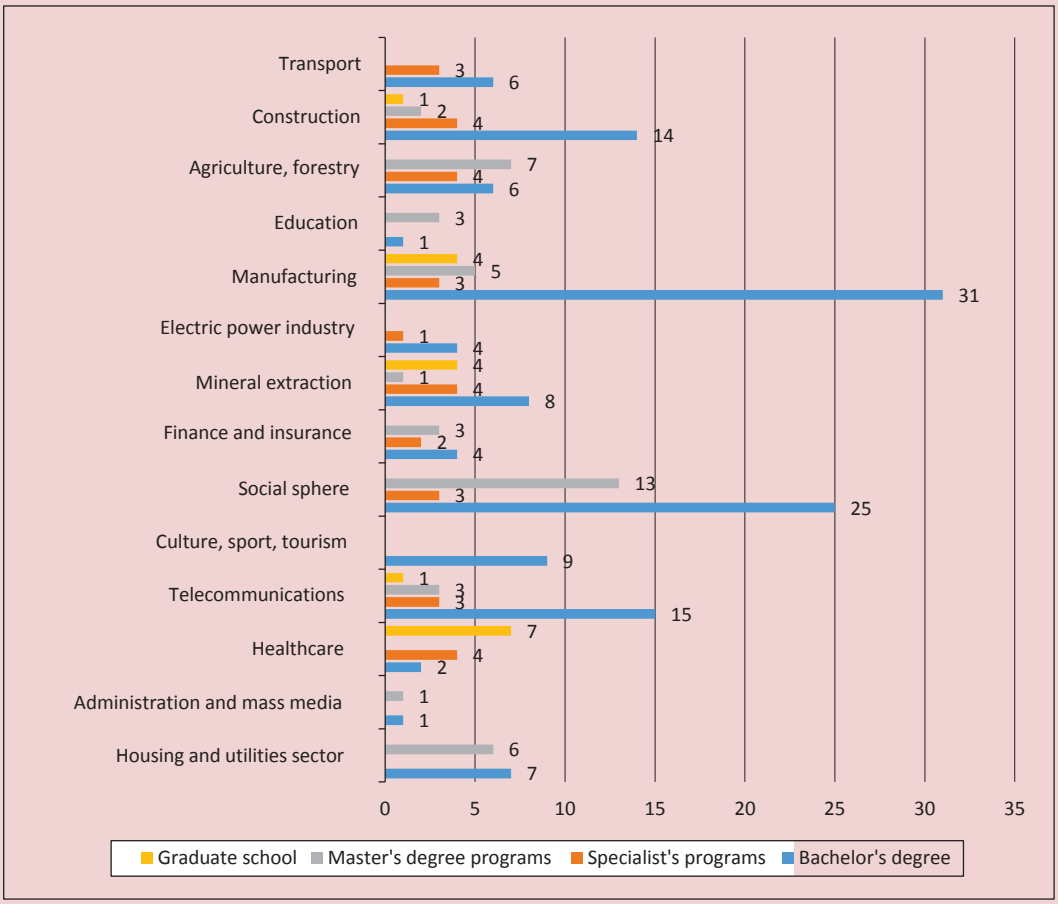


Figure 13. Number of students enrolled in the programs of the Arctic orientation at universities located in the Arctic zone

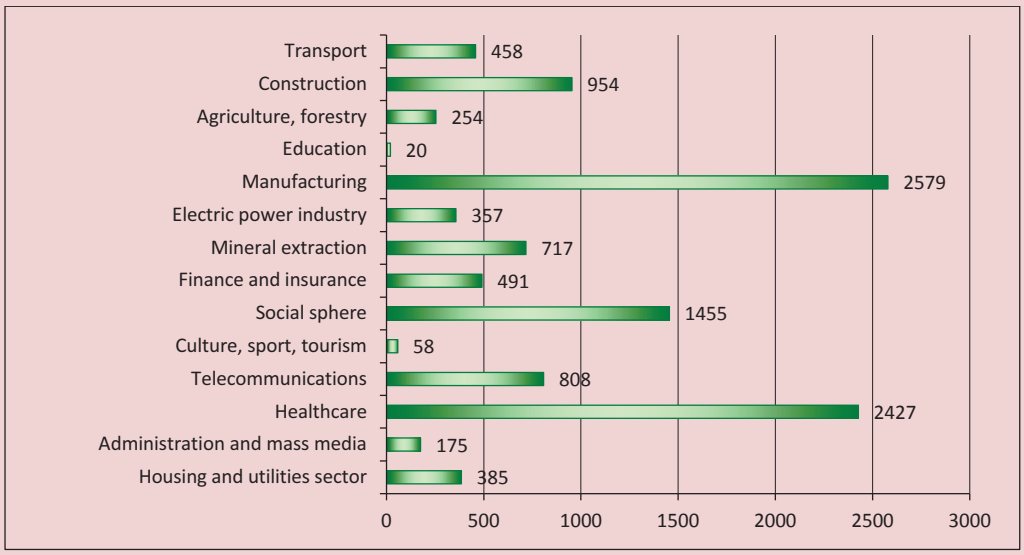
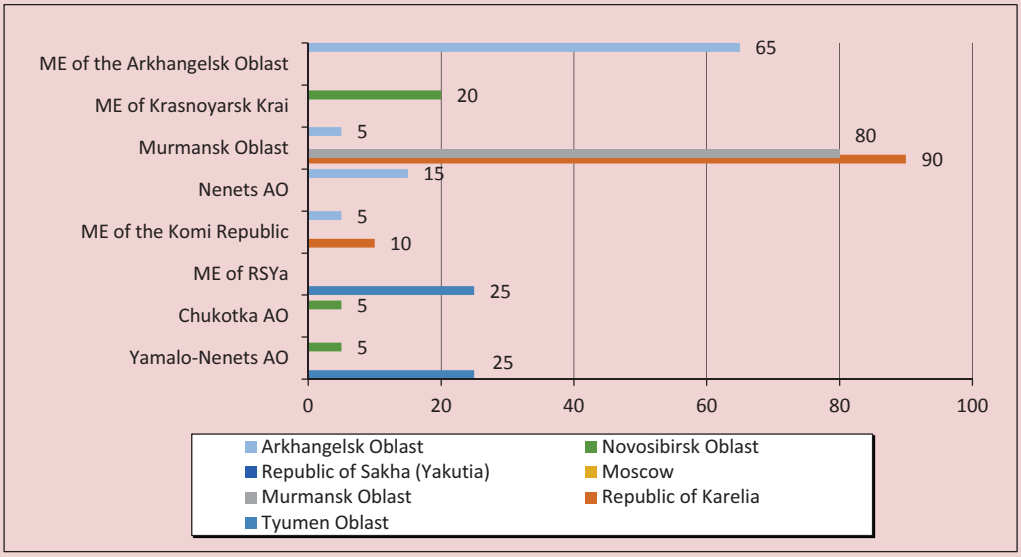


Figure 14. Proportion of graduates employed within their obtained specialty in the subjects of the Arctic zone of Russia, 2015, %



Migration of the population in the subjects of the Russian Federation with the territories included in the Arctic zone of the Russian Federation in 2012–2014

Subject of the Arctic zone of the Russian Federation	Migration gain (loss)		
	2012	2013	2014
Murmansk Oblast	-7925	-10017	-4998
Nenets Autonomous Okrug	50	- 12	6
Chukotka Autonomous Okrug	-336	-354	-154
Yamalo-Nenets Autonomous Okrug	-1127	-8124	-6068
Arkhangelsk Oblast	-2038	-3304	-1623
Republic of Komi	-3655	-3626	-2059
Republic of Sakha (Yakutia)	-1032	-907	-471
Krasnoyarsk Krai	-2210	-3837	-3198
Arctic zone of the Russian Federation	-18273	-30181	-18565

Compiled with the use of the data of the Federal State Statistics Service. General results of population migration, broken down by constituent entities of the Russian Federation for 2014. Available at: http://www.gks.ru/bgd/ (accessed 22.07.2016).

are characterized by migration decline of the population, except for Nenets Autonomous Okrug *(Table)*.

3. Forecast data of sectoral and corporate personnel services are not available. Currently, it is a difficult task to be solved. Its relevance may be due to the poorly formed internal need for forecasts of current and especially long-term demand for labor resources, which, in turn, may be due to a decrease in the intensity (and cessation in some areas) of geological exploration on land and shelf of the Arctic Ocean, a significant time lag from exploration to the beginning of development of mineral deposits (over 20 years), and thus – a significant period of return on investment and, as a consequence, weak interest on the part of resource corporations.

4. The labor market in the subjects of the Arctic zone of the Russian Federation is characterized by an imbalance between the demand (10,536 specialists in the framework

of the medium-term need) and supply (61,424 students in universities in the region) of labor resources. In order to reduce the imbalance in the shortage of engineering personnel and an overabundance of specialists in the field of management and services, the Ministry of Education and Science of the Russian Federation (from May 2018 – the Ministry of Science and Higher Education) reduces the target numbers of admission to universities in the region in the training programs "Administration" and "Management", and increases the admission to technical (engineering) and natural science fields of training.

5. The interaction between higher education institutions and enterprises and organizations in the implementation of practice-oriented educational programs is not streamlined in terms of organizing targeted training (only 3.4% of the total number of students enrolled in "Arctic" programs study under contracts of targeted admission).

The need to develop labor resources and improve human capital is a challenge for non-standard and large labor market of the Arctic zone. The challenge should be met with the state regional policy and personnel policy of enterprises focused on the implementation of a set of strategic objectives for the development of the Arctic region, contributing to the consolidation of the working population in this region with extreme climatic conditions, provision of people with comfortable and safe life, and development of entrepreneurship. Therefore, we can recommend the conclusions of our study to be used by federal and regional executive authorities in the development of the policy in the field of management of scientific and educational space, personnel training for the real sector of the economy of the Arctic zone of the Russian Federation, including the implementation of megaprojects, the development of a system for monitoring and assessing staffing needs in the subjects of the Arctic zone and the introduction of such a system in the management system of its socio-economic development.

In order to increase the awareness of stakeholders and participants of the relations in the field of education, systematization and dissemination of the accumulated material relating to personnel training for the Russian Arctic, the Northern (Arctic) Federal University is forming an information and analytical database using the findings of our study – a portal of the national Arctic scientific and educational consortium, which displays universities and scientific and educational institutions engaged in training in the Arctic zone of the Russian Federation, the current register of educational programs implemented in them, data on the number of students, as well as a map[5] of employers in the region [27].

References

1. Pilyasov A.N. *I poslednie stanut pervymi: Severnaya periferiya na puti k ekonomike znaniya* [So the last shall be first: the Northern Periphery on the Way toward the Knowledge Economy]. Moscow: LIBROKOM, 2009. 544 p.
2. Glomsrod S., Aslaksen I. *The Economy of the North*. Oslo – Kongsvinger, 2006. 99 p.
3. Barsegov Yu.G., Korzun V.A., Mogilevkin I.M. et al. (Eds.). *Arktika: interesy Rossii i mezhdunarodnye usloviya ikh realizatsii* [The Arctic: Russian Interests and International Conditions for Their Implementation]. Moscow: Nauka, 2002. 356 p.

[5] Territorial map of educational institutions, educational programs implemented in universities of the Arctic zone of the Russian Federation and enterprises engaged in economic activity in the Arctic zone. Available at: http://arctic-union.ru/napravleniya/base (accessed 07.02.2017).

4. Dodin D.A. *Ustoichivoe razvitie Arktiki (problemy i perspektivy)* [Sustainable Development of the Arctic (Problems and Prospects)]. Saint Petersburg: Nauka, 2005. 283 p.
5. Chistobaev A.I., Kondratov N.A. The Arctic: geopolitical and geo-economic interests of foreign countries. *Geopolitika i bezopasnost'=Geopolitics and Security,* 2014, no. 1 (25), pp. 84-91. (In Russian).
6. Numand Larsen J., Fondahl G. (Eds.). *Arctic Human Development Report. Regional Processes and Global Linkages.* Copenhagen: Nordic Council of Ministers, 2014. 505 p.
7. Panikar M.M., Shaparov A.E. Imperatives of the current state policy of the Arctic countries on Far North development. *Vestnik Severnogo (Arkticheskogo) federal'nogo universiteta. Seriya: gumanitarnye i sotsial'nye nauki=Vestnik of Northern (Arctic) Federal University. Series "Humanitarian and Social Sciences"*, 2016, no. 6, pp. 33-44. (In Russian).
8. Heleniak T. The role of attachment to place in migration decisions of the population of the Russian North. *Polar Geography*, 2009, vol. 32, pp. 31-60.
9. Semenova A., Popelnitskaja I.M. Use of panel data for assessing socio-economic situation in the northern regions of Krasnoyarsk Krai. *Zhurnal Sibirskogo federal'nogo universiteta. Seriya: gumanitarnye nauki=Journal of Siberian Federal University. Humanities & Social Sciences*, 2017, vol. 10, no. 12, pp. 1905-1915. (In Russian).
10. Semenova A., Popelnitskaja I.M., Bukharova E.B., Razumovskaja V.A., Bukharov A.V. Analysis of morbidity rate of the population at the Artic territories on the extent of commercial development and ecological state on the example of Krasnoyarsk Krai. In: *4th International Multidisciplinary Scientific Conference on Social Sciences and Arts SGEM*, 2017, no. 3 (11), pp. 417-422.
11. Smakova D.B. Arctishe zone und deren wirtschaftliches potential. In: *Materialy 3-i nauchno-prakticheskoi konferentsii "Novye tekhnologii v inzhenerii"* [Proceedings of the 3rd Scientific-Practical Conference "New Technologies in Engineering"]. Moscow: Rossiiskii universitet druzhby narodov, 2014. Pp. 129-132.
12. Povarich I.P., Harchenko A.P. Assessment of labor force in the Russian North as key factor in economic development. *Tomsk State University Journal*, 2015, November, no. 400, pp. 253-260. (In Russian).
13. Belonozhko M.L., Silin A.N., Barbakov O.M. Social and human potential of the Arctic frontier (by the results of sociological research in the Yamal). *International Journal of Ecological Economics and Statistics*, 2018, vol. 39, no. 1, pp. 132-142.
14. Giltman M.A. Employment in the North of Russia: Microdata Analysis. *Zhurnal Novoi Ekonomicheskoi Assotsiatsii – Journal of the New Economic Association*, 2017, no. 3, pp. 103-124. (In Russian).
15. Revich B.A., Khar'kova T.L., Kvasha E.A., Bogoyavlenskii D.D., Korovkin A.G., Korolev I.B. *Demograficheskie protsessy, dinamika trudovykh resursov i riski zdorov'yu naseleniya Evropeiskoi chasti Arkticheskoi zony Rossii* [Demographic Processes, the Dynamics of Human Resources and Health Risks of the population of the European Part of the Arctic Zone of Russia]. Moscow: Lenand, 2016. 304 p.
16. Shabaeva S.V., Stepus' I.S., Khoteeva I.A. Opportunities of Subarctic higher education institutions to solve personnel problems in the Arctic. *Universitetskoe upravlenie: praktika i analiz=University Management: Practice and Analysis*, 2017, vol. 21, no. 4 (110), pp. 106-115. (In Russian).
17. Belyaeva D.P., Belevskikh T.V., Bakhtina A.G. Formation of labor resources in the North of Russia (on the example of the Murmansk Oblast). *Ekonomika i upravlenie=Economics and Management,* 2016, no. 2 (136), pp. 20-26. (In Russian).
18. Ivanova M.V., Klyukina E.S. Contemporary preconditions for the future of the Arctic labor resources. *Monitoring obshchestvennogo mneniya: ekonomicheskie i sotsial'nye peremeny=The Monitoring of Public Opinion: Economic and Social Changes,* 2017, no. 6 (142), pp. 180-198. (In Russian).
19. Korchak E.A. Knowledge economics of "in the management of labor potential of the Northern territories of Finland. In: *Materialy Vserossiiskoi nauchno-prakticheskoi konferentsii "Aktual'nye voprosy obrazovaniya v XXI veke"* [Proceedings of the All-Russian Scientific-Practical Conference "Topical Issues of Education in the 21st Century]. Murmansk: MAGU, 2017. Pp. 124-129. (In Russian).
20. Karapetyan M.Sh., Kutlubaeva A.R., Obruch G.Yu. Labor resources in the Arctic zone of the Russian Federation. In: *Materialy mezhdunarodnogo molodezhnogo simpoziuma po upravleniyu, ekonomike i finansam, g. Kazan',*

5–7 dekabrya 2017 g. [Proceedings of the International Youth Symposium on Management, Economics and Finance, Kazan, December 5–7, 2017]. Kazan, 2017. Pp. 488-492. (In Russian).

21. Matveev A. Problems of providing the North of Russia with labor resources: finding a solution. *Sotsial'naya politika i sotsial'noe partnerstvo=Social Partnership and Social Policy,* 2013, no. 11, pp. 5-13. (In Russian).
22. Sigova S.V., Stepus' I.S. Recruitment needs for the Russian Arctic Zone priorities development – higher education system value. *Universitetskoe upravlenie: praktika i analiz=University Management: Practice and Analysis*, 2015, no. 5 (99), pp. 19-29. (In Russian).
23. Pitukhin E.A., Moroz D.M., Astaf'eva A.M. Forecasting personnel needs of the regional economy in the context of professions. *Ekonomika i upravlenie=Economics and Management,* 2015, no. 7, pp. 41-49. (In Russian).
24. Selin V.S., Skuf'ina T.P. (Eds.). *Regional'naya ekonomika i voprosy severovedeniya* [Regional Economy and the Issues of Arctic Research]. Apatity: KNTs RAN, 2013. 200 p.
25. Selin V.S., Tsukerman V.A., Vinogradov A.N. *Ekonomicheskie usloviya i innovatsionnye vozmozhnosti obespecheniya konkurentosposobnosti mestorozhdenii uglevodorordnogo syr'ya arkticheskogo shel'fa* [Economic Conditions and Innovative Opportunities to Ensure the Competitiveness of Hydrocarbon Deposits of the Arctic Shelf]. Apatity: Kol'skii nauchnyi tsentr RAN. 2008. 267 p.
26. Bugaenko O.D., Zaikov K.S., Ryabchenko S.V., Stepanova V.V. Analytical statement on the current status of the system of training of scientific and industrial personnel to meet the staffing needs of the Arctic zone of the Russian Federation. In: *Materialy Vserossiiskoi nauchno-prakticheskoi konferentsii "Arktika – natsional'nyi megaproekt: kadrovoe obespechenie i nauchnoe soprovozhdenie". Arkhangel'sk, SAFU, 5–6 iyunya 2016 g.* [Proceedings of the All-Russian Scientific-Practical Conference "The Arctic – a National Megaproject: Staffing and Scientific Support". Arkhangelsk, NARFU, June 5–6, 2016]. Arkhangelsk, 2016. Pp. 156-178. (In Russian).
27. Zaikov K.S., Kalinina M.R., Kondratov N.A., Tamitskii A.M. Innovation Course Of Economic Development In the Northern and Arctic territories in Russia and in the Nordic Countries. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2017, vol. 10, no. 3, pp. 59-77. (In Russian).

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Provision of Social and Resource Support to the Policy of Socio-Cultural Modernization of Regions by the Population with Higher Education

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Abstract. The paper reflects an experience of empirical research on the institutional and regulatory component in the modernization of Russian regions that are historically at different levels of civilizational development. The information basis of the study includes findings of a mass representative survey ("civil examination") conducted by the Center for the Sociology of Management and Social Technology at the Institute of Sociology of the Russian Academy of Sciences; the survey was carried out in four constituent entities of the Russian Federation: the Moscow Oblast, the Republic of Bashkortostan, the Belgorod Oblast and the Republic of Kalmykia; the assessment of their development include criteria of the level of socio-cultural modernization (grant # 15-18-30077). We believe that higher education is an underestimated resource of the state strategy for socio-cultural modernization of regions. People with higher education are considered as an avant-garde social group able to exert an increasing influence on the harmonious development of the country. This group is characterized as a "soft" force in the support of constructive actions of the power vertical and in the future – as a centripetal factor capable of providing a high level of solidarity in the Russian society in solving multidisciplinary problems of modernization. We elaborate the research tools outlined in the article "The Role of Institute of Higher Education in Solving the Issues of Socio-Cultural Modernization of Regions" (*Economic and Social Changes: Facts, Trends, Forecast,* 2017, vol. 10, no. 5). We clarify the empirically tested hypotheses: first, socio-cultural modernization of Russian regions is associated with the degree of development of their government systems that depend, in turn, on social organization and self-organization, the hierarchy of groups, including the population

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with higher education, and their interest in the process of modernization; second, the social group of the population with higher education is an electorate with average estimates of social and political activity, which can play an important role in the development of problem situations in regions with different levels of modernization and in the creation of new models of organizational development and management. The goal of our study is to identify the degree of social support that the population with higher education provides to the policy of the power vertical and its individual links. We provide the results of analysis of socio-economic indicators of regional development, taking into account the place and role of the population with higher education. The tools of the survey are designed to conduct further comparative studies on larger samples.

Key words: social resource, higher education, management problems, regions, "civil examination", socio-cultural modernization.

Introduction. At present, the problem of choosing the trajectory of socio-cultural modernization not only for individual countries, but also for entire civilizations has become more acute. It is being addressed by every politician and official, businessman and researcher, as well as every citizen: everyone makes choices thus determining their attitude to the problems of modernization and participation in their solution [1; 2]. Nowadays, we cannot ignore the significantly increased diversity of interests and the complex social structure of the Russian society that has occurred over the years of post-Soviet development. At the same time, the two opposing value systems still coexist: one focused on personal success and development, the other – on the interests of the society and the state. Just like in the mid-90s of the 20th century, it has to be stated that the complexity of social modernization depends not only on the developed social projects, or on the spontaneously implemented reforms, or intentions of the ruling elite, but also on whether these intentions can be perceived by the complex system of groups of interest in the society. And it is not only about investment in the economy, but also about real improvement of the standard of living and the quality of life in the social sphere, as stated in the President's 2018 May decree, which determines the national goals and strategic objectives of the country up to 2024. It should be taken into account that in Russia, as in any country, there is an opposition that cooperates the authorities on a confrontational basis, which has repeatedly led to the aggravation of the country's *"socio-cultural split" (the term of A.S. Akhiezer)* [3]. In this context, the issues of improving the quality of civic participation, the level of social responsibility and the importance of civic action and interaction are acute. A number of researchers reasonably believe that informed civic participation is a key factor in development and social well-being. It largely depends on the contribution each citizen makes to the solution of social problems. Their level of education plays an important role [4].

The Center for Management Sociology and Social Technology at Institute of Sociology of the Russian Academy of Sciences (work on the Russian Science Foundation grant in 2015–2017 with the author's participation at the final stage) obtained interesting results of empirical measurement of the performance of regional authorities and management bodies, being historically at different levels of civilizational, in particular socio-cultural development. They are reflected in the collective research work "*Russia: reforming the vertical of power amid regions' socio-cultural modernization*"[5]. The work clarifies the previously stated elements of the overall program of the study. Thus, *a social problem* is defined as a split between the society

and the state manifested in the gap between population's estimates of the performance of the chain of the vertical of power and management bodies and their ability to simultaneously solve external and internal problems of the socio-economic development in regions with different levels of modernization. *Modernization* is referred to as a complex, civilizational process carried out by broad population masses in order to meet their needs to improve working conditions and the quality of life. *A research problem* is defined as lack of theoretical, methodological and empirical data in the subject area of management sociology in terms of the ability of the specified vertical of power to address the problems of harmony in the divided society, successfully respond to external and internal challenges, and ensure comprehensive, civilizational modernization. *The object* is the process of socio-cultural development in regions in a specific historical and socio-economic situation according to the modernization level criterion. *The subject* is the clarification of the type and nature of social laws in the framework of the theory of "civil contract", reflecting the degree of the population's social support of the work of certain chains of the vertical of power and management bodies in the regions and, ultimately, the degree of control over the modernization process. Moreover, the measurement of social subjectivity of various population groups, including people with higher education, their role in the feedback relations with the authorities and management bodies, the manifestation of solidarity with small, including protest groups, with the regional community and with Russia as a whole [5; 6]. The contribution of the author consists in *interpreting* the results of the mass survey ("civil examination") through *the method of secondary analysis* and the empirically tested hypotheses taking into account higher education as a social resource for the state strategy of socio-cultural modernization in the regions.

Stating the research problem

According to experts, the root causes of inefficiency and slowdown in the country's modernization are lack of demand for human potential of the working population in Russian regions, narrowly focused or low demand of private and public business for new domestic knowledge and technology. The institutional-regulatory (social) variable of modernization, which characterizes changes in the chain of regulatory institutions [7], lags far behind and is spontaneously and fragmented. Its aspects remain poorly elaborated in the complex of scientific research describing, explaining and predicting the social processes taking place in the country. In particular, it is not provided that the course of modernization depends not only on spontaneous, but also on organized, and therefore, managing factors in vertical ("center-periphery") and horizontal ("self-organization of subjects of socio-economic action in regions and between regions") modernization. Moreover, education remains one of the regulatory institutions in socio-cultural modernization, which, along with the system of power and management, acts as an independent factor in the regions' civilizational development [8]. A number of researchers believe that with the development of the post-industrial society both in Russia and developed Western countries, and the manifestations of its social outline and fundamental characteristics, the concept of *smart proletariat (the term of V.K. Levashov)* will reflect the features of inevitable reality [9]. The new, "revolutionary class of the digital age" includes highly skilled and professional employees, many of whom are initially structured and arranged through information networks. It primarily includes the employees in the sphere of socio-cultural reproduction – science and higher education.

We believe that higher education is a latent and still largely undervalued resource in the

state strategy of socio-cultural modernization in regions. The social group of people with higher education is leading, able to have an increasing impact on the country's harmonious development. The specified group should be considered today as a "soft" force for supporting constructive actions of the vertical of power and a future centripetal factor capable of providing a high level of solidarity in Russia to solve multi-disciplinary problems of modernization. The recent structural changes in Russia's constituent entities such as the unification of a number of autonomous oblasts and okrugs, the annexation of the Republic of Crimea and Sevastopol, and the division of the Ministry of Education and Science into the Ministry of Education, the Ministry of Science and Higher Education complicates the comprehensive analysis of higher education management, preventing the formation of a single vertical of executive power. In this sense, the modern stage of higher education management from our point of view is of particular interest for the academic environment.

An external weighty argument is the inclusion of our country in the ranking of countries with high shares of people with higher education. According to *the OECD report "Education at a Glance 2017"*, 56% of Russians aged 25–64 have higher education. This value is the second largest after Canada among all OECD and partner countries, exceeding the average value by 19% [10]. According to the Higher School of Economics, the share of people aged 17-25 engaged in programs of higher education in the country as a whole comprises 32.9 %.

It is important to understand that if the objective to modernize higher education for its transition to mass education at the level of bachelor's degree available to more than 50% of young people of the relevant age group is successfully accomplished, the functions of education change – from the reproduction of the elite to the adaptation of the entire population to social and technological changes [11]. However, consistent civilizational development of the society is ensured by active interaction of an individual with the surrounding social environment, their direct participation in collective action, rather than by direct imposition of certain ideals, identities, emotions and knowledge [12].

It is noteworthy that, according to *Federal Law no. 273-FZ "On education in the Russian Federation", dated 29.12.2012*, the system of higher education is a set of interacting, successive educational programs of different levels and focus, federal state educational standards and requirements, a network of educational institutions and scientific organizations implementing them; authorities managing education, institutions and organizations subordinated to them, associations of legal entities, public and state-public associations carrying out activities in education. Its purpose is to train highly qualified personnel in main areas of socially useful activities according to the needs and demands of the state and the civil society; to meet the needs of an individual in intellectual, cultural, and moral development; to provide skills development in science and teaching for personnel by conventionally determining the content of educational standards and qualification requirements to the level of graduates' training. At the individual level, higher education retains its impact on the person's life trajectory in the form of recognition of diploma. At the same time, the content of the education itself is only generally considered and is not associated with further development of both scientific knowledge in general and competencies acquired by the graduate in further professional activity. The functional specific nature of this system is that vocational training is usually aimed at activities outside the educational institution, which determines the autonomy of higher education as a social system.

Of particular research interest is achieving the theoretical and applied objectives on the formation of *a socio-forecast approach to managing* higher education as a condition for conceptual development of the educational system and the institution of education as a whole. It is also necessary to develop a forecast paradigm of higher education management with further diagnosis and justification of the target mechanism of its implementation at the present stage of civilizational development in Russia Federation and its regions.

Elements of the general research program

The purpose is defined as the identification of degree of social support from people with higher education of the policy of the vertical and its separate links. *The search objective* is to analyze socio-economic indicators of regional development, taking into account the parameter of working population with higher education.

The main hypothesis is as follows: higher education is a social resource to address multidisciplinary problems of socio-cultural modernization. The activation of potential of people with higher education, *"actors-professionals" (the term of O.V. Aksenova)* [13] in the state strategy of socio-cultural modernization of regions can "gently" affect the level of support for constructive actions of the vertical of power and further ensure a high level of solidarity within the Russian society. *Two concluding hypotheses* are identified: *first*, regional socio-cultural modernization is associated with the development degree of their systems of power and management, which , in turn, depend on social organization and self-organization, the hierarchy of groups including people with higher education, and their interest in the modernization process; *second*, the social group of people with higher education represent an electorate with average socio-political activity, which can play an important role in the development of problem situations in regions with different modernization levels and in creation of new models of organizational development and management.

Methods of primary data collection and analysis

The mass representative survey covered four Russian regions: the Moscow Oblast, the Republic of Bashkortostan, the Belgorod Oblast, and the Republic of Kalmykia. The distribution by type of modernization, balance of these regions: the Moscow Oblast – 6 – above average, the Republic of Bashkortostan – 3 – average, the Belgorod Oblast – 2 –below average, the Republic of Kalmykia – 1 – below average (*according to the classification of levels of socio-cultural modernization by N.I. Lapin*). The indices of modernization balance in regions: 0.440/0.389/0.231/0.281 respectively. The Moscow and Belgorod oblasts are located in the Central Federal District, the Republic of Bashkortostan – in the Volga Federal District, the Republic of Kalmykia – in the Southern Federal District [1].

The model of quota sample realization (N=500 for each region) is formed at the intersection of "gender*generation*education" features by weight of the corresponding groups in the 2010 census in Russia (model) and by region (implementation) per 100 people. Each quota corresponds to the weight of the group in the population per 1.000 people with the electoral qualification. According to the research methodology, the respondents' education is characterized as incomplete secondary and lower, general secondary, vocational secondary, incomplete higher, and higher. The distribution of average data as a percentage of the total number of respondents is as follows: 13, 17, 38, 6, 27 [14][1].

[1] Here and further in the text without additional references we use data of sociological research of the Center for Management Sociology and Social Technology at Institute of Sociology of the Russian Academy of Sciences conducted in 2015–2017.

Table 1. Ranked list of regional higher education systems by modernization level of regions and coverage of young people with programs of higher education, 2014 (for Russia as a whole and for four regions of empirical study)

Regions' modernization level	Russia, regions	Coverage of people aged 1725 with programs of higher education (deviation from mean), %	Availability of places at universities/ highly selective institutions, ranks	Affordability, rank	Geographical accessibility, rank
High	Russia	32.9 (0)	–	–	–
	Moscow and the Moscow Oblast	49.2 (+16.3)	2 / 4	29–30	1
Average	Republic of Bashkortostan	27.4 (-5.5)	49 / 20–21	8–9	37
Below average	Belgorod Oblast	36.3 (+3.4)	14 / 52–80	47–48	32–34
Low	Republic of Kalmykia	28.1 (-4.8)	42–43 / 52–80	72	64

Compiled from: Lapin N.I. (Ed.). Belyaeva L.I. et al. *Atlas of modernization in Russia and its regions: socio-economic and socio-cultural trends and problems*. Moscow: Ves' Mir, 2016. 360 p.; Gromov A.D., Platonova D.P., Semenov D.P., Pyrova T.L. *Access to higher education in Russian regions*. Moscow: NIU VShE, 2016. 32 p.

This ratio of values shows a regional increase in the share of respondents with incomplete secondary and lower education (from 10% in the Moscow Oblast to 14% in the Republic of Kalmykia) and a decrease in the share of respondents with higher education (from 33% in the Moscow Oblast to 25% in the Republic of Kalmykia). In the Republic of Bashkortostan there is a relatively large share of respondents with secondary vocational education (44 %) and a smaller share – with secondary general education (13 %).

The situation with the share of young people engaged in higher education programs in the studied regions differs (*Tab. 1*).

Thus, the Moscow Oblast and Belgorod oblasts demonstrate the coverage of young people with places at universities (49.2 and 36.3%, respectively). High coverage of higher education in the Belgorod Oblast, where about 1% of all students study, is explained by a relatively large network of higher education institutions, taking into account the population in the region. In the Belgorod Oblast there are 15 universities and university branches with 53,100 students. In the republics of Kalmykia and Bashkortostan the coverage of higher education is 28.1 and 27.4%, respectively [15].

The results of data validity assessment show that the general structure of the population (N=2002) is characterized by a shift towards more educated people, a decreasing number of people with incomplete secondary or lower education, as well as with general secondary and vocational secondary education. There are insignificant deviations from the sample weight of groups of younger, middle, and older generations taken within group boundaries by sex. The correlation between their specific weights in the general population and in the resulting array is very high: 0.982 for Pearson, 0.980 for Spearman and 0.902 for Kendall at Q=99 %.

Results of empirical research

Assessment of the degree of support for the policy of management authorities and their individual links by people with higher education

At the level of support for governance levels we observe the following hierarchy: Office of the President of the Russian Federation ranks first (35% "for" – 30 "abstained" – 35 "against"); 2nd – administrations of enterprises and organizations (30–35–35); 3rd – the Government of the Russian Federation (27–37–36); 4th – Federation Council of the Russian Federation (24–39–37); 5th – sectoral ministries (23–

39–38); 6-th – State Duma (22–38–39); 7th – regional administrations (22–34–43); and, finally, 8th – administrations of cities and villages (21–32–47). It should be noted that protests among the population grow from place to place, the share of "supporters", "mediators" and "opponents" of authorities is changing. Two circumstances are of particular interest: the significant prevalence of "opponents" of the administration system over its "supporters", as well as a significant weight (up to 39% in some cases) of "undecided" people. This seems to be a significant sign of people's *"mediation behavior" (the term of A.P. Davydov)* [16].

There is empirical evidence that there is a noticeable gap between the level of people's support for the foreign policy of the country's authorities and for solutions to internal socio-economic problems, first of all – raising the standard of living and the living conditions in regions with different modernization types and balance levels. The opinions of respondents from different regions vary in assessing the need to change the system of administration: one third were "for", one third – "against" and more than a third (about 40 %) – abstained or did not make a certain decision.

At the level of efficiency assessments of the highest level of administration we can observe the distribution shifted towards the reformist group of votes, which requires changes in the work of the country's administration. The greatest shift is observed in terms of the work of the President's Office (66% of reformist opinions) and the Russian Government (52%). As for the work of the State Duma and the Federation Council, the extreme positions are balanced by medium orientation comparable to them, which implies the presence of different points of view on the effectiveness of their work.

At the level assessing the efficiency of sectoral ministries and the office of the Governor of the republic, krai, or region, there are shifted distributions towards only conservative or only reformist orientations. Moderate orientation prevails.

There is no shift not have a sloping character in one direction or another to assess The assessments of efficiency of city or village administration do not shift towards any direction, along with the efficiency of local government or administration of an enterprise (institutions, organizations). It is not necessary to change the operation of the mentioned administration levels in the estimates.

At the level of assessing the shortcomings of the management system, there is a significant number of respondents medium and highly concerned about significant aspects of the national system of management in terms of "focus on reporting to a superior, rather than addressing the problem" (55%), "the transformation of managers into a clan" (50%), "the use of organization's resources for personal purposes" (51%), "poor feedback, lack of control over decision implementation" (48%), and "inappropriate enthusiasm for Western management" (42%).

At the level of operation of links of administration bodies, there are distribution shifts towards satisfaction in terms of "work of culture institutions" (57%), "work of preschool institutions" (55%), "organization and support for school education" (50%), "professional education, professional development" (49%). There is mainly average and positive satisfaction with the signs of "availability of electronic information on the work of authorities"(39–40%), "strategic development of a city (settlement)" (38-38%). However, there are interregional differences in respondents" estimates of the last two indicators. Thus, in the Moscow and Belgorod oblasts there are higher estimates of availability of electronic information on the work of authorities (51 and 46%, respectively). In the Belgorod Oblast, the assessments of strategic regional development is higher (56%).

Table 2. Ranked list of regional labor markets by modernization level and employment of people with higher education in regions' structures, 2015 (for Russia as a whole and for four regions of empirical research)

Regions' modernization level	Russia, regions	Working population with higher education in region's structures (deviation from mean), %	Russia's rank by number of students per 10,000 people, rank
High	Russia	33.0 (0)	–
	Moscow the Moscow Oblast	47.8 (+14.8) 43.6 (+10.6)	1 81
Average	Republic of Bashkortostan	26.8 (-6.2)	39
Below average	Belgorod Oblast	30.4 (-2.6)	18
Low	Republic of Kalmykia	35.6 (+2.6)	30

Compiled from: Lapin N.I. (Ed.). Belyaeva L.I. et al. *Atlas of modernization in Russia and its regions: socio-economic and socio-cultural trends and problems*. Moscow: Ves' Mir, 2016. 360 p.; *Russian regions. Socio-economic indicators. 2016: statistical book*. Moscow: Rosstat, 2016. 1326 p.

Experience in empirical research indicates that people with higher education strongly understand the alienation of a significant number of leaders from executive bodies, frequent substitution of management with control or collusion, signs of corrupton in the actions of authorities, etc. There is a clear prevalence in public opinion of respondents of this group of power component in the vertical of power, and the administrative-command nature of the management system, which does not contribute to the socio-cultural modernization of Russia and its regions.

Analysis of socio-economic indicators of regional development taking into account the parameter of the working population with higher education

Rosstat data (*Table 2*) state that there is a significant share of the working population with higher education in the regional economic structures: from 26.8% in the Republic of Bashkortostan to 43.6% in the Moscow Oblast (with 33.0% in Russia as a whole). In absolute terms, this is 471.6 and 1339.0 thousand people, respectively. However, in the whole country there is a severe shortage of specialists in science and technology (54 thousand people). Analysts of *Korn Ferry Hay Group,* the largest international consulting management company, estimate the loss of the Russian economy from lack of highly educated professionals worth 300 billion dollars for the next 12 years [17].

We believe that in regions under review do not fully reveal their potential of people with higher education in addressing the modernization issues. First of all, we are talking about the Republic of Kalmykia which achieved the first type of modernization with a balance level below average at 35.6% of the working population with higher education. Also, the Belgorod Oblast which ranks 18th (relatively high) in Russia in terms of the number of students per 10,000 people and with coverage of young people with programs od higher education above average, has a similar indicator of 30.4%, which demonstrates low rates of civilizational development (2 – below average).

Conclusion. The scientific novelty and practical use of the research project consists in the fact that it substantiates the relevance of a new stage of institutional regulation of relations between society and the state on the basis of taking into account the emerging trends of socio-cultural modernization in the regions. We place special emphasis on the willingness of the authorities and of all segments of society to participate in this process; at that the major role should be played by the social group that is well-trained from the scientific and educational perspective. We believe that today's dominant model of social development based on economic growth and centralized management should be replaced by a model of "socialization" of power and management

from the standpoint of a full-fledged use of the institutional and regulatory component. In the model, the ability of citizens to analyze critically the surrounding reality becomes particularly important; it allows them to develop effective solutions to problems in key areas of their lives on their own [18; 19; 20].

This vision fits into the *"scenario for scientific and technological leadership of Russia" (the term by N.I. Lapin)*, the implementation of which requires the concentration of resources on obtaining new scientific results. At present, it is necessary to ensure the mutual influence of science and society by involving the latter in the formation of requests for research findings, development of network forms of organization of scientific, scientific, technological and innovative practices. As we can see, the new Strategy for scientific and technological development of the Russian Federation aims to form an integral national innovation system with the involvement of local socio-cultural communities. It is necessary to provide the "soft" and comprehensive state regulation of modernization processes. Taking into consideration Russia's long experience, we should emphasize that regulation carried out only top down cannot be effective. But the twofold regulation that is carried out "top down" on the part of federal authorities, and "bottom up" on the part of regional authorities can become quite effective. Constructive cooperation of the initiatives "top down and bottom up" will produce a synergistic effect of the transition of the majority of regions in the second stage of modernization – the information stage [9].

The hypotheses formulated were generally confirmed in the course of the empirical study we conducted. The results show that the social group with higher education is able to influence the growth of social and civic subjectivity and the level of people's support for the actions of the vertical of power. The problem of the influence of education on the mechanisms that provide a high level of solidarity of the Russian society in solving the problems of socio-cultural modernization of the regions is not inferior to the more general problems of interaction between the government and civil society. It is necessary to point out the significant share of this group, which allows us to classify its members as the "undecided" ("mediators"). It is clear that a relatively small part of these "mediators" (according to experts, about 10%) is enough to support one or the other of the opposing sides in order to change the situation in the country radically.

An important result of the study is the adjustment of the mass survey tools, as well as the planning of a similar study on a more representative sample of regions.

References

1. Lapin N.I. (Ed.). Belyaeva L.I. et al. *Atlas modernizatsii Rossii i ee regionov: sotsioekonomicheskie i sotsiokul'turnye tendentsii i problemy* [Atlas of modernization in Russia and its regions: socio-economic and socio-cultural trends and problems]. Moscow: Ves' Mir, 2016. 360 p.
2. Gontmakher E.Sh. Russian executive power: real and required. In: *Gosudarstvo. Obshchestvo. Upravlenie: sb. statey* [State. Society. Power: collection of articles]. Moscow: Al'pina Pablisher, 2013. 271 p.
3. Akhiezer A.P. *Rossiya: kritika istoricheskogo opyta* [Russia: the criticism of historical experience]. Moscow: Novyy khronograf, 2008. 938 p.
4. Gorshkov M.K., Trofimova I.N. Education as a factor and resource of civic participation and democratic development of society. *Sotsiologicheskaya nauka i sotsial'naya praktika=Sociological Science and Social Practice*, 2016, no. 1, pp. 5-19. DOI: 10.19181/snsp.2016.4.1.4144. (In Russian).

5. Tikhonov A.V. (Ed.). et al. *Rossiya: reformirovanie vlastno-upravlencheskoy vertikali v kontekste problem sotsiokul'turnoy modernizatsii regionov* [Russia: reforming the vertical of power amid regions' socio-cultural modernization]. Moscow: FNISTs RAN, 2017. 432 p.
6. Tikhonov A.V. The problem with reforming our country's system of government: addition to the history of developing a research program.. *Vestnik Instituta sotsiologii=Bulletin of the Institute of Sociology*, 2018, no. 2 (25), pp. 10-26. DOI: 10.19181/vipp.2018.25.2.506. (In Russian).
7. Lapin N.I. Issues of shaping the concept and human measures for the strategy of step-by-step modernization in Russia and its regions. *Sotsiologicheskie issledovaniya=Sociological Studies*, 2014, no. 7, pp. 8-19. (In Russian).
8. Tikhonov A.V., Lenkov R.V. The role of institute of higher education in solving the issues of socio-cultural modernization of region. *Economic and Social Changes: Facts, Trends, Forecast*, 2017, vol. 10, no. 5, pp. 158-168. DOI: 10.15838/esc/2017.5.53.11
9. Tikhonov A.V. *Rossiya i mir: global'nye vyzovy i strategii sotsiokul'turnoy modernizatsii: materialy Mezhdunar. nauch.-prakt. Konf* [Russian and the world: global challenges and strategies for socio-cultural modernization. Material of the international research-to-practice conference]. Moscow: FNISTs RAN, 2017. 760 pp.
10. *"Russian Federation", in Education at a Glance 2017: OECD Indicator*. Paris: OECD Publishing, 2017. Available at: https://dx.doi.org/10.1787/eag-2017-81-en (accessed: 19 December, 2018).
11. Trow M. Problems in the transition from elite to mass higher education. In: *Policies for Higher Education*. Paris: OECD, 1974. Pp. 51-101.
12. Dewey J. *Democracy and Education: An Introduction to the Philosophy of Education*. Los Angeles: Indo-European Publ., 2011. 421 p.
13. Aksenova O.V. *Paradigma sotsial'nogo deystviya: professionaly v rossiyskoy modernizatsii* [The paradigm of social action: experts in Russian modernization]. Moscow: IS RAN, 2016. 304 p.
14. Tikhonov A.V. (Ed.). Akimkin E.M. et al. *Problemy reformirovaniya vlastno-upravlencheskoy vertikali v kontekste protsessov sotsiokul'turnoy modernizatsii regionov* [Problems in reforming the vertical of power amid regions' socio-cultural modernization]. Moscow: IS RAN, 2016. 348 p.
15. Gromov A.D., Platonova D.P., Semenov D.P., Pyrova T.L. *Dostupnost' vysshego obrazovaniya v regionakh Rossii* [Access to higher education in Russian regions]. Moscow: NIU VShE, 2016. 32 p.
16. Davydov, A.P. The problem of mediation in the European culture: Russia and the West. *Obshchestvennye nauki i sovremennost'=Social Sciences and Modernity*, 2000, no. 6, pp. 82-93. (In Russian).
17. Rubchenko M. *A vas ya poproshu ostat'sya. Komu v Rossii ne grozit bezrabotitsa* [I'd rather you stay. Who in Russia is in no danger of losing a job]. Moscow: RIA Novosti, 2018. Available at: https://ria.ru/economy/20180627/1523443635.html, svobodnyy.
18. Mityagina E.V., Bushkova-Shiklina E.V. Sistema chelovecheskogo potentsiala: kontseptualizatsiya ponyatiya. *Filosofiya i sotsiologiya=Phylosophy and Sociology*, 2010, vol. 3, no. 1, pp. 15-20. (In Russian).
19. Tikhonova N.E. *Sotsial'naya stratifikatsiya v sovremennoy Rossii: opyt empiricheskogo analiza* [Social stratification in modern Russia: experience of empirical analysis]. Moscow: IS RAN, 2007. 320 p.
20. Nussbaum M.C. *Not for Profit: Why Democracy Needs the Humanitiepp*. Princeton, NJ: Princeton University Press, 2012. 168 p.

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Social investment as a tool for modernization of the demographic development in the Far East

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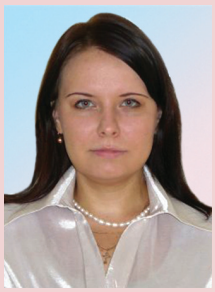

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Abstract. The experience of domestic and foreign studies demonstrates a growth of interest in the problem of rational distribution of public financial resources as social investments in human capital development, which is described in our paper with the help of demographic development parameters; this corresponds to the modern tradition of considering the relationship of economic and social dynamics in extreme regions through the prism of demographic changes. In this context, the perspective estimates of public spending on the social sphere in relation to the Far East, a region that was proclaimed a strategic priority of Russia in the 21st century, are of particular value. The goal of our study is to develop and test the tools that allow us to quantify the scale and structure of public spending on education, healthcare and social policy, and that promote the achievement of the target values set out in the concept of demographic policy of the Far East for the period up to 2025. Using the model constructions built on the basis of

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dynamic data for 2000–2017, we obtain the estimates of the impact of social investment on demographic development parameters on the example of Khabarovsk Krai. In the framework of traditional approach to the quantitative analysis of regression dependences we also use distributed lag models that take into consideration cumulative effects. We find out that the growth of public spending and the increase in social investment in the economy of the Far East do not lead to positive changes in demographic indicators. The region continues to lose its population despite high unit costs and social support. We reveal that large-scale public expenditures influence demographic indicators in different ways, depending on the period of "lagged effect". We substantiate an optimal structure of distribution of social investments, which can ensure the achievement of target indicators of demographic development in Khabarovsk Krai, proceeding from objective conditions and potential opportunities of the region. Our findings reflect the real situation adequately and can be used to assess the effectiveness of state demographic and social policy measures. A promising direction for further research can be the adaptation of the proposed tools and obtaining integral estimates based on an expanded set of factors describing the system of demographic and socio-economic processes in the Far East.

Key words: demography, social sphere, budget expenditures, social investments, Far East.

Introduction

In theory, the act of spending budget funds means that the state carries out a market exchange of tax revenues for relevant social benefits, which provide the necessary vector of social and economic progress in society [1–5]. At the same time, the costs of producers of socially significant services are covered by revenues from the relevant budget allocations and from individual consumer fees (if there are any) [6]. The state's expenses in this case, according to A.Ya. Rubinshtein, are considered "not as gratuitous aid from a patron, but as social investment in human capital" [7]. This position is consistent with the views of other authors. For example, European scientists C. Lennartz, R. Ronald [8], B. Nolan [9] note that in the last decade social investment is again considered as an integral part of the policy of the "welfare states". Until the middle of the 2000s in North-Western Europe the development of social policy was in line with reduction, deregulation and rejection of traditional forms of social protection as a function of the state (N. Gilbert [10], R. Starke [11]), and social policy focused attention on particular issues to promote employment, social benefits and support public pension systems (A. Hemerijck [12]). As for the second decade of the 21st century, it was marked by the return of countries to the expansion of public social spending (J. Hudson, S. Kühner [13]). Despite the forecasts of researchers (P. Pierson [14]) on the fact that European countries copy the U.S. low-cost social policy model that limits the opportunities for providing social support to the general population, in fact, the function of the state changed from providing assistance mainly to the poor to the formation of the national "social investment strategies" (P. Taylor-Gooby, J.M. Gumy, A. Otto [15]). In the framework of such strategies the state directs budgetary funds not only to the solution of current tasks, for example, protection of citizens in adverse social or economic situations, but also forms strategic vectors of budget investments in the modernization of human capital through increased access to social benefits. The estimated effect is expected in the form of higher national educational level, saturation of labor markets through

the acquisition of additional professional skills by citizens and addressing housing issues, distribution of the social standards of healthy lifestyles, etc. Researchers (G. Esping-Andersen [16], N. Morel, B. Parlier, J. Palme [17], F. Vandenbroucke, K. Vleminckx [18]) say that one of the main effects of the implementation of social investment strategies is the development of a mechanism that reduces the possibility of material and social risks in society and the economy; this remains relevant for the Russian reality, as well.

Since domestic and foreign researchers interpret the concept of social investment in different ways – as a "form of corporate social responsibility", and "as an investment of financial resources in addressing social problems with the expectation to gain profit from invested funds" [19], we consider social investment solely as the process of spending budget funds on the development of social spheres of economic activity, ensuring the growth of human capital. Indicators of the growth of human capital [20] are the parameters of demographic development, the change of which demonstrates the potential impact of financial instruments on social dynamics.

The search for relationships between financial flows and socio-demographic parameters of the development of countries and regions remains a permanent research task. Demographic indicators are usually considered as part of other indicators of territorial socio-economic development; and the change in the indicators is estimated depending on the size of public spending. For example, L. Sinevičienė [21] investigates the relationship between the expenditure of the European Union countries and the economic dynamics of their sustainable development (using statistical methods: hierarchical and cluster analysis, descriptive statistics, correlation and regression analysis) and finds out that public spending, the share of which in the national and regional budgets is considerable and which is directed to social assistance and healthcare, has the positive impact on the socio-economic development of territories. Perhaps, therefore, the indicators of population health and factors that reduce mortality become the subject of attention of scientists. A group of researchers (S. Budhdeo, J. Watkins, R. Atun, C. Williams, T. Zeltner, M. Maruthappu [22]) who assessed the relationship between European Union expenditure on healthcare[1] and changes in mortality rates[2] based on multivariate regression analysis, prove that the reduction of state expenditure on health has a direct impact on the growth of mortality, increasing the negative effect over time to a greater extent for the adult population. Still earlier, J. Nixon and P. Ulmann [23] used panel data, econometric analysis and a model with fixed effects and demonstrated that the increase in healthcare expenditures has the maximum effect on reducing infant mortality, but has virtually no effect on the change in life expectancy. This affects the age structure of the population and the opportunities for human capital growth, which is important for the countries of the Old and New World. Given the demographic shifts in the population structure and the growing need for social support of the older generations, researchers from the University of Chicago (J.B. Shoven, M. Topper, D.A. Wise [24]) estimated that the implementation of social programs in the United States requires about 40% of expenditures of the consolidated budget of the country. Countries with high fertility and the predominance of young generations find

[1] Healthcare expenditures are accounted for in three ways: as a share of total government expenditures, as a share of gross domestic product, and as expenditures measured by purchasing power parity per capita.

[2] Five types of mortality are considered: neonatal, post-neonatal, lethal in children under five years of age, in adult men, in adult women.

it important to take into account not only the impact of public spending on health, but also the impact of spending on education, culture, social infrastructure, etc. Researchers from India (Pranab Kumar Das and Saibal Kar [25]), the second most populous country in the world, assess the role of fiscal policy of the state as a socially necessary intervention in the processes of redistribution of finance against the background of progressive population growth, focusing on endogenous growth models. They distinguish two different effects of social investment: increased health spending has a positive impact on the quality of the working population and increases productivity, and higher spending on education and training diverts workers from the labor market in a country with high demand for unskilled labor and employment opportunities in the informal sector. The above conclusions are supplemented by research findings of Russian scientists linking economic and financial indicators to social and demographic results of the development of the country and regions [26–29].

Academician A.G. Aganbegyan notes that the reduction in budget expenditures on education and healthcare, the narrowing of social assistance channels, coupled with the general economic instability, stimulate the population to refuse to give birth to children [30, 31]. Despite the implementation of national projects and significant social investments, Russia is far from achieving the goals of the demographic development strategy[3].

Thus, obtaining reliable estimates of the effects of the state budget policy aimed at population growth remains a very important task both in theory and in practice.

Identification and quantitative analysis of changes in spatial and sectoral indicators induced by government efforts through financial flows allow us to compare the goals and results and assess the effectiveness of the measures taken, and if necessary, determine possible directions for their adjustment. The distribution of social investments is of particular importance for the Far East[4] of Russia, since it is a macroregion, which is currently the object of close attention of the national government.

The strategic priority of the state regional policy in the Far East is the advanced development and creation of comfortable conditions for the life and activity of the population in the macroregion that has its own specifics of geographical location and geopolitical importance for the country[5]. Finding a solution to the set ambitious tasks for the accelerated development of the territory is faced with restrictions that constrain the pace of achievement of exogenously set parameters of socio-economic development [32–34]. The most significant barriers include demographic parameters, according to which the Far East has consistently ranked first among the outsider regions for more than two decades[6]. The area of 36% of the total territory of Russia is home to 4.2% of the country's population, 3/4 of which is concentrated in the southern zone along the Trans-Siberian Railway. The value of the birth rate (1.858) does not ensure the reproduction of the local population, and "the

[3] On approving the Concept for demographic policy of the Russian Federation for the period till 2025: Decree 1351 of the President of the Russian Federation of October 9, 2007.

[4] In our paper, the Far East of Russia is considered within the borders of the Far Eastern Federal District, which includes nine constituent entities of the Russian Federation (Republic of Sakha (Yakutia), Kamchatka Krai, Primorsky Krai, Khabarovsk Krai, Amur Oblast, Magadan Oblast, Sakhalin Oblast, Jewish Autonomous Oblast, Chukotka Autonomous Okrug).

[5] State program of the Russian Federation "Socio-economic development of the Far East and the Baikal region": Resolution 308 of the Government of the Russian Federation of April 15, 2014 (as amended on March 30, 2017).

[6] *Demographic Yearbook of Russia*. Rosstat, 2017. Available at: http://www. gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1137674209312 (accessed: 16.08.2018).

ratio of the number of deaths to the number of births exceeds the all-Russian figure by 2.1 times, which indicates the unfavorable demographic development of the region against the background of nationwide indicators" [35, p. 39].

The negative dynamics of the natural movement is aggravated by the large-scale outflow of the population from the territory of the macroregion, which in 1990–2017 lost almost a quarter of its inhabitants, including a significant part of highly skilled labor resources along with the younger generation of potential residents of the Far East. Among the main factors that motivating people to leave are the high cost of living and low wages along with dissatisfaction with the quality and availability of social services [36]. At the same time, it is the consumption of social benefits that contributes to the expanded reproduction of human capital, and their accessibility provides the necessary level of social security [37] and social mobility, which, according to some authors (Hickey [38], Barrientos [39], Benabou [40]), is consistent with the principles of justice and is an integral attribute of the social state or the welfare state.

Russia's long-term attempts to stop the rapid decline in the number of inhabitants of the Far East are largely associated with the use of traditional ways of solving problems. Such methods include institutional and organizational, financial: state budget expenditures on social sphere development of the regional economy (education, culture, cinematography, healthcare, social policy, physical culture and sport, mass media) or social investment. There is no doubt that if we want to reverse the negative trend and to reach a steady positive dynamics of natural and migration movements, then it necessary, for example, to have high-quality and well-functioning social infrastructure [41] and the appropriate personnel to provide the conditions for demographic reproduction and migration inflow processes; all this requires significant financial resources.

For quite a long period of time, within the framework of institutional reforms taking place in the economy of the country as a whole and in the macroregion in particular, there was a purposeful saturation with social investments[7] from the budgets, which should contribute to the rapid modernization of the social sphere and its transition to innovative development. For 2000–2017, the share of expenditures for these purposes from the total expenditures of all consolidated budgets of the subjects of the Far East increased from 40.5% in 2000 to 55.6% in 2017; nominally, it increased in 16 times (from 27.8 to 442.9 billion rubles), accordingly) *(Tab. 1)*.

The 2017 indicators in the subjects of the Far Eastern Federal District vary from 36.4% in Chukotka Autonomous Okrug to 65.4% in the Jewish Autonomous Oblast; this is due to the heterogeneity of the structure of the relevant consolidated budgets and depends on the amount of funds the budgets receive, as well as on structural priorities. The ratios of social investment to gross regional product are no less diverse. Thus, according to this indicator, the leader is Kamchatka Krai (18.9% of GRP), and the outsiders are the Sakhalin Oblast (9.0%) and Primorsky Krai (8.9%). But if in the case of the leaders it is associated with high costs of production and provision of social benefits, then in the case of the outsiders – with the presence of high-yield economic sectors. Nevertheless, almost all the territories of the Far East allocate more than 50% of their expenses to the social sector of the economy (with the exception of Chukotka Autonomous Okrug and in some periods – the Sakhalin

[7] In accordance with the budget legislation and the methodology of Rosstat, expenses are taken into account under the item "social and cultural activities".

Table 1. Proportion of social investments in the structure of consolidated budgets and GRP of constituent entities of the Far Eastern Federal District, %

Region	Consolidated budget			GRP		
	2000	2010	2017	2000	2010	2016*
Russian Federation	39.0	54.9	59.7	7.0	9.7	8.7
Far Eastern Federal District	40.5	50.1	55.6	9.0	11.3	11.3
Republic of Sakha (Yakutia)	42.1	55.7	55.8	12.5	14.6	13.2
Kamchatka Krai	42.4	48.1	51.6	10.6	19.9	18.9
Primorsky Krai	40.2	37.9	59.3	6.7	8.4	8.9
Khabarovsk Krai	37.6	61.0	63.6	6.8	12.3	10.8
Amur Oblast	44.7	59.2	59.3	8.5	15.2	11.7
Magadan Oblast	35.2	50.5	50.8	10.3	16.9	12.8
Sakhalin Oblast	40.8	46.9	50.7	7.0	6.1	9.0
Jewish Autonomous Oblast	52.9	56.3	65.4	13.7	16.4	16.2
Chukchi Autonomous Okrug	29.9	35.2	36.4	15.5	15.4	15.6

* Data as of 2017 are not available.

Calculated with the use of: *Regions of Russia, Socio-Economic Indicators: Statistics Collection 2000–2017*. Rosstat. Available at: http://www.gks.ru/ (accessed: 20.07.2018); Reports on the execution of the consolidated budgets of the RF subjects in 2017. *Official website of the Federal Treasury of the Russian Federation*. Available at: http://www.roskazna.ru/ (accessed: 24.09.2018).

Oblast, where the expenditures on the national economy prevail). If we take into account the housing and utilities expenses, then we see that 2/3 of all expenditures from the consolidated budgets have had and continue to have a social orientation.

Taking into account price inflation, as well as territorial differences in the potential and scale of regional economies, we find it of interest to compare not the nominal, but the real expenditures of the consolidated budgets of the macroregion for social purposes per capita. The comparison of the estimates shows that according to the data for 2017 alone, the six leaders according to real (in the 2000 prices) social expenditures per capita include Chukotka Autonomous Okrug (45.8 thousand rubles per capita per year), Yamalo-Nenets Autonomous Okrug (36.0), Republic of Sakha (Yakutia) (37.5), Sakhalin Oblast (27.1), Kamchatka Krai (23.4), and Magadan Oblast (23.3). For comparison: on average in Russia, social spending from the consolidated budgets of the territories in 2017 amounted to only 8.7 thousand rubles per capita in the prices of 2000. That is, five of the nine regions of the Far East located in the North-Eastern part of the macroregion, make the highest specific social investments and retain these positions almost throughout the entire analyzed period, which is due to the action of objective price-raising factors in the regions of the North and localities equated to them; at the same time, it is a consequence of the spatial features of the distribution of the small population in numerous settlements, many of which are located in remote and inaccessible areas. The latter makes it necessary for the regions to maintain an extensive and large-scale social infrastructure. Among the regions of the southern zone of the Far East, only Khabarovsk Krai is 10% ahead of the average Russian figure in terms of specific social spending per capita. The real expenditures of the budgets of Primorsky Krai and the Amur Oblast reach only 90% of the national average for Russia, and the traditional outsider – the Jewish Autonomous Oblast – reaches only 88%. The reason for this lag, in addition to the common problems concerning budget replenishment, is the lack of local initiative and the indifference of the authorities of these constituent entities

Table 2. Planned values of demographic development indicators in Khabarovsk Krai until 2025

Indicator	2017	2018	2019	2020	2025
Population (thousand people)	1335	1340	1350	1365	1464
Total fertility rate (number of children born to a woman of reproductive age: 15–49 years)	1.80	1.85	1.87	1.90	2.05
Mortality from all causes (cases per one thousand people)	12.7	12.3	11.9	11.5	10.2
Life expectancy, years	69.3	70.2	71.2	72.2	76.3
Source: our compilation with the use of the concept for demographic policy of the Far East for the period up to 2025: Resolution 1298-r of the Government of the Russian Federation of June 20, 2017.					

toward finding the opportunities to raise funds for the support and modernization of socially important sectors of the regional economy.

In general, for 18 years (2000–2017), the consolidated budgets of the subjects of the Far Eastern Federal District invested almost four trillion rubles in the social sphere. Despite this, the movement of the population of the macroregion, as we already showed above, has a negative trend. In this situation, a natural question arises: do social investments (budget expenditures) have an impact on demographic processes in the Far East?

In 2017, the Russian Government adopted the "Concept for demographic policy of the Far East for the period up to 2025" (hereinafter – the Concept[8]); it was the next step toward changing the current situation and forming the resources to promote accelerated economic development o in the federal district.

This document is a description of government initiatives aimed at stabilizing and increasing the number of population, with a quantitative assessment of the results of the initiatives in the context of individual indicators for each of the subjects of the Russian Federation that are part of the Far Eastern Federal District. In particular, in Khabarovsk Krai by 2025 it is expected that the population will increase to 1,464 thousand people, the total fertility rate – to 2.05, mortality from all causes will decrease to 10.2 cases per one thousand people, and life expectancy will reach 76.3 years *(Tab. 2)*.

At the same time, despite the algorithmic nature of the Concept, it lacks numerical measurements of the drivers of positive demographic dynamics in the macroregion. For example, there are no parameters of financial support, but only streamlined wording about the sources of funding (from the state budget to charitable and extra-budgetary funds). The amount of public expenditures (regional consolidated budget expenditures) necessary to achieve the targets remains unknown although it is the budget expenditures on the social sphere that are considered as the main "regulator" of the demographic development of the Far Eastern macroregion.

Since the preliminary results show that the demographic trend (including both natural and mechanical components) is not related much to the growth of budget expenditures on the social sphere, it becomes necessary to find statistically significant model structures as applied to the economy of a particular region, including those built taking into account the effects that are "delayed in time".

The difficulties of quantitative analysis of the intermediate link represented by drivers of demographic dynamics in the transitive connection of state intentions with the results of their implementation are mainly associated with the lack of tools that would help formalize the subject of the study (the influence of certain factors on regional demographic dynamics) and obtain estimates of its components in the future.

[8] The concept for demographic policy of the Far East for the period up to 2025: Resolution 1298-r of the Government of the Russian Federation of June 20, 2017.

In this case, the "reliability of formalization" involves taking into account the main features of the formation and flow of the parameters and processes under consideration; this, in turn, minimizes the degree of entropy of forecast estimates.

Methodological aspects of the study and the initial data. The course of the research process, which determines the relationship between the size of public funding and the parameters of regional demographic dynamics, is presented by the following steps:

1) the features of dependencies between the parameters of demographic development of the region and the social expenditures of the region's consolidated budget are revealed;

2) the specifications of the above dependencies are considered using economic and mathematical analysis;

3) the structures designed are evaluated;

4) the volume and structure of the state expenses necessary for achievement of target values of demographic development parameters in the region till 2025 are estimated.

Based on the formulation of the research problem, the above algorithm can be applied to the territory whose operations on the formation and expenditure of funds are a structural element of the budget system of the Russian Federation. In other words, any unit of administrative-territorial division of the Russian Federation or their totality can be considered as a region.

Within the framework of our paper, all the calculations are carried out on the example of Khabarovsk Krai. The choice of this subject of the Russian Federation is explained by the presence of geographical, economic, social, and demographic characteristics typical of the entire population of Far Eastern subjects of the Russian Federation [42]. The corresponding circumstance allows us to consider the region as a model region.

The array of demographic development parameters includes four elements: population size, birth rate, death rate, and life expectancy.

Expenditures of the consolidated budget of the Russian Federation on the social sphere in our calculations are adjusted to the population size and are presented in the form of four indicators (one total and three of its components): expenditures on social and cultural activities, healthcare, education, and social policy per capita.

The period under study is 26 years and is divided into two segments: 2000–2017 – the "base", which is used to identify, formalize and analyze quantitatively the dependencies; 2018–2025 – "prospect" – the time range, for the points of which, equidistant for one year, the values of the effective signs of previously identified dependencies are forecasted.

In order to ensure the comparability of the data on the time period under consideration, all cost indicators are translated into the prices of a single year (2000).

The information base of our study is the official materials of the Federal Treasury[9], the Federal State Statistics Service[10], and a set of target indicators contained in the Concept[11].

The first two of the above steps that determine the course of the research process are "universal" in terms of "application objects". In other words, their implementation does not depend on the scale, administrative status and other characteristics of the region under study.

Step 1. Thus, it is obvious that each of the parameters of people's life in any territory, at least, appears to be a functional dependence on two components: the first component is formed under the influence of the external

[9] http:// roskazna.ru/

[10] http://www.gks.ru

[11] The concept for demographic policy of the Far East for the period up to 2025: Resolution 1298-r of the Government of the Russian Federation of June 20, 2017.

environment (including state policy measures), and the second component is formed under the influence of internal (subjective) motivations (aspirations, beliefs, etc.) and personal characteristics (health groups, heredity, etc.). As a result, in order to minimize the degree of entropy of the results obtained, the specifications of the dependencies between demographic development parameters of the region and the expenses of the consolidated budget of the latter should take into account the actions and other factors, in addition to these components *(the first feature of the dependencies between demographic development parameters of the region and consolidated budget expenditures of the latter on the social sphere)*.

Since the objectives of spending consolidated budget funds of the region on the social sphere are long-term (expenditures made in the current year will affect the demographic indicators within a certain time interval), the next condition for the successful implementation of step 1 is to take into account the time lags and cumulative effects of the impact of the relevant social investments on demographic parameters. In other words, the required specifications of the dependencies between the indicators under consideration should assume the presence of the values of the independent variable for several consecutive moments of time *(the second feature of the dependencies between demographic development parameters of the region and consolidated budget expenditures of the latter on the social sphere)*.

Step 2. It is possible to register the above mentioned conditions of formalization of demographic dynamics (step 2) by using econometric modeling methods. The models used in this case are dynamic, they are called distributed lag models. The general specification of the latter is presented in (1):

$$y_t = \mathrm{a} + b_0 x_t + b_1 x_{t-1} + b_2 x_{t-2} + \\ + b_3 x_{t-3} + \cdots \quad (1)$$

where y –demographic development parameters of the subject of the Russian Federation; x – expenditures of the consolidated budget of the subject of the Russian Federation; t – time.

The interpretation of the economic meaning of the coefficient a is associated with the assessment of the impact of all exogenous variables (the variables that are different from those present in the model) on the resulting feature. The corresponding interpretation in our paper allows us to take into account the first feature of the relationship between the demographic development parameters of the subject of the Russian Federation and the expenditures of its consolidated budget on the social sphere.

The presence of an infinite lag in the model ($t \to \infty$) means, first, the availability of opportunities to identify and assess trends and cumulative effects of public spending on regional demographic dynamics (the second feature of dependencies); second, it increases the objectivity of the study, allowing us, without introducing expert assumptions about the time "horizon" of the effectiveness of public policy measures, to identify the latter.

The value of the b_i coefficient is interpreted as a change in the average value of the demographic development parameter of the region at a single change in the volume of public spending on the social sphere at the *i-th* time. The tendency of the coefficient values to zero determines the time "horizon" of the influence of public spending on the demographic dynamics of the region.

Quantitative analysis of coefficients a and b_i is carried out on the basis of retrospective data on the dynamics of public expenditures and demographic indicators for the 2000–2017 period.

Estimates of the impact of budget expenditures on demographic indicators are determined by the formula (2). The upper index

t is given by the length of the time interval under consideration

$$k_i = \frac{b_i}{\sum_0^t b_i}. \quad (2)$$

The summation of b_i and k_i for successive moments of time allows us to get an idea of the cumulative effects of government spending on the demographic dynamics of the region.

Step 3. The simultaneous presence in the model (1) of the values of the same variable, represented by relatively equidistant moments of time, causes the problem of multicollinearity. This circumstance makes it impossible to estimate the coefficients of the model traditionally – using the least squares method – without prior special transformations. One of the latter is the Koyck transformation based on the geometric progression method [43].

We suggest that the degree of correlation between the demographic dynamics of the region and public spending on the social sphere decreases with the increase in the time span between the moment when the latter were carried out and the moment under cosideration (3):

$$b_i = b_0\lambda^i,\ i = 0..\infty,\ 0 < \lambda < 1. \quad (3)$$

Substituting the values of b_i in (1), we obtain the following model (4):

$$y_t = \mathrm{a} + b_0x_t + b_0\lambda x_{t-1} + b_0\lambda^2 x_{t-2} + b_0\lambda^3 x_{t-3} + \cdots \quad (4)$$

If build a similar dependency for the previous point in time, multiply it by the parameter λ and subtract this dependency from the formula (4) term-by-term, we obtain the following autoregression model (5):

$$y_t = \mathrm{a}(1-\lambda) + b_0x_t + \lambda y_{t-1}. \quad (5)$$

The coefficients of the equation (5) are estimated on the basis of the generalized least squares method using specialized software for PC – econometric package Eviews 5.0. The obtained estimates allow us to find numerical expressions for the coefficients of the model (1) by organizing the reverse of the transformations we have carried out: substitution of b_0 and λ in (3) helps calculate b_i; the coefficient *a* is calculated from the expression $a(1-\lambda)$, present in (5), provided that the value λ is known, after which it is sent directly from (5) to (1).

Step 4. Quantitative identification of the volume and structure of public expenditures that ensure the achievement of the target values of demographic development indicators in the region until 2025 (step 4) is carried out by organizing an iterative process of recursive calculations (6).

$$x_t = \frac{y_t - (\mathrm{a} + b_1x_{t-1} + b_2x_{t-2} + b_3x_{t-3} + \cdots)}{b_0}. \quad (6)$$

In this case, y_t – perspective values of demographic parameters of Khabarovsk Krai specified in the Concept for 2018–2025, and x_{t-1}, x_{t-2}, x_{t-3}, etc. – the amounts of public spending directed to the social sphere of the region in 2000–2024. In this case the values of x_t at *t*=2018...2025 are calculated sequentially: the effective feature in the dependency (6) built for the moment of time t becomes a factor variable in the "transition" to the moment of time *t*+1.

The maximum length of the lag under the influence of budget funds on each parameter of demographic development of the region is determined based on the values of coefficients b_i in the model (1) and the significance test of the latter, adopted in the study.

Research results and discussion. The quantitative analysis of the coefficients in the models of type (1) constructed for individual

parameters of demographic development for Khabarovsk Krai allowed us to obtain the following results *(Tab. 3)*.

It should be noted that the stopping of the iterative process of calculating the coefficients at one the same step (eighth step: estimation of the values of the coefficients b_0–b_7) for all parameters of demographic development and directions of public expenditures is due solely to the desire of the authors to work with a single time "horizon". This circumstance is the reason for the artificial introduction of the latter (the specified number of model coefficients (1) corresponds to the period of implementation of the Concept – 2018–2025 – including the current year).

Meanwhile, in the case of interpretation of the values of the coefficients *bi*, , tending to zero, for example, when the inequation 0.1>is met (other conditions may be considered, which is determined by the objectives and extent of the study, etc.), we observe,as can be seen from *Table 3*, other boundaries of the effects generated by public expenditures for the demographic dynamics of Khabarovsk Krai. For example, budget expenditures on the implementation of social policy (line 4) influence the dynamics of population size in the region for seven years (coefficient b_7 in absolute value is less than 0.1); (line 8) birth rate dynamics – for three years (b_3 is less than 0.1), (line 12) death rate dynamics – for six years (b_6 in absolute value is less than 0.1). Along with this, we find out that the funds of the consolidated budget of the region (line 16) do not influence life expectancy of the population (absolute values of the coefficients b_0–$b_7$do not exceed 0.1); this fact is quite natural, since the formation of this parameter of the demographic process depends on a huge number of factors (including, for example, heredity) that act over a long period of human life.

Table 3. Assessment of the impact of social investments on demographic development parameters for Khabarovsk Krai

#	x	a	b_0	b_1	b_2	b_3	b_4	b_5	b_6	b_7
Population size										
1	A	1482894.3	-5.472	-3.326	-2.021	-1.228	-0.747	-0.454	-0.276	-0.168
2	B	1489849.2	-14.922	-8.453	-4.789	-2.713	-1.537	-0.870	-0.493	-0.279
3	C	1293979.9	1.951	1.684	1.452	1.253	1.081	0.932	0.804	0.694
4	D	1457355.8	-22.662	-10.267	-4.651	-2.107	-0.955	-0.432	-0.196	-0.089
Birth rate										
5	A	13478.2	0.206	0.113	0.062	0.034	0.019	0.010	0.006	0.003
6	B	12833.4	0.566	0.306	0.166	0.090	0.048	0.026	0.014	0.008
7	C	11024.9	0.558	0.459	0.378	0.311	0.256	0.210	0.173	0.142
8	D	13806.4	1.006	0.398	0.158	0.062	0.025	0.010	0.004	0.002
Death rate										
9	A	28413.3	-0.336	-0.231	-0.159	-0.109	-0.075	-0.052	-0.035	-0.024
10	B	25831.4	-0.598	-0.411	-0.282	-0.194	-0.133	-0.091	-0.063	-0.043
11	C	27398.9	-0.682	-0.581	-0.495	-0.422	-0.359	-0.306	-0.261	-0.222
12	D	24060.7	-0.868	-0.563	-0.365	-0.237	-0.154	-0.100	-0.065	-0.042
Life expectancy										
13	A	54.4	0.0003	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001
14	B	54.6	0.0007	0.0006	0.0005	0.0004	0.0003	0.0002	0.0002	0.0002
15	C	53.2	0.0008	0.0008	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007
16	D	58.2	0.0011	0.0008	0.0006	0.0005	0.0003	0.0003	0.0002	0.0001

Note: A – expenditures of the consolidated budget of the region on social and cultural activities; B – expenditures on education; C – expenditures on healthcare; D – expenditures on social policy.
Calculated by A.V. Belousova.

Thus, the limitation of the lag infinity in the evaluation of the coefficients of the model (1) can be carried out expertly (for example, the case discussed above: exogenous determination of the boundaries of the period of influence of independent variables on the result) and by introducing additional conditions based on the economic sense and the values of the indicators involved in the study.

The data in Table 3 show that the total public expenditures on the social sphere (lines 5, 9, 13) have a positive impact on certain parameters of demographic development in Khabarovsk Krai: they contribute to an increase in the birth rate and life expectancy and lead to a decrease in the death rate. Thus, the increase in the corresponding expenditures of the regional budget for one thousand rubles per inhabitant of the Krai in the current year leads to an increase in the birth rate by 206 people in Krai on the whole (line 5, coefficient b_0) and to reduce mortality by 336 people (row 9, the coefficient b0). In a year, the effect of the funds invested is reduced and is already plus 113 people for the birth rate and minus 231 people for the death rate.

The situation is reverse with regard to the population size: the increase in the amount of budget funds allocated to the social sphere as a whole (line 1), education (line 2) and social policy (line 4), in particular, leads to a decrease in the population size in the region. Thus, each ruble of the regional budget per capita, spent on the social sphere in the current year, leads to a reduction in the population size by about five people (b_0 =-5.472). While maintaining the appropriate level of investment in the course of 8 years, the region could lose up to 14 people per each ruble of budget expenditures (the sum of coefficients b_0-b_7: -5.472; -3.326; -2.021; -1.228; -0.747; -0.454; -0.276; -0.168). The obtained estimates suggest that the negative impact of total social spending on the population size at a positive impact on the natural parameters of reproduction is most likely due to mechanical factors, namely, population migration, which is not considered separately in our study.

In general, public expenditures on education and social policy are also unable to overcome the negative population dynamics in the period under consideration; such dynamics are formed under the influence of a much wider range of indicators than the volume and dynamics of public spending for these purposes. Each thousand rubles of the budgetary funds spent for the specified purposes in per capita measurement promotes the process of reducing the number of inhabitants of the Krai in the first year by 14,922 people (line 2), in the second year – by 8,453 people, etc. In our case, it is explained, for example, by youth migration, when obtaining a certificate or diploma of secondary vocational education motivates graduates or young specialists to search for their place in life outside the Krai. The inverse reaction of population parameters to the growth of financial support in the framework of social policy is also not unique. Among the residents of the Far East who leave the region, there are many persons over the working age, who receive a wide range of social assistance services. At the same time, the growth of social spending against the background of the decline of the population size in the Krai, perhaps, demonstrates the inefficient targeting of certain budget items, non-specificity of the measures taken or the discrepancy between the set of social benefits offered by the regional authorities and the urgent needs of the inhabitants of the Krai.

The most adequate estimates are obtained for expenditures on healthcare (lines 3). However, the degree of sensitivity of demographic parameters to them is less intense. Thus, the application of the formula (2) to the

data in Table 3 allows us to demonstrate *(Tab. 4)* that in the case of population size, birth and death rates, the implementation of more than 50% of the effect generated by the expenses of the consolidated budget of the region on the entire social sphere and education occurs during the first two years, including the year of allocation of funds.

The allocation of public funds to the development of healthcare extends the scope of influence to three years. In the case of social policy, the effect of the influence of expenditures on the change in population size and birth rate is observed in the year in which the funding is granted and is realized by 55 and 60%, respectively.

Table 4. Extent of the impact of social investment on the parameters of demographic development in Khabarovsk Krai

#	x	b_0	b_1	b_2	b_3	b_4	b_5	b_6	b_7
Population size									
1	A	0.40	0.24	0.15	0.09	0.05	0.03	0.02	0.01
2	B	0.44	0.25	0.14	0.08	0.05	0.03	0.01	0.01
3	C	0.20	0.17	0.15	0.13	0.11	0.09	0.08	0.07
4	D	0.55	0.25	0.11	0.05	0.02	0.01	0.00	0.00
Birth rate									
5	A	0.45	0.25	0.14	0.08	0.04	0.02	0.01	0.01
6	B	0.46	0.25	0.14	0.07	0.04	0.02	0.01	0.01
7	C	0.22	0.18	0.15	0.13	0.10	0.08	0.07	0.06
8	D	0.60	0.24	0.09	0.04	0.02	0.01	0.00	0.00
Death rate									
9	A	0.33	0.23	0.16	0.11	0.07	0.05	0.03	0.02
10	B	0.33	0.23	0.16	0.11	0.07	0.05	0.03	0.02
11	C	0.20	0.17	0.15	0.13	0.11	0.09	0.08	0.07
12	D	0.36	0.24	0.15	0.10	0.06	0.04	0.03	0.02

Note: A – expenditures of the consolidated budget of the region on social and cultural activities; B – expenditures on education; C – expenditures on healthcare; D – expenditures on social policy. "Life expectancy" is excluded from the resulting features since it is not affected by social investment directly.
Calculated by A.V. Belousova.

Table 5. Estimated volume of social investments to achieve the target parameters of demographic development in Khabarovsk Krai (in the prices of 2000), rubles per capita

#	x	2018	2019	2020	2021	2022	2023	2024	2025
Population size									
3	C	16391.1	4534.9	4546.4	18615.3	12564.8	15452.9	27660.0	25177.3
Birth rate									
5	A	103557.2	165398.6	138117.7	160090.0	155114.6	165003.5	166814.2	173135.4
6	B	76694.0	39258.0	40643.7	53376.4	48661.1	50090.0	53324.0	53815.4
7	C	98491.1	20904.7	21182.6	76014.9	33341.2	33988.1	64988.3	41751.6
8	D	79903.6	18264.4	19695.1	62792.7	28990.4	30278.5	54750.7	36449.1
Death rate									
9	A	14407.0	14407.0	14390.1	14647.5	16691.7	15591.6	15750.2	15979.6
10	B	6732.5	5574.7	7072.6	3952.0	5980.0	4103.6	7278.1	5284.0
11	C	4604.8	4125.1	4360.2	4289.5	4083.4	4552.5	4457.6	4539.8
12	D	7273.3	4099.4	3923.6	5523.6	4722.8	4744.0	5253.9	5113.0

Note: A – expenditures of the consolidated budget of the region on social and cultural activities; B – expenditures on education; C – expenditures on healthcare; D – expenditures on social policy.
Calculated by A.V. Belousova.

Table 6. Structure of the distribution of expenditures on healthcare and social policy to achieve the target parameters of demographic development in Khabarovsk Krai, %

#	x	2018	2019	2020	2021	2022	2023	2024	2025
Population									
3	C	16.2	16.8	15.9	21.7	27.5	30.7	31.8	38.1
Birth rate									
8	D	79.2	67.8	68.9	73.3	63.5	60.2	63.0	55.1
Mortality									
11	C	4.6	15.3	15.2	5.0	8.9	9.1	5.1	6.8

Note: C – expenditures of region's consolidated budget on healthcare; D – social policy expenditures.
Calculated by: A.V. Belousova.

The target values of demographic development parameters in Khabarovsk Krai presented in the concept for demographic development of the Far East for the period up to 2025 allow us to quantify the amount of public spending necessary for the implementation of the program document *(Tab. 5)*, and it is done with the use of the data in Table 2 and formula (6).

Based on the data given in Table 5, we can compare different options for future expenditures and choose the most advantageous one for the regional budget. Thus, in order to reduce the death rate in Khabarovsk Krai by 29.8% by 2025 compared to 2018 (as planned in the Concept), the most effective option is to finance healthcare (line 11), the per capita expenditures on which will be the lowest in the course of eight years and will amount to 4000–4600 rubles per year (in the prices of 2000). As for the birth rate, expenditures on social policy are the most advantageous option (line 8).

Based on the estimates presented above, we can say that the optimal (less expensive) structure of social investments for Khabarovsk Krai, which will provide the achievement of target parameters of the concept for demographic development of the Far East for the period up to 2025, has the following form *(Tab. 6)*.

Thus, the estimates we have obtained allow us to simulate the optimal structure of the distribution of social investments that can provide the achievement of demographic development targets in Khabarovsk Krai on the basis of objective conditions and potential opportunities of the region.

The main volume of social investments allocated to healthcare and social policy is as follows: 79.2% of social expenditures are directed to social policy, the rest – to healthcare, with the majority (16.2%) – to the increase in population size and the smaller part (4.6%) – to the reduction in the death rate. By 2025, the basic positions will remain unchanged: social policy and the promotion of the birth rate will remain leaders (55.1%) losing 24 percentage points to healthcare (44.9%).

Conclusion

Modern studies in the field of economic theory, theory of public finance, social economics and social policy demonstrate a return to the discussion of the issues of social justice and social protection, among other things, through the expansion of state financial support. We are talking not just about an act of gratuitous assistance, but about a system-wide and purposeful process of formation of the state budget policy as social investment in the development of human capital.

Close attention of the state to the Far Eastern macroregion is due to the economic strategy for development of the Pacific borders, in the framework of which there is a demand for demographic resources for advanced socio-economic development; this attention is enshrined in the new concept for demographic policy approved by the Government of the Russian Federation in 2017.

The analysis of demographic and economic processes has shown that the growth of public spending and the increase in social investment in the economy of the Far East do not have an adequate impact on the positive change in demographic indicators. The region continues to lose its population despite high unit costs and the provision of support to the social sphere. The reason for this situation lies in the fact that the demographic dynamics, especially in terms of population migration, are determined not only (and in the case of extreme regions, not so much) by the development of the social sphere, at which social investments are mainly directed, but by a large number of other factors, including the specifics of the labor market, age and sex composition of the population, the value of alternative incomes and expenses of the population, the quality of municipal and transport infrastructure, etc.

We have formulated and solved the problem of finding statistically significant model structures as applied to the economy of a particular region; these structures take into account the "delayed" effects. Despite the use of well-known methods of analysis, the rationale for the feasibility and possibilities of their use for new research purposes, the transformation of traditional forms of model designs, the expansion of the potential use of the results obtained in this case allow us to assert that there exists the need to develop the authors' tools aimed at the quantitative identification of the scale and structure of public expenditures on the social sphere, ensuring the achievement of the target values of demographic development parameters in the region.

As a result of the applied experiment conducted on the example of the model region (Khabarovsk Krai), we have found out that, contrary to traditional expectations, public spending in the social sphere does not have a positive effect on the growth of population size as a whole, but provides positive changes in the natural movement of the population. The assessment of the scale and degree of influence of certain items of social expenditures of the regional budget on demographic parameters has revealed the most effective period (not more than three years) for social investment in human capital. We have substantiated the optimal structure for the distribution of social investments capable to provide achievement of target indicators of demographic development in Khabarovsk Krai, proceeding from objective conditions and potential opportunities of the region. The results we have obtained are original.

In the process of work, we have revealed the problems associated with the need to expand the set of factors describing the system of demographic and socio-economic processes in the Far East. Some issues are associated with the testing of the proposed tools separately for nine Far Eastern regions and the formation of the integral estimates for the whole macroregion. The search for adequate solutions to these problems is a promising area of research.

References

1. Samuelson P.A. The pure theory of public expenditure. *Review of Economics and Statistics*, 1954, vol. 36, no. 4, pp. 387-389.
2. Stiglitz J. The global crisis, social protection and jobs. *International Labour Review,* 2013, vol. 152, no. 1, pp. 93-106.
3. Makarov V.L. *Sotsial'nyi klasterizm. Rossiiskii vyzov* [Social Clusterism. The Russian Challenge]. Moscow: Biznes Atlas, 2010. 272 p.
4. Rubinshtein A.Ya. Twenty-five theses on the activity of the state in the social sector. *Ekonomicheskaya nauka sovremennoi Rossii=Economics of Contemporary Russia,* 2009, no. 1 (44), pp.25-38. (In Russian).

5. Yakobson L.I. *Gosudarstvennyi sektor ekonomiki, ekonomicheskaya teoriya i politika* [Public Sector of the Economy, Economic Theory and Policy]. Moscow: GU VShE, 2000. 368 p.
6. Rubinshtein A.Ya. Economic crisis and the new paradigm of public support of the patronized goods. *Zhurnal Novoi ekonomicheskoi assotsiatsii=Journal of the New Economic Association,* 2015, no. 2 (26), pp. 264-269. (In Russian).
7. Rubinshtein A.Ya. *K teorii rynkov "opekaemykh blag"* [To the Theory of the Markets of "Patronized Goods"]. Moscow: IE RAN, 2008. 60 p.
8. Lennartz C., Ronald R. Asset-based welfare and social investment: competing, compatible, or complementary social policy strategies for the new welfare state? *Housing, Theory and Society,* 2017, vol. 34, no. 2, pp. 201-220, DOI: 10.1080/14036096.2016.1220422
9. Nolan B. What use is 'social investment? *Journal of European Social Policy,* 2013, vol. 23, no. 5, pp. 459-468. DOI: 10.1177/0958928713499177
10. Gilbert N. *Transformation of the Welfare State: The Silent Surrender of Public Responsibility*. Oxford: Oxford University Press, 2002. DOI:10.1093/0195140745.001.0001
11. Starke P. The politics of welfare state retrenchment: a literature review. *Social Policy & Administration*, 2006, vol. 40, no. 1, pp. 104-120. https://doi.org/10.1111/j.1467-9515.2006.00479.x
12. Hemerijck A. *Changing Welfare States*. Oxford: Oxford University Press, 2013. 485 p. https://doi.org/10.1017/S0047279413000469
13. Hudson J., Kühner S. Towards productive welfare? A comparative analysis of 23 OECD countries. *Journal of European Social Policy,* vol.19, no. 1, pp. 34-46. DOI: 10.1177/0958928708098522
14. Pierson P. *The New Politics of the Welfare State*. Oxford: Oxford University Press 2001. DOI:10.1093/0198297564.001.0001
15. Taylor-Gooby P., Gumy J.M., Otto A. "Can "new welfare" address poverty through more and better jobs?" *Journal of Social Policy, 2015,* vol. 44, no. 01, pp. 83-104. DOI: 10.1017/S0047279414000403
16. Esping-Andersen G. (Ed.). *Why We Need a New Welfare State*. Oxford: Oxford University Press 2002. DOI:10.1093/0199256438.001.0001
17. Morel N., Parlier B., Palme J. (Eds.). *Towards a Social Investment Welfare State?: Ideas, Policies and Challenges*. Bristol: Policy Press, 2012. 336 p.
18. Vandenbroucke F., Vleminckx K. "Disappointing poverty trends: is the social investment state to blame?" *Journal of European Social Policy,* 2011, vol. 21, no. 5, pp. 450-471. DOI: 10.1177/0958928711418857
19. Ivanova N.V. Social investment: a review of foreign practices. *Grazhdanskoe obshchestvo v Rossii i za rubezhom=Civil Society in Russia and Abroad*, 2013, no. 3, pp. 31-36. (In Russian).
20. Schultz T.W. Investment in human capital. *The American Economic Review,* 1961, vol. 51, no. 1, pp. 1-17.
21. Sinevičienė L. Investigation of the relationship between government expenditure and country's economic development in the context of sustainable development. *International Journal of Economics and Management Engineering*, 2015, vol. 9, no. 3, pp. 749-753 https://waset.org/publications/10000637/investigation-of-the-relationship-between-government-expenditure-and-country-s-economic-development-in-the-context-of-sustainable-development
22. Budhdeo S., Watkins J. Atun R., Williams C., Zeltner T., Maruthappu M. Changes in government spending on healthcare and population mortality in the European Union, 1995–2010: a cross-sectional ecological study. *J R Soc Med*, 2015 vol. 108, no.12, pp. 490-498. DOI:10.1177/0141076815600907
23. Nixon J, Ulmann P. The relationship between healthcare expenditure and health outcomes. Evidence and caveats for a causal link. *The European Journal of Health Economics*, 2006, vol. 7, no. 1, March, pp. 7-18. Available at: https://doi.org/10.1007/s10198-005-0336-8
24. Shoven J.B., Topper M., Wise D.A. The impact of the demographic transition on government spending. In: *Studies in the Economics of Aging.* National Bureau of Economic Research**,** University of Chicago Press, 1994. Pp. 13-38. Available at: http://www.nber.org/chapters/c7336
25. Pranab K.D., Saibal K. *Public Expenditure, Demography and Growth: Theory and Evidence from India. Discussion Paper no. 9721.* 2016. February. 40 p. Available at: http://ftp.iza.org/dp9721.pdf
26. Vasil'eva A.V., Vasil'eva E.V., Tyulyukin V.A. Modeling the impact of budget funding on socio-demographic processes in the region. *Ekonomika regiona=Economy of Region,* 2012, no. 2 (30), pp. 266-276. (In Russian).

27. Chichkanov V.P., Chistova E.V., Tyrsin A.N. General assessment of the effectiveness of social sphere financing in Russia's regions. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2018, vol. 11, no. 5, pp. 87-102. DOI: 10.15838/esc.2018.5.59.6. (In Russian).
28. Tatarkin A.I., Minakir P.A. (Eds.). *Otsenka faktorov rosta i prognozirovanie sotsial'no-ekonomicheskogo razvitiya regionov Rossii* [Evaluation of Growth Factors and Forecasting Socio-Economic Development in the Regions of Russia]. Yekaterinburg: Institut ekonomiki UrO RAN, 2012. 178 p.
29. Arkhangel'skii V.N., Zin'kina Yu.V., Korotaev A.V., Shul'gin S.G. Modern trends in the birth rate in Russia and the impact of government support measures. *Sotsiologicheskie issledovaniya=Sociological Studies,* 2017, no. 3, pp.43-50. (In Russian).
30. Aganbegyan A.G. Demographic drama on the way of perspective development of Russia. *Narodonaselenie=Population,* 2017, no. 3, pp. 4-23. DOI: 10.26653/1561-7785-2017-3-1.
31. Aganbegyan A.G. *Demografiya i zdravookhranenie Rossii na rubezhe vekov* [Demography and Healthcare in Russia at the Turn of the Century]. Moscow: Delo, 2016. 192 p.
32. Isaev A.G. Territories of advanced development – a new instrument of regional economic policy. *EKO,* 2017, no. 4, pp. 61-77. (In Russian).
33. Minakir P.A. Expectations and realities of the "Focusing on the East" policy. *Ekonomika regiona=Economy of Region,* 2017, vol. 13, no. 4, pp. 1016-1029. (In Russian).
34. Minakir P.A., Prokapalo O.M. Russian Far East: economic phobias and geopolitical ambitions. *EKO,* 2017, no. 4, pp. 5-26. (In Russian).
35. Motrich E.L. Far East in Russian demography: trends during reform. *Prostranstvennaya ekonomika=Spatial Economics,* 2017, no. 3, pp. 133- 153. DOI: 10.14530/se.2017.3.133-153. (In Russian).
36. Motrich E.L., Izotov D.A. Modern trends and problems of migration in the border regions of Russia: the Far East. *Problemy prognozirovaniya=Studies on Russian Economic Development,* 2018, no. 3, pp. 28-37. (In Russian).
37. Leont'eva A.G. Differentiation of social expenditures in the Russian regions and its measures of reduction. *Vestnik VGUIT=Proceedings of the Voronezh State University of Engineering Technologies,* 2017, vol. 79, no. 2, pp. 380-389. DOI: 10.20914/2310-1202-2017-2-380-389. (In Russian).
38. Hickey S. Relocating social protection within a radical project of social justice. *The European Journal of Development Research,* 2014, vol. 26, no. 3, pp. 322-337. Available at: https://link.springer.com/article/10.1057%2Fejdr.2014.9
39. Barrientos A. Justice-based social assistance. *Global Social Policy,* 2016, vol. 16, no. 2, pp. 151-165. Available at: https://doi.org/10.1177%2F1468018116633576
40. Benabou R., Ok E.A. Social mobility and the demand for redistribution: the Poum hypothesis. *The Quarterly Journal of Economics*, 2001, vol. 116, no. 2, pp. 447-487. Available at: https://doi.org/10.1162/00335530151144078
41. Naiden S.N., Gritsko M.A. Reaction of the regional social system to institutional and investment shocks. *Regionalistika=Regional Studies*, 2016, vol. 3, no. 6, pp. 6-22. (In Russian).
42. Naiden S.N., Belousova A.V. Methodical tools for assessing people's welfare: an interregional comparison. *Ekonomika regiona=Economy of Region,* 2018, vol. 14, no. 1, pp. 53-68. DOI: 10.17059/2018–1–5. (In Russian).
43. Koyck L.M. *Distributed Lags and Investment Analysis. Contributions to Economic Analysis, IV*. Amsterdam: North Holland Publishing Company, 1954. 111 p.

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Factor Analysis Reflecting the Impact of Labor Migration on the Spread of Socially Dangerous Diseases in Russia*

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Abstract. The goal of the paper is to assess the possible impact of international labor immigration on the prevalence of the following diseases which are dangerous to others: HIV, active tuberculosis, syphilis, drug addiction, enterobiosis, pediculosis, acute and chronic viral hepatitis B and C in Russia's regions. We analyze the works on the impact of migration on the health of the population of the host territory. The main research methods that we use include econometric and correlation analysis. We construct panel models for each of the diseases. The models test various socio-economic indicators (including education level, cash income, housing improvement and the incidence of alcoholism), as well as climatic, geographical and demographic indicators. In order to calculate the indicators characterizing the level

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of labor immigration in the regions we use Rosstat data on the legal employment of foreign citizens in the regions of the Russian Federation and on the number of foreign citizens who arrived in Russia. The study has shown that of all the diseases considered, immigration can only have an impact on the spread of drug addiction. This issue needs further study. As far as infectious diseases are concerned, labor immigration does not affect the level of morbidity detected in the regions. As a rule, these diseases are associated with poor sanitary and socio-economic conditions (tuberculosis, syphilis and enterobiosis); on the other hand, there are big problems concerning their detection, and the real level of morbidity in the country is unknown (HIV and viral hepatitis). We also reveal a significant statistical correlation between the groups of diseases: 1) drug addiction, HIV, active tuberculosis, acute viral hepatitis and 2) alcoholism, syphilis, chronic viral hepatitis.

Key words: labor immigration, socially dangerous diseases, well-being of the territory, regions of Russia.

Introduction

International migration raises many socio-economic issues, including the impact of migration on the health of the host society and migrants themselves. Health issues faced by migrants are often similar to those faced by the rest of the population, although in some cases they may be specific. However, the link between migration and the importation of contagious diseases, as well as the impact of the presence of migrants on their spread (including "socially dangerous" diseases), has not been fully studies yet. Health and migration are generally considered independently by the researchers. The research into the correlation between these population processes started not so long ago.

Some foreign researchers have found that migrants who moved less than two years ago were healthier at the time of their arrival (except when they were diagnosed with contagious diseases) than local residents of the host country. This phenomenon, which is been called "the Healthy Migrant Effect", can be explained by the self-selection of healthier people who decide to move from their homeland to another country. This effect was confirmed by studies in the US [1], Canada [2], Australia [3], and several countries in Western Europe [4]. Some time after migrating, the health of migrants and indigenous people in the host country is usually compared [5] and sometimes it does not happen. For example, the overall mortality rates of immigrants from Latin America are lower than that of indigenous people of the United States despite their less favorable socio-economic conditions [6]. A similar result was obtained in studies of citizens of Morocco in France [7] and the Turkish population in Germany [8]. One reason is that old and diseased migrants often return to their homeland, so the average life expectancy of those who remain is increased. In any case, this is exactly what happens in the US [9].

O.A. Kislitsyna, after analyzing data from the European Social Survey and the Russian Monitoring of Economic Situation and Health, identified statistically significant differences in self-reported health of migrants and indigenous people in 14 out of 29 countries, including Russia. She notes that most countries lack statistics to compare the health of migrants and indigenous people. This is particularly the case of Russia [10].

With regard to the possible role of migration in the importation of contagious diseases into the host community, the WHO regional office for Europe (WHO/Europe) insist that "there is

no systematic link between these phenomena. Contagious diseases are mainly related to poverty. Europe has a many-years' experience in fighting against infectious diseases such as tuberculosis (TB), HIV/AIDS, hepatitis, measles and rubella, and has managed to largely relieve the burden of these diseases in the course of economic development through improving housing conditions, providing safe water and proper sanitation, efficient operation of healthcare systems and ensuring access to vaccines and antibiotics. However, these diseases have not yet been eliminated and still exist in the European region, regardless of migration. ... The risk of importing rare infectious agents into Europe ... is extremely low. Experience shows that when it takes place, the disease vectors are ordinary passengers, tourists or health workers, rather than migrants or refugees"[1].

At the same time, the Infectious Disease Epidemiology Annual Report published in 2017 at Robert Koch Institute, points to the negative consequences of a mass influx of migrants for the health of the German population. The report lists diseases whose prevalence has increased including: cholera, hepatitis, AIDS, leprosy, malaria, syphilis, and tuberculosis[2].

Most European studies analyzing the spread of HIV-associated tuberculosis confirm that the level of HIV-associated tuberculosis among migrants is higher than among the local population [11].

A number of European researchers writing about the diagnosis and treatment of infectious diseases mark the underreporting of cases. A lesser degree of underreporting of infectious diseases in reports among migrants is noted compared to the underreporting of illnesses among the local population. We see the reason that the share of unreported cases of tuberculosis is less among migrants than that of the local population is in the strengthened communicable disease surveillance over migrants [12, 13]. Nightingale et al. assumed that a lower degree of underreporting of hepatitis B and C among migrants compared to local residents is associated with mandatory screening of arriving migrants [14].

Better definition of diseases among migrants compared to the local population may also have an impact on morbidity rates in Russia. N.Ya. Shcherbak and I.M. Ulyukin analyze the experience of authorized organizations in Saint Petersburg in terms of medical examination of foreign citizens and stateless people in 2010–2013 and note that the incidence of HIV, tuberculosis and syphilis among foreign citizens is 1.5 times higher than that of local residents [15]. According to data of the Central Research Institute of Tuberculosis, among every 100,000 examined Russians and every 100,000 thousand foreign citizens in Russia, tuberculosis is detected 2.65 times less often among the former, HIV – 2.93 times more often than among the latter [16]. And this is despite the fact that all foreign citizens are subject to mandatory medical examination for tuberculosis and HIV, unlike citizens of the Russian Federation.

B.B. Prokhorov believes that the main factor affecting people's health is the socio-economic situation status of individual population groups [17]. It is obvious that this can affect the level of migrant morbidity. E.E. Rashkevich,

[1] WHO regional office for Europe. Migration and Health: key issues. Available at: http://www.euro.who.int/ru/health-topics/health-determinants/migration-and-health/migrant-health-in-the-european-region/migration-and-health-key-issues (accessed: 15.03.2018).

[2] Infektionsepidemiologisches Jahrbuch meldepflichtiger Krankheiten für 2016 Robert Koch-Institut, Berlin, 2017. Available at: http://www.rki.de/DE/Content/Infekt/Jahrbuch/Jahrbuch_2016.pdf?__blob=publicationFile (accessed: 15.03.2018).

Yu.V. Frolova and et al. note a rate of latent (3 times) and active tuberculosis (10 times) among children from okmgrant families in the Smolensk Oblast in 2014–2015. Migrant children are more often in contact with tuberculosis patients (6 times more often than children permanently residing in the Smolensk Oblast) and 25% less likely to have BCG-vectored vaccination [18]. The study of N.S. Maltseva et al. [19] indicates a fairly high level of hepatitis infection among foreign citizens who arrived in Khabarovsk on a work visa. At the same time, 17% of surveyed migrants possess antibodies to hepatitis E not endemic in Khabarovsk Krai. N.D. Alsalikh, D. A. Sychev et al. [20, 21] come to a conclusion that a significant share of labor migrants arriving in Russia are already infected with hepatitis C, which suggests a high probability of importation of this infection. P.V. Istomin, V.V. Mefodiev and V.G. Bychkov [22] conclude that migration significantly effects the spread of HIV. S.A. Solonin et al. speak of a significant level of hepatitis E infection among citizens coming from China to the territory of the Russian Federation [23]. N.L. Struin and A.S. Shubina [24] analyzed studies (mainly foreign) on the incidence of social infections among migrants in various countries; the analysis also confirms that the incidence of syphilis, HIV and other sexually transmitted diseases among migrants is higher than among local residents.

Thus, the majority of researchers engaged in studying the impact of foreign citizens on the epidemiological situation in the host territory agree that migration, including labor, can make a significant contribution to the spread of socially dangerous diseases, contrary to the statements of WHO/Europe. However, WHO/Europe materials state that, among other factors, "migrants' risk of catch or come down with tuberculosis depends on the incidence of tuberculosis in their country of origin", as well as on "the living and working conditions in the host country, including access to healthcare and social security". "The risk of contamination is higher in closed, poorly ventilated spaces". It is also noted that active tuberculosis "develops only among part of the infected (the risk ranges from 10% during life for the population as a whole to 10% during a year for HIV-positive people) and within a few months or years after infection", and that in migrants' most countries of origin the HIV rate is low, while "there is increasing evidence that some migrants become infected with HIV after migrating"[3].

Thus, at present, the impact of international migration on the spread of socially dangerous diseases remains debatable.

The present paper aims to use probability models to assess the possible impact of international labor immigration on the spread of a number of socially dangerous diseases in the Russian regions. To achieve this, we set the following objectives: to perform an econometric analysis of the spread of drug addiction and all those infectious diseases from the *List of socially dangerous diseases*,[4] which during 2010–2016 occurred in all Russian regions and for which there is enough statistics for modeling. Drug addiction is not included in the List, yet it can cause the spread of diseases from the List, and its spread could theoretically be influenced by international migration. Data from Rosstat, Unified Interdepartmental Statistical Information System (EMISS) and Ministry of Health of the Russian Federation are used.

[3] WHO regional office for Europe. Migration and Health: key issues. Available at: http://www.euro.who.int/ru/health-topics/health-determinants/migration-and-health/migrant-health-in-the-european-region/migration-and-health-key-issues (accessed: 15.03.2018).

[4] Approved by the Resolution of the Government of the Russian Federation no. 715, dated 01.12.2004. Available at: http://base.garant.ru/12137881/ (accessed: 15.03.2018).

Description of statistical data and research methodology

The EMISS database[5] contains statistics of the Ministry of Health in the regional context (since 2005, on the number of registered patients with infections diagnosed for the first time, per 100,000 people) for the following socially dangerous diseases: 1) HIV; 2) active tuberculosis[6]; 3) syphilis; 4) drug addiction. EMISS provides statistics on the spread of other infections only since 2009 or 2010 and only on the number of cases in the regions[7]. We selected the following diseases for the purposes of our study: 5) enterobiasis[8]; 6) pediculosis; 7) chronic viral hepatitis (diagnosed for the first time, the virus is not specified, hepatitis B and C can become chronic); 8) acute viral hepatitis B; 9) acute viral hepatitis C.

Table 1 lists the regions with the highest and lowest incidence of each of the socially dangerous diseases under review. In brackets – years of observation and number of cases per 100,000 people. The absolute maximum for the country during the observation period is highlighted in bold.

Overall, statistics show that the incidence of tuberculosis, syphilis and acute viral hepatitis B and C is clearly declining. Statistics on other diseases (enterobiasis, chronic viral hepatitis and pediculosis) over the period under review do not show significant improvement. In terms of drug addiction the situation varies greatly by region, HIV is demonstrating an upward trend. The number of people diagnosed with HIV for the first time since 2012 annually exceeds the number of people diagnosed with chronic viral hepatitis for the first time, and since 2014 their number exceeded the number of cases of tuberculosis. In 2016, pediculosis and enterobiasis ranked first and second in the number of cases among the diseases under review (more than 200,000 cases), HIV ranked third (84,000 cases) followed by tuberculosis (77,000), chronic viral hepatitis (68,000), syphilis (31,000), drug abuse (16,000), hepatitis C (1,806) and hepatitis B (1,378).

Migration has traditionally been one of the factors in spread of infectious diseases, so it is not surprising that regions with highest prevalence of dangerous diseases such as HIV, tuberculosis and syphilis are geographically close to each other (see Table 1). The question put forward in the study is what role international labor immigration plays in the spread of these and other socially dangerous diseases in Russia.

To address this issue, we attempt to build probability panel models of spread of diseases in the Russian regions.

The panel multiple regression equation has the following form:

$$Y_{(t,R)} = a_0 + a_1 X_{1(t,R)} + \cdots + a_n X_{n(t,R)} + \varepsilon, \quad (1)$$

where Y – explained variable, vector with time and space coordinates;

X_i – factors affecting the explained variable;

a_i – coefficients,

ε – remainder of the equation.

In our case, explained variables – **B1–B9** – denote the number of cases or first diagnoses per 100,000 people per year t in the region (Russia's constituent entity) R, t takes values from 1 in 2005 to 12 in 2016.

[5] Unified Interdepartmental Statistical Information System. Available at: https://fedstat.ru/organizations/ (accessed: 15.03.2018).

[6] The Ministry of Health provides statistics separately on "active tuberculosis" and "tuberculosis of respiratory tract". In the List of socially significant diseases at Rosstat website only "active tuberculosis" is listed, although the List approved by the Government of the Russian Federation contains "tuberculosis" without specification.

[7] Number of reported cases of infectious diseases: Available at: https://fedstat.ru/indicator/38208, https://fedstat.ru/indicator/38207 (accessed: 17.09.2018).

[8] Selected as the most common type of helminthiasis.

Table 1. Regions with highest and lowest incidence of socially dangerous diseases (per 100,000 people)

Regions and years with highest incidence	Regions and years with lowest incidence
B1. HIV (2005–2016)	
Kemerovo Oblast (2011–138; 2012–219; 2013–217; 2014–**240**; 2015–238; 2016–202); Tomsk Oblast (2013–173; 2014–149; 2015–164); Sverdlovsk Oblast (2012–136; 2013–151; 2014–169; 2015–170; 2016–145); Irkutsk Oblast (2010–166; 2012–136; 2014–149; 2015–148; 2016–146); Novosibirsk Oblast (2013–140; 2014–149; 2015–144); Saint Petersburg (2005–133; 2010–146); Ulyanovsk Oblast (2008–136); Chelyabinsk Oblast (2015–136).	Chechen Rep. (2005–0.0); Rep. of Tyva (2005–2.3; 2006–0.0; 2008–1.3; 2016–2.9); Nenets Autonomous Okrug (2015–0.0); Jewish Autonomous Oblast (2005-2006–2.1; 2007–1.6; 2008–2.2); Stavropol Krai (2005–1.8; 2006–2.0); Karachay-Cherkess Rep. (2005–2.3); Omsk Oblast (2005–2.3; 2006–3.4); Rep. of Kalmykia (2005–2.4; 2010–3.2; 2013–3.2); Voronezh Oblast (2005–3.0); Rep. of Khakassia (2005–3.0); Arkhangelsk Oblast (2006–3.1); Kabardino-Balkar Rep. (2006–3.4).
B2. Active tuberculosis (2005–2016)	
Rep. of Tyva (2005–**250**; 2006–246; 2007–235; 2008–240; 2009–228; 2010–233; 2011–231; 2012–206; 2013–187; 2014–169; 2015–162; 2016–178); Primorsky Krai (2005-2006 –165; 2007–189; 2008–192; 2009–209; 2010–201; 2011–172; 2012–163); Jewish Autonomous Oblast (2005–159; 2007–167; 2008–190; 2009–170; 2010–174; 2011–176; 2012–173; 2013–176); Rep. of Buryatia (2005–159; 2006–174; 2008–159; 2009–168); Chukotka Autonomous Okrug (2016–172); Kemerovo Oblast (2005–157).	Chechen Rep. (2005–0.0; 2014–29.2; 2015–30.7); Nenets Autonomous Okrug (2010-2011–0.0; 2016–20.5); Belgorod Oblast (2013–29.3; 2014–28.9; 2015–27.1; 2016–21.5); Vologda Oblast (2015–29.7; 2016–21.7); Oryol Oblast (2016–26.7); Moscow (2014–28.0; 2015–28.1; 2016–28.6); Voronezh Oblast (2015–31.4; 2016–28.5);); Karachay-Cherkess Rep. (2015–29.2); Arkhangelsk Oblast (2016–29.6); Rep. of Dagestan (2016–30.2); Oryol Oblast (2015–30.2).
B3. Syphilis (2005–2016)	
Chukotka Autonomous Okrug (2005–504; 2006–**663**; 2007–264; 2008–180); Rep. of Tyva (2005–383; 2006–334; 2007–390; 2008–487; 2009–353; 2010–255; 2011–209; 2012–199; 2013–177); Rep. of Khakassia (2005–191; 2006–197; 2007–181; 2008–192; 2009–156); Jewish Autonomous Oblast (2007–155; 2008–172; 2009–167; 2010–144); Altai Rep. (2008–166); Amur Oblast (2005–158; 2006–162; 2007–158; 2008–157; 2009–152; 2010–142); Zabaykalsky Krai (2007–140; 2008–159; 2009–146).	Chechen Rep. (2005–0.0); Nenets Autonomous Okrug (2010–7.1; 2012–4.7; 2013–2.3; 2015–4.6); Rep. of Dagestan (2012–4.4; 2013–6.2; 2014–4.2; 2015–3.7; 2016–3.5); Chukotka Autonomous Okrug (2013–5.9); Kostroma Oblast (2016–5.2); Rep. of Karelia (2015–7.1; 2016–5.4); Rep. of Adygea (2016–5.8); Ryazan Oblast (2016–6.5); Tambov Oblast (2016–6.5); Kamchatka Krai (2016–6.6); Rep. of Kalmykia (2013–6.7; 2016–7.2); Komi Rep. (2016–7.2); Leningrad Oblast (2015-2016–7.4).
B4. Drug addiction (2005–2016)	
Jewish Autonomous Oblast (2016–**66.8**); Irkutsk Oblast (2005–56.7); Kemerovo Oblast (2005–45.9; 2006-2007–52.9; 2008–51.9; 2009–49.0); Primorsky Krai (2005–42.9; 2015–43.5; 2016–52.6); Sverdlovsk Oblast (2008–50.9; 2009–47.8; 2010–42.8); Rep. of Adygea (2005–45.8; 2006-2007–50.2); Karachay-Cherkess Rep. (2005–41.6; 2006-2007–45.3); Perm Krai (2006-2007–44.5); Irkutsk Oblast (2006-2007–43.4); Krasnodar Krai (2006-2007–43.3).	Chechen Rep. (2005–0.0; 2012–2.0; 2013–1.2; 2014–0.4; 2015-2016–1.1); Nenets Autonomous Okrug (2016–0.0); Chukotka Autonomous Okrug (2010–0.0; 2012–0.0; 2014-2016–0.0); Rep. of Kalmykia (2013–0.4; 2014–1.1; 2015-2016–0.4); Rep. of Ingushetia (2010–0.6; 2011–1.2; 2012–0.7; 2013–1.4); Astrakhan Oblast (2015–0.8; 2016–1.0); Arkhangelsk Oblast (2005–1.5; 2006-2007–1.4); Chuvash Rep. (2014–1.7; 2015–1.5); Belgorod Oblast (2016–1.6); Kirov Oblast (2012–1.6).
B5. Enterobiasis (2009–2016)	
Nenets Autonomous Okrug (2009–614; 2011–550; 2014–502; 2015–608; 2016–**677**); Rep. of Tyva (2009–509; 2012–483; 2013–498; 2014–586); Udmurt Rep. (2009–545; 2016–497); Jewish Autonomous Oblast (2010–506; 2016–481); Altai Rep. (2010–482).	Rep. of Ingushetia (2009–34; 2010–38; 2012–33; 2013–38; 2014–27; 2015–40; 2016–31); Krasnodar Krai (2016–31); Moscow (2015–33; 1016–35); Rep. of North Ossetia (2011–43; 2016–36); Chechen Rep. (2015–39)
B6. Pediculosis (2010–2016)	
Moscow (2010–1471; 2011–1470; 2012–1438; 2013–1434; 2014–**1596**; 2015–1273; 2016–1075); Nenets Autonomous Okrug (2010–371; 2012–293); Magadan Oblast (2013–289; 2014–371; 2015–305); Arkhangelsk Oblast (2010–300).	Chechen Rep. (2010–0,3; 2011–0,0; 2012–0,1; 2013-2014–0,0; 2015–0,5; 2016–0,0); Karachay-Cherkess Rep. (2010–7,1; 2011–3,6; 2012–5,7; 2013–0,8; 2014–5,1; 2015–6,6); Rep. of Ingushetia (2010–1,2; 2011–0,9; 2013–7,8).
B7. Chronic viral hepatitis (2010–2016)	
Kamchatka Krai (2010–**233**; 2011–218; 2012–204; 2013–170); Saint Petersburg (2010–194; 2011–188; 2012–180; 2013–182; 2014–170; 2015–152; 2016–146); Sakhalin Oblast (2011–186; 2012–151); Yamalo-Nenets Autonomous Okrug (2010–184; 2011–169; 2012–151; 2013–165).	Chechen Rep. (2010–2.4; 2011–4.2; 2012–6.5; 2013–2.4; 2014–1.3; 2015–0.8; 2016–2.2); Rep. of Ingushetia (2010–2.9; 2011–5.6; 2012–3.6; 2014–6.5; 2015–6.8; 2016–6.3); Rep. of Dagestan (2010–4.9; 2011–5.4); Kabardino-Balkar Rep. (2016–8.2).
B8. Acute viral hepatitis *B* (2010–2016), average for the period	
Tomsk Oblast (3.47). Vladimir Oblast (3.40). Tyumen Oblast excluding Autonomous Okrug (2.51). Moscow (2.50). Ivanovo Oblast (2.46). Kurgan Oblast (2.42).	Rep. of Buryatia (0.06). Oryol Oblast (0.09). Rep. of Ingushetia (0.22). Kabardino-Balkar Rep. (0.38). Arkhangelsk Oblast (0.41). Rep. of Khakassia (0.45).
B9. Acute viral hepatitis *C* (2010–2016), average for the period	
Kurgan Oblast (3.76). Tyumen Oblast excluding Autonomous Okrug (3.55). Yamalo-Nenets Autonomous Okrug (3.27). Sverdlovsk Oblast (3.25). Chelyabinsk Oblast (3.23). Khanty-Mansi Autonomous Okrug (3.15).	Altai Rep. (0.07). Rep. of Buryatia (0.18). Rep. of Dagestan (0.22). Rep. of Kalmykia (0.25). Karachay-Cherkess Rep. (0.33). Oryol Oblast (0.37). Rep. of Ingushetia (0.45), Ryazan Oblast (0.49).
Source: EMISS data.	

The indicators reflecting the socio-economic and migration situation, climate and some other characteristics of the region were tested as factors.

To calculate the indicators characterizing the level of labor immigration in the regions we used data from Rosstat on *legal employment of foreign citizens* in Russian regions and on the *number of foreign citizens* (at the place of residence).

The level of legal employment of foreign citizens (**M1**) is the number of foreign citizens with a valid work permit or a valid employment patent per 1,000 people at the end of the year. This indicator has certain drawbacks. First, data on patents by region are available only since 2013, although purchase of patents for foreigners was introduced in the middle of 2010. Second, the greatest number of foreign employees in Russia is usually observed in the second and third quarters, rather than at the end of the year. Third, until 2011, the number of granted permits during a year was published, rather than the number of valid work permits at the end of the year. Thus, the data do not fully meet the comparability criterion.

The index of international migrant arrival in the region (**M2**) is calculated as follows. First, we calculate the international migrant arrival coefficient per 100,000 people. Then, for each region and each year we calculate the index of international migrant irrival, which represents the percentage of arrival coefficient to the region to arrival coefficient to Russia in a given year, i.e. the national level is taken as 1. It is noteworthy that the rules of statistical accounting of international migration for the period 2005–2016 changed many times and even more significantly than statistics on labor migration. As a result, Rosstat data do not reflect the real changes in migration over time, although they help compare regions with each other in each year. In this regard, we apply the above two-step method. As a result, we get an indicator more consistent with the criterion of comparability in time and space.

Variables **M1** and **M2** complement each other and both reflect the level of labor immigration, as most foreign citizens arriving in the region for a period of 9 months or more are labor migrants. Some of them, however, move to Russia for permanent residence. Unlike **M2**, **M1** does not include labor migrants from countries of the Eurasian Economic Union (EAEU), but includes labor migrants who arrive for a period of 3–9 months. It can be assumed that illegal migrants are attracted to the same regions as legal ones. Variables **M1** and **M2** can then be considered to indirectly reflect the impact of illegal labor immigration as well.

We selected the following indicators of the socio-economic situation in a region.

Level of education index in an entity (**ILE**) which is calculated according to census data as the sum of products of share of people with a certain level of education and the score assigned to this level. Including: no education – 0, primary general education – 1, secondary general and primary vocational education – 3, secondary vocational education –4, incomplete higher education and bachelor's degree – 5, higher education and postgraduate studies – 6. For years between censuses it is accepted that the level of education was changing linearly.

Data on *living space per person* at the beginning of the year (LS); the share of households *without sewage* (WS) and *hot water* (WHW) are also taken from censuses. We also assume the between the censuses, the situation was changing linearly.

Employment rate (**ER**) is the share of employed among people aged 15–72. *The level of monetary income* (**LMI**) is calculated as the ratio of per capita monetary income of the

population to living wage in the region. That is, monetary incomes equaling living wage are taken as 1. In both cases – Rosstat data are used.

Data on alcohol abuse per 10,000 people (**Alc**) are taken from EMISS (rate per 100,000 people).

Climate indicators can influence people's physiological functions and behavior and are therefore included in the list of variables. The average monthly air temperature in January (**T1**) and July (**T7**) is taken as the average monthly air temperature (data of the Federal Service for Hydrometeorology and Environmental Monitoring).

Moreover, region's characteristics such as population density (**PD**), share of urban population (**SUP**), total fertility rate (**TFR**), that is, the number of children born per 1,000 people, the share of children (%) and adolescents aged 1–4 years (**C0104**), 5–9 (**C0509**), 5–14 and 15–19 (**C1519**) at the beginning of the year, as well as the number of abortions per 1,000 people (**TAb**) were tested. By adding TAb(t) to TFR(t+1) we obtain an approximate representation of the share of pregnant women (**TPr**) in the region in year *t*. This makes sense since pregnant women are subject to mandatory medical examination. This is the variable that was tested in models; TAb and TFR performed an auxiliary role. We also introduce a fictitious **NatR** variable, which equals 1 if the region is "national" (republic or autonomy), and 0 – if otherwise.

Research results

Preliminary correlation analysis (*Table 2*) shows that the spread of a number of socially dangerous diseases (tuberculosis, syphilis and enterobiasis) is closely related to the general socio-economic situation in the region (poverty, poor housing conditions, alcohol abuse, low employment rate). Some others (HIV, chronic viral hepatitis, pediculosis), on the contrary, are more common in economically prosperous regions. There may be problems identifying these diseases in poor regions. Drug addiction occupies an intermediate position: it has no significant correlation with socio-economic

Table 2. Correlation coefficients between morbidity rate in Russian regions and various indicators

	B1	B2	B3	B4	B5	B6	B7	B8	B9
M1	0.105	0.057	0.190	0.138	-0.066	**0.365**	**0.394**	0.123	0.217
M2	0.063	-0.082	-0.143	0.015	**-0.255**	0.006	**0.342**	0.147	**0.263**
LMI	0.238	**-0.288**	-0.225	0.094	-0.184	**0.360**	**0.269**	0.146	**0.273**
LS	0.119	**-0.382**	**-0.317**	-0.192	**-0.278**	-0.059	-0.119	0.012	0.051
WS	**-0.276**	**0.437**	**0.399**	-0.076	**0.544**	-0.223	-0.245	-0.177	-0.231
WHW	-0.244	**0.380**	**0.299**	-0.103	**0.483**	**-0.274**	**-0.262**	-0.170	-0.231
ILE	**0.298**	**-0.270**	**-0.293**	-0.003	**-0.346**	**0.509**	**0.374**	0.195	0.191
Alc	-0.176	0.242	**0.379**	0.138	0.140	0.060	**0.268**	0.134	0.230
ER	0.234	-0.192	-0.125	0.017	-0.143	**0.299**	**0.376**	0.079	0.246
T1	**-0.297**	**-0.544**	**-0.420**	-0.178	**-0.413**	-0.050	**-0.300**	-0.003	-0.129
T7	-0.184	**-0.283**	**-0.278**	-0.192	**-0.294**	-0.125	**-0.462**	-0.001	-0.195
PD	0.071	-0.186	-0.052	0.031	-0.176	**0.779**	**0.277**	0.170	0.040
SUP	**0.351**	-0.048	-0.057	**0.250**	-0.183	**0.406**	**0.381**	0.205	**0.340**
NatR	**-0.256**	0.013	0.104	-0.156	**0.303**	-0.135	-0.076	-0.243	-0.147
TFR	0.019	**0.281**	**0.265**	-0.059	**0.356**	-0.092	0.114	-0.080	-0.051
TAb	-0.161	**0.537**	**0.555**	0.226	**0.502**	-0.028	**0.345**	0.059	0.206
C0104	0.027	0.132	0.066	-0.110	**0.426**	-0.171	0.024	-0.184	-0.091
Period	2005–2016	2005–2016	2005–2016	2005–2016	2009–2016	2010–2016	2010–2016	2010–2016	2010–2016

indicators. Apparently, other factors are more important for it, the correlation with which was not considered. Significant correlation coefficients are highlighted in bold in the table. A strong correlation between TAb and detection of new cases of diseases such as tuberculosis, syphilis and chronic viral hepatitis is noteworthy. It is possible that the diagnose could be one of the reasons why women decide to terminate their pregnancy.

Judging by the table of correlation, it can be assumed that international immigration has an impact on the spread of pediculosis and viral hepatitis in Russia. On the other hand, both diseases are more common in economically prosperous regions attractive to migrants, so the correlation may be accidental. Econometric modeling provides a more accurate image.

Tables 3–5 present the results of simulation. Equation coefficients are random values, so after each in brackets its standard deviation (standard error) is specified. The significance level of coefficients is indicated by asterisk: * – 0.1, ** – 0.05, *** – 0.01, **** – 0.001; N – number of observations, R^2 – determination coefficient.

Minor factors were excluded from the models except for migration indicators. A factor was also excluded from the model if it could be assumed that the sign of a coefficient is distorted as a result of multicollinearity. In Table 1, we see that for each disease there are hotspots of highest prevalence, with the situation changing rather slowly from year to year. Therefore, each model includes an additional factor – morbidity in the previous period.

Interpretation and discussion of results

The most important role in identifying new cases of each of the diseases under review belongs to the situation with the same disease in the previous year. These variables reflect the impact of factors operating in previous periods,

Table 3. Models to identify new cases of HIV, active tuberculosis and drug addiction

Factors	Explained variable		
	B1	B2	B4
Constant	3.42** (1.72)	13.92**** (3.31)	10.11**** (2.96)
M1(*t*-1)	-0.0714* (0.0381)	–	–
M2(*t*-1)	0.0647 (0.5833)	–	–
M1	–	0.0328 (0.0235)	0.0328** (0.0130)
M2	–	-0.293 (0.347)	-0.277 (0.196)
ILE	–	–	-3.275**** (0.977)
WS	-0.129*** (0.041)	–	–
AIc	-0.149** (0.073)	0.0213**** (0.0048)	–
ER	–	-0.190**** (0.057)	–
SUP	–	–	0.0649**** (0.0148)
T1	-0.405**** (0.076)	–	–
B1(*t*-1)	0.914**** (0.015)	–	–
B2(*t*-1)	–	0.935**** (0.008)	–
B4(*t*-1)	–	–	0.843**** (0.016)
B1	–	0.0317**** (0.0084)	–
B4	0.188**** (0.045)	–	–
t	–	-0.495**** (0.102)	-0.144**** (0.055)
Note			
N	906	907	911
R^2	0.868	0.949	0.798
Period	2006–2016	2006–2016	2006–2016

Table 4. Models to identify new cases of syphilis, enterobiasis and pediculosis

Factors	Explained variable		
	B3	B5	*Ln*(B6)
Constant	-5.43 (5.64)	-103.7**** (13.6)	-0.910** (0.417)
M1	0.0008 (0.0552)	-0.168 (0.131)	0.00121 (0.00159)
M2	0.665 (0.731)	0.319 (1.464)	0.00581 (0.01494)
LMI	-2.92*** (1.06)	–	–
WHW	–	0.447**** (0.133)	0.00474*** (0.00152)
ILE	–	–	0.174* (0.102)
NatR	–	11.33**** (3.10)	–
SUP	–	0.675**** (0.141)	0.00692**** (0.00186)
Ln(PD)	1.99**** (0.47)	–	–
TPr	0.650**** (0.179)	–	–
C0509	–	–	0.0230** (0.0113)
T1	-0.395**** (0.108)	–	–
B3(*t*-1)	0.785**** (0.016)	–	–
B5(*t*-1)	–	0.959**** (0.014)	–
Ln(B6(*t*-1))	–	–	0.865**** (0.020)
T	-0.857**** (0.207)	5.11**** (0.60)	–
Note			
N	907	581	491
R^2	0.871	0.928	0.900
Period	2006–2016	2010–2016	2011–2016

Table 5. Models to identify new cases of chronic and acute viral hepatitis

Factors	Explained variable		
	B7	B8	B9
Constant	-8.71*** (3.12)	0.7630**** (0.1956)	-0.7358*** (0.2743)
M1	-0.0021 (0.0542)	0.0032 (0.0029)	-0.0035 (0.0036)
M2	-0.526 (0.553)	0.0000 (0.0328)	0.0857** (0.0359)
LMI	2.01** (0.87)	–	0.0013** (0.0006)
NatR	–	-0.1833*** (0.0665)	–
SUP	0.0842** (0.0409)	–	0.0051* (0.0029)
Ln(PD)	–	0.0364** (0.0159)	–
TPr	–	–	0.0154* (0.0070)
B1	–	0.0014* (0.0007)	–
B3	0.0926**** (0.0207)	–	–
B4	–	–	0.0110*** (0.0039)
B7(*t*-1)	0.857**** (0.016)	–	–
B(*t*-1)	–	0.5030**** (0.0321)	–
B9(*t*-1)	–	–	0.5781**** (0.0307)
T	–	-0.0497*** (0.0180)	–
Note			
N	492	496	498
R^2	0.909	0.492	0.581
Period	2011–2016	2011–2016	2011–2016

included and excluded from the models. Thus, the correlation table and the table with model coefficients complement each other.

Econometric simulation has established a clear link between the spread of HIV, drug addiction, active tuberculosis, and acute hepatitis B and C. Drug addicts remain one of the main HIV and hepatitis C risk groups. HIV-positive people are at high risk of contracting tuberculosis and they more often diagnosed with hepatitis B than other population groups.

Among the diseases under review HIV is currently the greatest threat to the Russian population not only due to the severity of consequences, but also due to the fact that HIV epidemic in Russia is happening on a massive scale, although in 2016 the number of first diagnoses was less than in 2014–2015. According to the model, a typical region with the largest number of new cases detected is an entity with cold winter and low degree of alcohol abuse, without any significant problems with sewage. In other words, these are mostly relatively prosperous places. Perhaps, the reason is that HIV came to the USSR from abroad and the residents of more prosperous regions had more foreign contacts. At the same time, drug addiction incidence factor is significant in the model. From all this, it can be concluded that there is a problem with detecting HIV infection in the country. Drug addicts are diagnosed with HIV not only because they are one of the main risk groups (for comparison: in 2014, 21,000 people were diagnosed with drug addiction for the first time and the number of infected with HIV through intravenous drugs in the same year amounted to 22,468 people[9]), but also because they are obligatory examined for this disease. However, it can be argued that there is no widespread high prevalence of HIV infection yet, warm "national"[10] regions with a high share of rural population seem the most prosperous in this regard. However, the performance of the correlation coefficient between B1 and TPr is alarming: from -0.161 in 2005 to 0.033 in 2015 and 0.121 in 2016. This may indicate that the official number of HIV cases detected in 2016 has decreased, largely due to the fact that the number of examined people has decreased. Immigration and legal employment of foreign citizens do not affect HIV incidence for the reason that mostly migrant workers come from countries where HIV prevalence is much less than in Russia (exception – Ukraine).

The prevalence of tuberculosis is traditionally higher in poor and cold regions with poor housing conditions and relatively low levels of education. The simulation shows that new foci of active tuberculosis were more frequent in regions with higher levels of alcohol addictio, relatively low employment rate and higher HIV prevalence. It is not clear why there is a sustained high correlation between B2 and the share of pregnant women. There are two possible explanations. Either there are problems detecting the disease: it is detected where it is looked for, and pregnant women must be examined, or the reason is that in poor regions the birth rate is usually higher. The importance of the time factor with a negative coefficient indicates medical advances in fighting against tuberculosis. However, the HIV epidemic can reverse this process. This is evidenced by the fact that the correlation between B1 and B2 increases over time: from -0,030 in 2005 to

[9] HIV infection: information bulletin. No. 40. Central Research Institute of Epidemiology, Federal Research Center for HIV Prevention and Control. http://www.hivrussia.ru/files/bul_40.pdf

[10] In the southern republics, official statistics reflect the real situation even less than in other Russian regions as there HIV-infected are outcasts, so people refuse to be examined. Source: https://www.svoboda.org/a/29281743.html (accessed: 03.09.2018).

0,367 in 2016. The connection of tuberculosis with HIV infection is well known [11; 13; 16]. Immigration has no impact on the spread of tuberculosis, although in most countries of origin of migrant workers the incidence is higher, perhaps, for the reason that foreign citizens diagnosed with tuberculosis must leave the country[11]. Foreigners who are in the country without permits also pose a threat for the Russian citizens. Therefore, the state's objective is to stimulate legal employment for foreign citizens.

Models for B4 include a time factor with a significant negative coefficient, that is, in general, the severity of the drug addiction problem is reduced. The slowest decline in the number of new cases of drug addiction is in regions with a high share of urban population and a relatively low level of education, as well as in places attractive to labor immigrants. Drug addiction is the only disease where the coefficient under M1 variable is significant and positive. Therefore, either part of the migrants who apply for a patent to work in Russia are in fact drug distributors, or drug trafficking routes for some other reasons partly lie in the regions that attractive to labor immigrants. Perhaps in both cases we are talking about effective demand for drugs and migrant labor. This issue requires further research. It is noteworthy that the models for B4 have the lowest determination coefficient. Therefore, they probably lack some important factors that have not been considered here. Perhaps, if they were included in the model, the result would be different.

We have also found a statistically significant link between syphilis incidence and detecting chronic viral hepatitis, although syphilis incidence is declining rather rapidly and there is no progress in fighting against chronic viral hepatitis.

New cases of syphilis are most common in regions with low incomes, a relatively high share of pregnant women and a high population density. The last two factors suggest that there are serious problems detecting syphilis. After all, low population density can affect the access to health services. Unfortunately, official figures do not give an idea of what share of the region's population live in settlements without healthcare facilities. According to the model for B3, immigration has no impact on the spread of syphilis, which is probably explained by the fact that this is a disease which obliges a foreign citizen to leave the Russian territory if they are diagnosed with it.

Chronic viral hepatitis is a disease which is difficult to detect. This is evidenced by the correlation table and the model for B7. Apparently, people diagnosed with alcohol addiction (alcohol contributes to the transition of hepatitis B and C to a chronic form) and syphilis, as well as pregnant women must be examined for viral hepatitis, so these diseases are detected. The correlation with syphilis is stable decreasing with the incidence of alcohol addiction (from 0.364 in 2012 to 0.173 in 2016) and growing with the share of pregnant women (from 0.175 in 2010 to 0.280 in 2015). It can also be assumed that well-off urban residents of economically prosperous regions are most often examined on their own initiative. The factor of population density is also significant, that is in fact the factor in territorial accessibility of medical services.

N. Kovalenko, a representative of the MOO "Together against hepatitis" patient organization, says: "a person diagnosed with hepatitis may simply not know about it.

[11] The list of Infectious socially dangerous diseases justifying the refusal to issue or cancellation of the temporary residence permit of foreign citizens and stateless persons, or residence permit, or patent, or work permit in Russia: Order of the Ministry of Health of the Russian Federation no. 384n, dated 29.06.2015.

The state merely does not provide funds for treating viral hepatitis. Patients is treated at the regional level"[12]. However, in most cases regions also lack funding. However, since the 2000s, mandatory vaccination of children against hepatitis B has been introduced and any Russian under 55 can also be vaccinated free of charge[13]. However, social advertising in this regard in Russia is practically absent.

Viral hepatitis is often detected among HIV-positive people, hepatitis C being detected several times more often than hepatitis B [25; 26], however, from models for B7-B9, variable B1 is significant only in the model for B8, and the factor B4 – only in the model for B9. The latter can be explained by the fact that intravenous drug use is one of the main routes of both HIV and hepatitis C. The importance of factors such as population density (in the model for B8) and especially TPr (for B9) indicate that the detected cases of acute hepatitis B and C are only the top of the iceberg.

Immigrants are not obliged to undergo a medical examination to detect hepatitis, although a number of studies [19, 20] revealed a fairly high level of hepatitis among foreign citizens who arrive in Russia. The simulation shows that immigration is not a factor in spread of chronic viral hepatitis and acute hepatitis B in the Russian regions. However, factor M2 is significant in the model for B9 (acute hepatitis C).

Enterobiasis is called "a dirty hands disease" so it is not surprising that B5 has such a large correlation with lack of sewage and hot water. WHW factor is selected out of these two factors correlating among themselves for the model. Enterobiasis is also the only disease under review that is more common in national regions, especially with a high share of the urban population. The time factor indicates the deteriorating situation. In fact, in 2016 more cases were recorded in Russia (excluding Crimea) than in 2011–2015, although less than in 2009–2010. This may partly be due to the increasing share of young children as they get infected most often.

In the model for detecting pediculosis, the explained variable is taken in a logarithmic form as it has a log-normal distribution: the incidence rate in Moscow is several times higher than in the second and third worst regions for this indicator. It is quite a typical situation when urban primary school students have lice after visiting summer camps[14], so variables SUP and C0509 are significant in the model for *Ln* (B6). Other significant factors show the importance of sanitation at home, as wells the fact that more educated people prefer to consult a doctor, rather than self-medicate when they detects this delicate problem.

International migration has no impact on the spread of enterobiasis and pediculosis.

Thus, an econometric study has shown that immigration appears to have an impact only on the spread of drug addiction and acute hepatitis, and that other infectious diseases tend to be associated with poor sanitation and socio-economic conditions (tuberculosis, syphilis and enterobiasis), or there are problems detecting them, while the real incidence rate in the country is unknown (HIV and viral hepatitis). We also reveaed a significant statistical correlation between groups of diseases: 1) drug addiction, HIV, active tuberculosis,

[12] Hepatitis in Russia: standards of treatment and case patients are required. RIA news. Avaiable at: https://ria.ru/disabled_know/20150728/1151262234.html (accessed: 15.03.2018).

[13] Hepatitis B vaccination for adults. Available at: http://vrachmedik.ru/300-privivka-ot-gepatita-b-vzroslyim.html (accessed: 15.03.2018).

[14] Berishvilli N. Pediculosis spread to schools. *Isvestiya newspaper,* 2017. August 15th. Available at: https://iz.ru/628867/pedikulez-idet-v-shkolu (accessed: 15.03.2018).

acute hepatitis and 2) alcoholism, syphilis, chronic viral hepatitis.

It is noteworthy that the reliability of results of the econometric study is directly related to the quality of original statistics and unfortunately it cannot be considered satisfactory.

In general, the research results are consistent with the findings of the WHO regional office for Europe that there is no systematic link between migration and serious contagious diseases and that contagious diseases, including socially dangerous ones, are mainly linked to poverty.

References

1. Singh G.K., Siahpush M. All-cause and cause-specific mortality of immigrants and native born in the United States. *American Journal of Public Health*, 2001, vol. 91, pp. 392-399.
2. Hyman I. *Immigration and health*. Ottawa, 2001.
3. Armfield J., Roberts-Thomson K., Spencer A. *Australia's Health 2000: the seventh biennial health report of the Australian Institute of Health and Welfare*.Australian Institute of Health and Welfare. Canberra, Australia, 2000.
4. Toma L. *Immigration phenomenon and right to health in Italy*. Metropolis Conference, Rotterdam, 2001. Available at: http://international.metropolis.net/events/rotterdam/papers/1_toma.htm (accessed: 14.03.2018).
5. Newbold B. Health status and health care of immigrants in Canada: a 1longitudinal analysis. *Journal of Health Services Research & Policy*, 2005, vol. 10, pp. 77-83.
6. Markides K.S., Eschbach K. Aging, migration, and mortality: current status of research on the Hispanic paradox. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 2005, vol. 60 (Special Issue 2), pp. 68-75.
7. Khlat M., Darmon N. Is there a Mediterranean migrants mortality paradox in Europe? *International Journal of Epidemiology*, 2003, vol. 32, pp. 1115-1118.
8. Razum O., Zeeb H., Akgun H.S., Yilmaz S. Low overall mortality of Turkish residents in Germany persists and extends into a second generation: merely a healthy migrant effect? *Tropical Medicine & International Health*, 1998, vol. 3, pp. 297-303.
9. Franzini L., Ribble J.C., Keddie A.M. Understanding the Hispanic paradox. *Ethnicity and Disease*, 2001, vol. 11(3), pp. 496-518. Available at: https://www.ncbi.nlm.nih.gov/pubmed/11572416 (accessed: 14.03.2018).
10. Kislitsyna O.A. Health differences between migrants and indigenous population in Russia and other countries of European region. *Sotsial'nye aspekty zdorov'ya naseleniya=Social aspects of population health*, 2013, vol. 31, no. 3. Available at: http://vestnik.mednet.ru/content/view/478/30/lang,ru/ (accessed: 14.03.2018). (In Russian).
11. Tavares A.M., Fronteira I., Couto I., Machado D., Viveiros M., Abecasis A.B., et al. HIV and tuberculosis co-infection among migrants in Europe: A systematic review on the prevalence, incidence and mortality. *PloS one*, 2017, vol. 12 (9). Available at: https://doi.org/10.1371/journal.pone.0185526 (accessed: 14.03.2018).
12. Melosini L., Vetrano U., Dente F.L., Cristofano M., Giraldi M., Gabbrielli L., Novelli F., Aquilini F., Rindi L., Menichetti F., et al. Evaluation of underreporting tuberculosis in Central Italy by means of record linkage. *BMC Public Health*, 2012, vol. 12(1), p. 472. Available at: https://doi.org/10.1186/1471-2458-12-472 (accessed: 14.03.2018).
13. Farchi S., Mantovani J., Borgia P., Giorgi R.P. Tuberculosis incidence, hospitalisation prevalence and mortality in Lazio, Italy, 1997–2003. *The International Journal of Tuberculosis and Lung Disease*, 2008, vol. 12(2), pp. 193-198. Available at: https://www.ncbi.nlm.nih.gov/pubmed/18230253 (accessed: 14.03.2018).
14. Nightingale S., Stormon M.O., Day A.S., Webber M.T., Ward K.A., O'Loughlin E.V. Chronic hepatitis B and C infection in children in New South Wales. *Medical Journal of Australia*, 2009, vol. 190(12), pp. 670-673. Available at: https://www.ncbi.nlm.nih.gov/pubmed/18230253 (accessed: 14.03.2018).

15. Shcherbak N.Ya., Ulyukin I.M. Opyt organizatsii meditsinskogo osvidetel'stvovaniya inostrannykh grazhdan i lits bez grazhdanstva v usloviyakh megapolisa. *Zdorov'e–osnova chelovecheskogo potentsiala: problemy i puti ikh resheniya=Health is the basis for human potential: problems and solutions,* 2014, vol. 9, no. 2. (In Russian).
16. Demikhova O.V., Nechaeva O.B. *Voprosy dostupa migrantov k meropriyatiyam po rannemu vyyavleniyu, diagnostike, profilaktike i lecheniyu tuberkuleza i tuberkuleza, sochetannogo s VICh-infektsiei v stranakh SNG (analiticheskii obzor)* [Issues of migrants' access to events on early detection, diagnosing, prevention, and treating tuberculosis and HIV-associated tuberculosis in CIS countries (analytical report)]. Moscow, 2016. Available at: http://mednet.ru/images/stories/files/CMT/migranty.pdf (accessed: 20.03.2018).
17. Prokhorov B.B. Social stratification of the society and population' health. *Problemy prognozirovaniya=Issues of Forecasting*, 2009, no. 3. Available at: https://ecfor.ru/wp-content/uploads/2009/fp/3/09.pdf (accessed: 14.03.2018). (In Russian).
18. Rashkevich E.E. et al. Screening and verifying tuberculosis among children from migrant families. *Smolenskii meditsinskii al'manakh=Smolensk Medical Almanac*, 2016, no. 1. Available at: http://cyberleninka.ru/article/n/skrining-i-verifikatsiya-tuberkuleznoy-infektsii-u-detey-iz-semey-migrantov (accessed: 15.11.2017). (In Russian).
19. Mal'tseva N.S., Starostina I.S., Kuznetsova S.A. On the frequency of detecting hepatitis B and A among labor migrants in Khabarovsk. *Dal'nevostochnyi zhurnal infektsionnoi patologii=The Far-Eastern Journal of Infectious Pathology*, 2009, no. 14, pp. 63-64. (In Russian).
20. Alsalikh N.D., Sychev D.A., Podoprigora I.V. The incidence of viral hepatitis C among labor migrants coming to Russia. *Elektronnyi nauchno-obrazovatel'nyi vestnik "Zdorov'e i obrazovanie v XXI veke"=Educational E-Journal "Health and Education in the 21st Century"*. 2017, vol. 19, no. 7. (In Russian).
21. Alsalikh N.D. et al. The prevalence of serological markers of viral hepatitis among labor migrants arriving in the Russian Federation. *Zhurnal infektologii= Journal of Infectology*, 2017, vol. 9, no. 2, pp. 80-85. DOI: 10.22625/2072-6732. (In Russian).
22. Istomin P.V., Mefod'ev V.V., Bychkov V.G. The menifestations of HIV in the Yamalo-Nenets Autonomous Okrug. *Meditsinskaya nauka i obrazovanie Urala=Medical Science and Education in the Urals*, 2017, vol. 18, no. 1, pp. 92-97. (In Russian).
23. Solonin S.A. et al. The circulation of hepatitis E in Khabarovsk Krai. *Dal'nevostochnyi zhurnal infektsionnoi patologii=The Far-Eastern Journal of Infectious Pathology*, 2010, no. 16, pp. 31-36. (In Russian).
24. Struin N.L., Shubina A.S. Social infections among migrants, factors contributing to morbidity: literature review. *Mezhdunarodnyi zhurnal prikladnykh i fundamental'nykh issledovanii=International Journal of Applied and Fundamental Research*, 2015, no. 11-5, pp. 676-679. (In Russian).
25. Kravchenko A.V. Parenteral viral hepatitis among HIV-positive people. *ShAGI professional=ShAGI Professional*, Special Issue, 2016, no. 67, p. 4. Available at: http://stepsfund.ru/zine/sp_07_2016.pdf (accessed: 14.09.2018). (In Russian).
26. Maksimov S.L., Tsarenko S.P., Kravchenko A.V., Gankina N.Yu., Yushchuk N.D. Markers of chronic hepatitis B among HIV-positive peopleand approaches to therapy. *Rossiiskii zhurnal gastroenterologii, gepatologii, koloproktologii=Russian Journal of Gastroenterology, Hepatology, Coloproctology*, 2010, vol. 20, no. 5, pp. 22-26. Available at: http://www.gastro-j.ru/files/s4_1288294380.pdf (accessed: 14.09.2018). (In Russian).

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University Partnership System as a Factor in the Development of Youth Entrepreneurship*

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Abstract. Economic development dynamics present a number of challenges to the system of higher education. Among these tasks, an important one is to train specialists who would meet the needs of the labor market. One of the components of this market is entrepreneurship, which, according to some scientists, can become a real driver of the national economic system and serve as the basis for increasing the welfare of citizens. The desire to engage in entrepreneurial activity should be conscious, and the activity itself should be prepared in advance. Education system in cooperation with business, non-governmental organizations and other partners is able to form such a desire and provide the necessary basic knowledge for the implementation of the plans of young entrepreneurs. Constructive building of partnership relations defines strategic development prospects for many educational institutions and within the "youth-entrepreneurial" context as well. The goal of our research is to determine the emotional

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readiness of university students to acquire entrepreneurial skills with participation of university partners. We suggest that partners, including business, public and municipal administration, scientific and non-governmental organizations, are able to intensify the development of entrepreneurial initiatives among university students, thereby promoting the development of entrepreneurship in general, and addressing the problems of employment of the younger generation. Emphasis on the participation of university partners in the development of entrepreneurial skills of students distinguishes our study from similar ones, thereby complementing similar works of other authors. The survey we carried out allowed us to study the opinion of 630 university students from three Russian cities. The results of the study demonstrate the emotional readiness of almost half of the respondents to engage in their own business. However, the existing restrictions and risks reduce the number of those who consider the option of organizing their own business as the main career path. Respondents consider it important to involve partners in the process of initiation and development of entrepreneurs; university partners, in turn, are able to complement the educational process.

Key words: youth entrepreneurship, partnerships, university partners.

1. Introduction

Modern trends in the world economy boost authorities and business structures' interest in the development of entrepreneurial initiatives of the younger generation. Thus, according to the results of the global survey of employment and youth entrepreneurship, conducted by the British audit and consulting company Ernst&Young, 47% of the surveyed entrepreneurs plan to hire employees outside the domestic market [1, p.4]. Entering new markets is the main reason for this process. At the same time, entrepreneurs understand that young people can be one of the main sources of their business development: only 14% of the entrepreneurs note that they do nothing to increase employment among young people. In other words, most entrepreneurs are interested in the emergence of initiative young professionals and business projects.

In this article the authors rely on the definition of youth entrepreneurship, enshrined in the RF Government Decree dated November 29, 2014, no. 2,403-p "On approval of the foundations of the RF state youth policy for the period up to 2025", where youth entrepreneurship is interpreted as entrepreneurial activity of citizens under 30, as well as legal entities(small and medium-sized businesses), whose average age of full-time employees, and also the age of a head does not exceed 30 years or the share of deposits of persons not older than 30 in the authorized (reserve) capital exceeds 75%.

At present youth entrepreneurship is increasingly coming to the attention of various socio-economic studies organized not only by universities and scientific organizations, but also analytical agencies and professional communities [2]. Such studies analyze problems, limitations, factors [3], as well as mechanisms to support youth entrepreneurship initiatives in different countries [4] and consider the extent of youth involvement in entrepreneurial activities [5, p. 128-135].

The significance of such studies is determined by the fact that – and here we will slightly paraphrase the Brazilian colleagues' words studying immigrants' behavior – entrepreneurship can become a "kind of creative response" [6, c. 242-258] of young people "seeking better working and living conditions".

However, among the respondents within the framework of the above study Ernst&Young[1], a large number of young entrepreneurs note that they have difficulties in creating and organizing their business at all levels – regional, national and global. The key obstacles to the implementation of entrepreneurial aspirations are as such: unavailability of funding sources – 43%; unfavorable economic factors – 43%; competition – 25%; inability to get good advice/consultation – 25%; lack of self-confidence – 25%; limited opportunity for internship – 18%.

Thus, almost half of the most popular reasons are directly or indirectly caused by a lack of knowledge: "inability to get good advice", "a lack of confidence in own capabilities", and "limited opportunity for an internship". The modern system of higher education is able to make significant progress in solving these problems.

In the article by T. Golovina et al. [7, pp. 42-61] the review of the system of youth entrepreneurship state support helps make a conclusion about the necessity to develop integration forms of the youth business–state interaction at the premises of universities ensuring the formation and development of, first of all, student technological entrepreneurship. The article authors emphasize the need for close cooperation of universities with authorities, private foundations and development institutions in solving entrepreneurship development problems.

However, in our opinion, the interaction field for entrepreneurship development is somewhat wider, and it covers a larger range of stakeholders. Combining the capabilities of universities with the competencies of business, as well as public, state and scientific environment can give a noticeable positive impetus to the development of youth entrepreneurial initiatives. The system of partnership, essential in many areas, plays a special role. The ability to build relationships is important for higher education. In recent years the issue of building long-term relations between universities and their partners has been actively discussed. Enterprises of different sizes and activity spheres, authorities, scientific organizations and public associations are among the partners. The possibility to transform from the transactional interaction logic to a multilateral cooperation system is analyzed. With this approach the role of universities is significantly widen. They become not only partners of individual companies and industries, but also act as a factor in the development of regional communities. Construction of beneficial partnership relations defines strategic development prospects for many educational institutions, including within the "youth-entrepreneurial" context.

All of the above makes our study relevant; its main purpose is to determine students' emotional readiness to acquire entrepreneurial skills with the participation of university's partners. The authors suggest that university's partners, including business, public administration, scientific and public organizations, are able to intensify the development of entrepreneurial initiatives among students, thereby having a positive impact on the development of entrepreneurship in general, as well as to solve the problems of younger generation employment. This study continues the series of works of Institute of Economics at the Russian Academy of Sciences (Ural Branch), devoted to the comparative studies of youth vision of the

[1] The study was conducted in Australia, Brazil, Canada, China, France, Germany, India, Japan, Mexico, the United Kingdom, the United States, Tropical Africa, the Middle East and North Africa).

role, entrepreneurship plays in territorial development [8, pp. 13-30], and to the Ural students' readiness to engage in entrepreneurial activity [9, pp. 206-222].

2. University partnership: concepts and perspectives for youth entrepreneurship

As part of the theoretical part of the article, the authors find it appropriate to consider not entrepreneurship, which has long been studied by economists, sociologists and psychologists, but forming university partnership concepts.

The theoretical basis of partnership consists of several scientific areas, with management being the most important. Management theories in terms of partnership characterize management models in various fields and activities aimed at creating and retaining partners as a management object. The approaches actively used in modern management practice are of particular interest: a corporate management theory; an E-government concept; a stakeholder theory.

However, the academic environment of the university, due to its specificity, requires additional approaches and elaboration of unique models for its management. One of these models was worked out in the mid-1990s and called the "triple helix" [10. p. 180]. On the basis of the principles of knowledge-focused society the model developers suggest that the strengthened interaction of universities, business and government will lead to a significant effect in economic development. In this interaction universities adopt certain features of business and government structures and become the basis for innovation, research and development and entrepreneurial projects. Convergence of positions, development of joint projects, creation and implementation of development programs by universities, business and government are the main essence of the "triple helix" model. Figuratively this model describes the intersection of 3 subsets, when the elements of one system can perform the functions of another. Due to such interference, hybrid institutional forms are created, in which the preservation of a high degree of autonomy is possible with a strong relationship of elements of initially different systems [11]. It is noteworthy that the evolution of universities in this model involves the adoption of business structures principles and the formation of an innovation ecosystem. Business, in turn, has wider cooperation with scientific and educational environment and participates in the development of state initiatives; authorities rely on opinions of science, education and business in decision-making.

The "triple helix" ideology has encouraged the scientific community's research in the features of relationship between business and universities [12, p. 42]. Business stimulate the process of interaction due to increasing competition, globalization of activities, growing costs of labor resources, significant rates of economic development in many world countries. The approach, promoting the ideas that are exclusively a joint result of the created eco-culture "enterprise-university" and are able to respond to many requests of the time, provides the basis for long-term growth and development of business [13, p. 80].

On the other hand, there is a need for universities to search for extra-budgetary revenue sources, which forces them to commercialize their projects and competencies [14, pp. 49-51]. To achieve this goal, there are a number of models (approaches). Receiving funding from business as university partners to the detriment of long-term relations is called as a transactional approach by some scientists. In the complex academic environment the transactional approach can greatly simplify business-university interaction.

The transactional approach can be applied at different levels: from a department or individual employee receiving his/her own benefit to the overall interaction level acceptable to an organization. Transactional interaction at the level of the whole university involves consideration of all departments' interests and can transform into a comprehensive long-term cooperation [15, c. 110]. However, this approach loses the fundamental features of creating long-term relationships, including exchange of informal knowledge, creation of trust, and development of cross-competencies.

Only the full involvement of business and universities in interaction processes helps obtain the strategic effect of cooperation. There are various models of such interaction, with the Partnership Continuum model proposed by W. Johnson [16] being the most well-known. The model describes the partner's increasing involvement in the activities of the university. The first stage reflects the mechanisms of students' awareness of an employer's HR-brand. In rare cases this stage includes the selection of interviews and opportunities for financial interaction among institutions based on the express method. But the last, fifth, stage is characterized by the presence of joint initiatives that allow for the implementation of state educational lobbying, joint elaboration of business projects, creation of innovative organizations and educational areas. The process is accompanied by significant donations to the university.

The logic of interaction is also revealed in other approaches, for example, in the "stairway" model developed by T. Baaken and successfully applied in the studies of university-business interaction in Europe [17, pp. 103-116]. The "stairway" model demonstrates organizational specifics of the development of relations with university partners. The relationship formation is based on the involvement of individuals and one-time contacts. The "upper step" of such interaction implies a long-term relationship with the university top management involvement and a systematic approach. At the same time, along with the financial basis of such interaction, non-financial values arise [18]:

– strategic positioning, strengthening the university brand through co-branding solutions with a business partner (in the educational, scientific environment of relations with authorities);

– development of relevant educational programs and an appropriate research agenda due to the expansion of competences;

– development of relations due to the choice of a long-term gradual engagement strategy (from first interaction experience to integrated projects).

In addition, many universities solve social problems in the process of their activities, which primarily imply the provision of educational services and the conduct of research. This type of activity is the basis of authority-university interaction. Many researchers refer a social function to a certain "third mission" of the university [19, pp. 67-72]. In the social sphere the university needs a coordinating partner – first of all, state bodies. The research in the specifics of interaction of the state, municipal authorities and the university is an important element for understanding the objectives of the functioning of a modern educational institution. For example, the classification of higher education institutions, proposed by D. Charles [20, p. 148], demonstrates the existence of partnerships between universities and regional authorities through the impact of university activities

on local social and economic systems. The researcher divides universities into five groups based on the institution role in relation to local government. For example, the first group is characterized by the inseparability of the city and the university. The university is perceived as a city, and the city – as a university: Cambridge, Oxford, Saint Andrews. The second group comprises former polytechnic institutions serving the tasks of industry. Despite the fact that universities are located in certain cities (Coventry, Sunderland, Derby), they primarily train personnel for regional production companies. The participation of educational institutions in the municipal society is limited to the interests of individual industrial groups. The following three groups of universities also determine the university role in relation to its location.

According to the above classification it can be concluded that there are different models of university activities that can have an impact on municipal and regional authorities. In some cases the university functioning is inextricably linked with a territory and determines its socio-economic strategy, in others – universities are quite isolated and do not influence the region of their presence, organizing their activities separately.

Similarly to the British, the Russian higher school has an institutional diversity of its existence in relation to authorities and local community. For example, considering a university-region interaction, O.V. Perfil'eva highlights 4 possible models to organize university activities under the influence of stakeholders [21, pp. 133-144]:

1. "University as a researcher" – the university's mission is inextricably linked with the global superiority on a research project market at the domestic level.

2. "University as a system integrator" – the university is considered as the main knowledge supplier to develop industries and territories across the country.

3. "University as a regional integrator" – the university that trains personnel for a regional labor market.

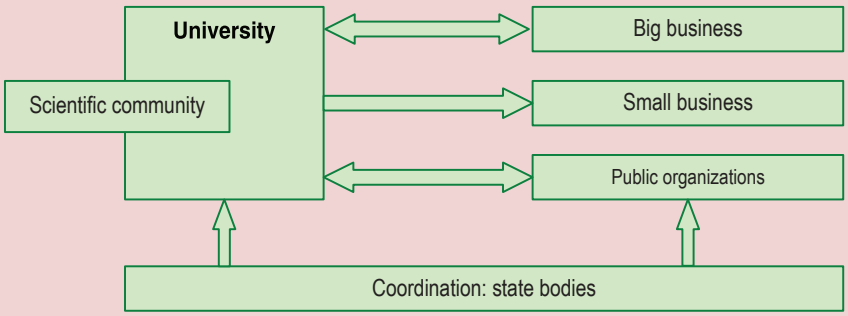
4. "University as a personnel supplier" – the university that performs the mission to train personnel for specific economic sectors.

In general, in our opinion, different models to organize university activities meet interests of different partners groups. For example, transactional interaction can be interesting for small business, as it helps solve its current problems, as a rule, related to the personnel issue. Complex interaction models give an opportunity to build long-term cooperation programs, implementing promising projects and activities designed for the joint development of large business structures and educational institutions. State and municipal authorities can act as coordinators of the public dialogue of universities, determining their social purpose and development strategies.

Returning to entrepreneurship-university relationship, it is important to emphasize the need to find effective mechanisms for involving the younger generation in entrepreneurial activities. Schematic relationship between business and other university partners is shown in *Figure 1.*

On the one hand, universities, as educational centers, implementing educational functions [22], have the opportunity to involve students in business activities, providing the necessary knowledge. On the other hand, university partners are able to actualize the knowledge acquired by the younger generation in the practical (entrepreneurial) context. At the same time, the substantive content of such

Figure 1. Interaction between universities and partners



interaction is the task of business, compatible with one of the traditional goals of universities – provision of relevant knowledge. At the same time, other partners, such as authorities and public organizations, can have a coordinating impact on this process. In general, such interaction is based on social partnership principles, currently discussed by expert community in relation to the education sphere[2].

When students are interested in organizing their own business, mutually beneficial cooperation of universities and their partners can be based on the forms, effective for the implementation in university environment. Also, such interaction can boost young people's interest in entrepreneurship in general. The results of the students survey in some higher education institutions helped determine the respondents' desire to engage in entrepreneurial activity, as well as identify possible forms of university partners participation in encouraging entrepreneurial activity of students.

3. Research method

When developing the research method, the authors rely on the established international and domestic practice of conducting such surveys. For example, the British audit and consulting company Ernst&Young conducts research in the field of youth entrepreneurship regularly. Experts are interested in the issues, such as: what discourages young entrepreneurs in the organization of their business; what mechanisms are necessary to increase the intensity of youth entrepreneurial projects development; how many young people are ready to engage in entrepreneurial activities.

In recent years the most complete study of young people's attitude to the organization of their own business is conducted in the framework of the Global University Entrepreneurial Spirit Students Survey (GUESSS)[3]. Personal motives, university environment, family and socio-cultural context of potential young entrepreneurs are analyzed. At the same time, their career preferences were studied in terms of the desire to engage in entrepreneurial projects in the future and the implementation of entrepreneurial initiatives at the moment. The research is regular, authoritative and has an academic partner in the Russian Federation (Graduate School of Management of the Saint Petersburg State University).

[2] *Social Partnership in the Education Sphere – Types, Tasks.* Available at: https://nalog-nalog.ru/socialnoe_partnerstvo/socialnoe_partnerstvo_v_sfere_obrazovaniya_vidy_zadachi/ (accessed November, 9, 2018).

[3] Shirokova G.V., Bogatyreva K.A., Belyaeva T.V., Tsukanova T.V., Laskovaya A.K. *Global Study of Entrepreneurial Spirit of University Students. National Report.* Graduate School of Management, Saint Petersburg University. 2016. Available at: http://gsom.spbu.ru/files/folder_11/guesss_2016_rus_final_v1.pdf (date accessed: 24.07.2018).

According to the 2016 GUESSS study results, more than 51% of the university students plan to work in their own company in 5 years after graduation. At the same time, no more than 11% of them plan to organize their own business immediately after graduation; the percentage of men who want to build a career as an entrepreneur immediately after graduation is higher than that of women (16% versus 8%). In addition, the greatest entrepreneurial intentions are revealed among the respondents, whose specialization is connected with economics and management, and the least – among those, who study Social Sciences.

According to results of the same study, university environment does not provide with necessary knowledge for doing business. Thus, more than 54% of the respondents studying at the university mention that "to date they have not had a entrepreneurship course". And only 4–5% of the respondents note that the environment formed in universities inspires the creation of new business. At the same time, training is an important element in building an entrepreneurial career for those who plan to do their own business immediately after graduation or in 5 years.

The environment of a respondent also has an impact on entrepreneurial preferences. First of all, it is the family and socio-cultural context. The GUESSS study proves that the immediate environment of students (family, friends and fellow students) is generally positive about their choice in favor of an entrepreneurial career. At the same time, behavioral moods of an individual significantly depend on the mood of the masses (collectivism) and are more often focused on the result under public pressure. All these signs indicate students' high entrepreneurship potential [23].

Partly relying on the GUESSS study, the authors have developed their own approach to

Table 1. Distinctive features of the author's approach and the GUESSS research

	Question groups	
Comparison criteria	**GUESSS**	**Study of the authors**
Students' emotional attitude	Creation of business while studying at the university. Motivation of university students – potential entrepreneurs. Sources of business ideas from university students. Career preferences. Index of entrepreneurial intentions. Locus of control (ability to control the situation).	Desire (willingness) to create and develop business. Perception of entrepreneurial activity. Career preferences.
Role of the University	Availability of entrepreneurship courses at the university. Dependence of career preferences and specialization of students at the university.	Acquisition of knowledge in the field of entrepreneurship. Universities' readiness to train entrepreneurs. University incentives for the development of youth entrepreneurial projects.
Public opinion	Attitude of family, friends, fellow students to the career of an entrepreneur. University students' attitude to the cultural context of society (collectivism, avoidance of uncertainty, distance of authorities, result orientation). Motivation of university students – potential entrepreneurs.	Demand for certain areas of business. Obstacles to the development of entrepreneurial projects.
Participation of university partners (primarily business) in the development of students' entrepreneurial skills	Not provided by the study	Students' perception of partners' participation in the development of entrepreneurial skills. Mechanisms of entrepreneur-student interaction. Students' participation in contests (projects) to support entrepreneurship.

interviewing university students. *Table 1* presents a comparison of these 2 approaches based on 4 criteria that form the basis for grouping questions: students' emotional attitude; the role, the university plays in the development of students' entrepreneurial projects; influence of the environment (society, family) on youth entrepreneurial projects development; participation of university partners in the development of entrepreneurial skills.

As you can see, the comparative analysis results clearly demonstrate differences and features of the author's survey. Thus, in case of partial coincidence of the survey purpose (determination of students' desire to engage in entrepreneurial projects) and selected question groups, the emphasis of the author's survey is shifted to the research in the participation of partners in the development of students' entrepreneurial skills. On the one hand, students are full-fledged consumers of educational and other types of products at the university; on the other hand, they are the main beneficiaries of the interaction between the university and its partners. Taking into account life orientations of the modern young generation and increasing speed of mastering professional skills (due to the availability and rise in the speed of information exchange), we can say that such interaction can improve the educational process quality.

The survey, organized by the article authors, is based on the use of a public questionnaire compilation service GoogleForms. The survey of university students (including graduate students) of the Russian Federation is a research method. An electronic link to the questionnaire was distributed through social networks, representatives of youth trade union organizations. The survey helps study the opinion of 630 young people from 3 Russian cities (Yekaterinburg, Vladivostok and Saransk), receiving education in 6 higher education institutions[4]. The general population sample is 92,000 students of universities of all forms and levels of education (as of June 2018), according to the information from the official websites of educational institutions. Thus, the sample size is 0.69%. The representative sample is achieved by participation of regional universities of different territories and students of all existing levels: 74.6% are enrolled in bachelor's programs, 20.6% – in master's programs, 3.2% – in specialty programs, 1.6% – in graduate programs. At the same time, the authors conducted a survey of students of different areas of training, guided by the diversity of existing types of business activity, which can potentially be occupied by young people.

4. Results of the students survey

Below there are some results of the survey in the context of 4 groups of questions.

Assessment of the emotional state of potential young entrepreneurs

According to the survey, the students' emotional state to engage in entrepreneurial activity is at a high level. Thus, 44.4% of the respondents have a pronounced desire to engage in their own business (estimates above 7 points on a 10-point scale). At the same time, the respondents believe that an entrepreneur is primarily a brave, modern and talented person. At the same time, an entrepreneur is not exactly a "hero of the time", not a "person who is constantly developing" and not an "occupation of the future".

This reflects the students' perception of their own business organization as a risky occupation for talented people who are ready to do exactly what they love (42.9%) (*tab. 2*).

[4] Ural Federal University (Yekaterinburg), Russian State Vocational Pedagogical University (Yekaterinburg), Ural State Medical University (Yekaterinburg), Ural State University of Economics (Yekaterinburg), Far Eastern Federal University (Vladivostok), Ogarev Mordovia State University (Saransk).

Table 2. Distribution of the respondents' answers to the question about perception of their own business

Answer option	% of the respondents number
Opportunity to do what you love	42.9
High monetary income	25.4
Free schedule and possibility to combine work and study	7.9
Opportunity to gain experience	7.9
High social status	6.3
Difficult to answer	4.8

At the same time, as can be seen from the data, 25.4% of the respondents correlate the opportunity to engage in their own business with a high monetary income, 7.9% positively assess a free schedule and the possibility to combine work and study. At the same time, the high social status of an entrepreneur is noted by a few – 6.3%. Along with the proposed answers, respondents have their own variants of their own business perception, such as "this is a risk and responsibility", "this is the process of forming a value, people are ready to pay for".

In general, the survey shows that more than 50% of the respondents are ready to create entrepreneurial projects (interested in creating their own business). At the same time, 22% of the respondents would like to get a job at a stable reliable company or in public service. The results indicate that university students are in a certain averaged position between the social assessment of "doing their own business" and the personal desire to be an entrepreneur, which may be caused by the effect of social desirability (facade effect) [24, p. 177] or the phenomenon of "paradoxical man" [25, p. 543].

Interaction between the university and its partners in the development of students' entrepreneurial skills

The analysis of the role, the university plays in the development of students' entrepreneurial skills, helps draw a number of conclusions about the educational process aimed at mastering the basics of doing person's own business, the activity of administrative services of universities in the sphere of implementing projects that identify and support entrepreneurs. *Table 3* presents answers to the question of obtaining the knowledge necessary for creating business, when studying at the university. At the same time, the respondents can detail a model of obtaining such knowledge – under the existing educational programs (taught disciplines) or in addition.

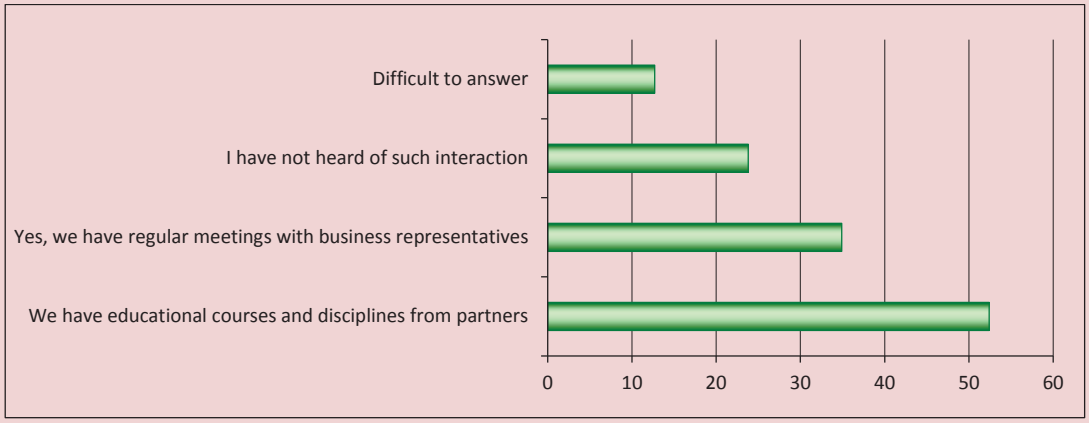
Table 3. Distribution of respondents' answers to the question "Do you get the knowledge you need to do your own business at the university where you get education?"

Answer option	% of the respondents number
We do not have such disciplines	42.9
This knowledge can be obtained at the university additionally	42.9
We have the appropriate disciplines	11.1
Difficult to answer	1.6

According to *Table 3*, quite a large number of the respondents (42.9%) note that within the proposed educational program there are no courses aimed at entrepreneurship. But 42.9% of the respondents indicate that the university provides an opportunity to gain additional knowledge about entrepreneurship. And only 11.1% of the students confirm the possibility for developing skills to create and run their own business.

The possibility of obtaining knowledge at the university additionally suggests some external actors' participation in the educational process. University partners can and should be present among these actors. The creation of educational courses, sometimes entire educational programs (for example, master's programs) is a common method of interaction with university partners. The distribution of students' answers in *Figure 2* shows, as far as this interaction is obvious for them.

Figure 2. Distribution of the respondents' answers to the question "Do university partners participate in the development of students' skills in the field of entrepreneurship", % of the respondents number



According to the figure, university partners are involved in the creation of educational courses to teach entrepreneurial skills (52.4%) and hold regular meetings with students (34.9%).

At the same time, as the survey confirms, many students lack knowledge in several areas: economics and finance (22.2%), law competence (19.0%), knowledge in the field of promotion and sales (17.5%) and knowledge in the field of activity organization (14.3%). And not all respondents (15.9%) believe that the university can stimulate youth entrepreneurial activity through modern educational courses (*tab. 4*).

Table 4. Distribution of the respondents' answers to the question "What incentives should the university offer to encourage young entrepreneurs' projects?"

Answer option	%, of the respondents number
Partners' involvement in entrepreneurial projects	38.1
Financial support for young entrepreneurs	36.5
Modern educational programs	15.9
Research and innovation projects in breakthrough areas of knowledge	6.3
Difficult to answer	3.2

As the table shows, partners' involvement (business, business community, experts, etc.) is an important incentive in the development of entrepreneurial projects (38.1%). However, financial support (grants, scholarships) for young entrepreneurs (36.5%) is also required, according to the students.

In the survey 50% of the respondents consider mentoring as the most effective mechanism of cooperation between students and entrepreneurs. At the same time, almost one fifth (19.4%) of the respondents believe that education in addition to the educational process is also an important element of such cooperation. Financing of young entrepreneurs' projects is the most effective mechanism for only 12.9%.

Thus, on the one hand, it is obvious that the respondents expect more financial support from universities and less from partners. At the same time, modern educational projects are more expected from established entrepreneurs (19.4% – from entrepreneurs against 15.9% – from the university).

Students' assessment of prospects to organize their own business

When organizing a business project, young entrepreneurs face a number of restrictions. According to the respondents, the main obstacles, preventing young entrepreneurs from establishing their business, are the following: unavailability of funding sources (31.7%), unfavorable economic factors (19%), competition (12.7%) and lack of self-confidence (12.7%). At the same time, the students have no interest in participating in competitions to identify and support youth projects: 95.2% of the respondents note that they do not participate in such contests. At the same time, there is a large number of such contests in the country (for example, the federal program UMNIK (Smart person), the program "You Are an Entrepreneur"), and 41.3% of the respondents believe that their conduct is an effective measure to stimulate the activity of young entrepreneurs. However, a little more than a quarter of the respondents (27%) think that the entrepreneurial spirit should be realized "in practice".

The survey shows that there are a lot of young people seeking to work at a large company (*tab. 5*).

Table 5. Distribution of the respondents' answers to the question "What career option is the most promising for you?"

Answer option	% of the respondents number
Employment at a large company	50.8
Creation and development of your own business	25.4
Employment at any company to gain experience	17.5
Employment at state bodies	4.8
Science	1.6

The table shows that more than 50% want to find a job as an employee at a large company, 17.5% are ready to get a job at any size company to gain experience. And only one in four of the surveyed students plan to create their own business in the near future – 25.4%.

We assume that a certain part of those wishing to find a job as a hired specialist have intrapreneurship potential and are capable not only to implement an entrepreneurial project at the workplace in the future, but also create their own business on the basis of the experience gained.

It is noteworthy that, despite the prevailing public opinion, the younger generation does not consider work in government as a successful career option – it is chosen by only 4.8% of the respondents.

The territorial distribution of responses is indicative. For example, let us compare answers to the questions that identify the desire to engage in entrepreneurial activities and the university partners' participation in the process of mastering young people's knowledge and skills in the field of entrepreneurship. The students from the Far Eastern Federal University (Vladivostok) have a pronounced desire to engage in entrepreneurial activity (average score – 8 points on a 10-point scale). Most students of the University also note that partners regularly participate in meetings with them, and the University provides an opportunity to gain additional knowledge about entrepreneurship. At the same time, most respondents from Ogarev Mordovia State University (Saransk) (75%) have not heard about partners' participation in the development of young entrepreneurs' skills. At the same time, they also express a great desire to engage in entrepreneurial activity (average score – 8 points out of 10) and note that the necessary knowledge can be obtained at the University additionally. The students at the Ural Federal University (Yekaterinburg) are more moderate than young people from other universities in their desire to organize

their own business (the average score is 6.63 out of 10 points). At the same time, more than half (66.1%) of the respondents note that the University holds regular meetings with partners and has educational courses and disciplines from business representatives. In the University also more than half of the students (57.6%) note that they receive the necessary knowledge for doing business (within the educational program or additionally).

5. Conclusion

The study results demonstrate the emotional readiness of almost half of the respondents to do their own business. However, the existing restrictions, risks and personal abilities to engage in entrepreneurial activity reduce a number of those who consider the option of organizing their own business as the main career path (only one in four is ready to create their own business). At the same time, potential entrepreneurs studying at the university are afraid of a lack of sources to finance their business. Adverse economic factors, high competition and a lack of self-confidence also cause concern.

The educational system can neutralize a number of fears. The need for this is actualized, unfortunately, by a lack of knowledge about business creation and development. The respondents lack knowledge in the field of economics, finance and a legal basis of entrepreneurship, promotion and sales, and organization of activities. The possibility of free access to educational programs and courses aimed at entrepreneurial skills development (both within the existing and additional), provides the necessary level of young entrepreneurs' confidence in their own abilities. University partners can take active part in this process. Students' expectations predetermine partners' participation in the university activity, namely partners' involvement in entrepreneurial projects, availability of educational courses and disciplines provided by partners, mentoring ensured by established entrepreneurs. The respondents consider it important to involve partners in the process of initiation and development of entrepreneurs. Thus, the active role of university partners is obvious. Partners are able to complement the educational process with an appropriate set of activities, consisting of the introduction and realization of a full-fledged mentoring system, the implementation of additions (miners) to educational courses, and the conduct of events and projects (according to the "hackathon" principle) aimed at boosting entrepreneurial skills. University partners form the environment, filling it with the missing elements necessary to increase a number of entrepreneurial projects among students. The opportunity to build a mutually beneficial dialogue, taking into account the interests of both universities and partners, has been realized in recent years, acquiring new forms of cooperation. However, the partners' active role in improving the educational process requires legislative incentives (tax incentives with the support of education and science) and elaborated models of interaction with universities (a single window format or multi-lateral cooperation).

At the same time, the participation of various types of partners is of high importance: business, representatives of state and municipal authorities (possibly as the main process beneficiary), scientific organizations (as a possible source of innovative projects), and public associations (as an advisory body). At the moment, according to the study, more than half of the respondents plan to work as an employee and only a quarter of the respondents want to create and develop their own business. Given the relatively low

proportion of repeat entrepreneurs (in case of failure at the first attempt), it is too early to talk about the significant development of the business sector through the involvement of students and university graduates. But the system of university partnership can affect this situation. Business can participate as a mentor and financial partner in entrepreneurial initiatives, relying on students' fresh ideas, able to supplement companies' existing product lines. At the same time, regardless of the region (as shown by the survey), it is necessary to boost business representatives' attention to to university youth in order to increase a number of initiated entrepreneurial projects. State and municipal authorities are able to form an event agenda on the basis of educational and scientific centers. The combined efforts of science, business environment, society and government agencies are able to form a variety of additional educational products aimed at creating and developing entrepreneurial skills of young people.

The study results can be used in the preparation of universities development programs and the implementation of youth entrepreneurial projects and state and municipal programs in the field of youth and entrepreneurship. At the same time, the effectiveness of the identified mechanisms of university partner participation (mentoring, educational minors, competitive events) requires additional study carried out by scientific community.

References

1. *Global'noe issledovanie zanyatosti i molodezhnogo predprinimatel'stva. Ernst& Young* [Ernst&Young Global Study on Employment and Youth Entrepreneurship]. *2015*. Available at: http://www.iblfrussia.org/upload/iblock/109/WEOY2015_JobSurvey_RUS.pdf (accessed June 23, 2018).
2. Clemensson M., Christensen J.D. *How to Build an Enabling Environment for Youth Entrepreneurship and Sustainable Enterprises*. Geneva: International labor office, 2010.
3. Chigunta F. *Youth Entrepreneurship: Meeting the Key Policy Challenges*. Wolfson College; Oxford University (UK), 2002.
4. Brister M. How to Support Youth Entrepreneurship. *CIPE Development Blog*, 2013.
5. Saulina Yu.P. Development of entrepreneurial activity in the Russian Federation. *Predprinimatel'stvo–XXI=Entrepreneurship–XXI*, 2015, no. 7, pp. 128-135. (In Russian).
6. Suelda de Albuquerque Ferreira et al. Migration in times of crisis: can entrepreneurship be a solution? The case of Brazilian entrepreneurs in Lisbon (Portugal). *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2017, no. 4, vol.10, pp. 242-258. DOI: 10.15838/esc/2017.4.52.14. (In Russian).
7. Golovina T., Merkulov P., Polyanin A. Strategic vectors of the development of the state support of youth entrepreneurship in Russia. *Ekonomicheskaya Politika=Economic Policy*, 2017, vol. 12, no. 5, pp. 42-61. DOI: 10.18288/1994-5124-2017-5-03. (In Russian).
8. Doroshenko S.V., Solomatin Ya.I. The youth factor socio-economic development of the Russian metropolis. *Regional'naya ekonomika i upravlenie: elektronnyi nauchnyi zhurnal=Regional Economics and Management: Electronic Scientific Journal*, 2015, no. 1, vol. 41, pp. 13-30. (In Russian).
9. Doroshenko S.V.Study of relationship and willingness of young people of the Sverdlovsk region to engage in small business. *Regional'naya ekonomika i upravlenie: elektronnyi nauchnyi zhurnal=Regional Economics and Management: Electronic Scientific Journal*, 2016, no. 4 (48), pp. 206-222. (In Russian).
10. Etzkowitz H. *The Triple Helix: University — Industry — Government Innovation in Action*. Routledge, 2008. P. 180. DOI: 10.4324/9780203929605.

11. Dezhina I.G. Features of the Russian "Triple helix" of relations of the state, science and business. *Innovatsii=Innovations*, 2011, no. 4, pp. 47-55. (In Russian).
12. Siegel D.S., Waldmann D., Atwater L.E., Link A. Toward a model of the effective transfer of scientific knowledge from academicians to practitioners: qualitative evidence from the commercialization of university technologies. *Journal of Engineering and Technology Management*, 2004, no. 21(1/2), p. 42. DOI: 10.1016/j.jengtecman.2003.12.006
13. Santoro M., Chakrabarti A.K. Firm Size and Technology Centrality in Industry-University Interactions. *Research Policy*, 2002, no. 31(7), p. 80. DOI: 10.1016/s0048-7333(01)00190-1.
14. Gupta A.K., Wilemon D. Changing patterns in industrial R&D management. *Journal of Product and Innovation Management*, 1996, no. 13(6). 1996. pp. 497-51. DOI: 10.1111/1540-5885.1360497.
15. Wessner C., Wolff A. *Rising to the Challenge: US Innovation Policy for the Global Economy*. Washington, D.C.: The National Academies Press. 2012. pp. 110-111. DOI: 10.17226/13386.
16. Johnson W. *The Collaboration Imperative: Universities and Industry as Partners in the 21st Century Knowledge Economy*. 2004. Available at: http://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_051414.pdf (accessed June 24, 2018).
17. Baaken T., Schröder C. *The Triangle for Innovation in Technology Transfer at University of Applied Sciences*. Higher Education Institutions and Innovation in the Knowledge Society, Helsinki, 2008. Pp. 103-116.
18. Plewa C., Quester P., Baaken T. Relationship marketing and university-industry linkages: a conceptual framework. *Marketing Theory*, 2005, vol. 5(4), pp. 433-456. DOI: 10.1177/1470593105058824.
19. Zinevich O.V., Balmasova T.A. "The third mission" and social engagement of universities. *Vlast'=The Authorities*, 2015, no 6, pp. 67-72. (In Russian).
20. Charles D.R. *Universities and Engagement with Cities, Regions and Local Communities. Rebalancing the Social and Economic. Learning*. Leicester: NIACE, 2005. Pp. 148-150.
21. Perfil'eva O.V. The University in the region: steps towards third mission. *Vestnik mezhdunarodnykh organizatsii=International Organisations Research Journal*, 2011, no. 1(32), pp. 133-144. (In Russian).
22. Reznik G.A., Ponomarenko Yu.S., Kurdova M.A. Functions of the university: new development opportunities. *Mir nauki. Pedagogika i psikhologiya=World of Science. Pedagogy and Psychology,* 2014, no. 4. Available at: https://mir-nauki.com/PDF/30PMN414.pdf (accessed September 18, 2018). (In Russian).
23. House R., Hanges P., Javidan M., Dorfman P., Gupta V. *Culture, Leadership, and Organizations: The GLOBE Study of 62 Societies*. Thousand Oaks, CA. Sage Publications, 2004.
24. Edwards A. *The Social Desirability Variable in Personality Assessment and Research*. New York: The Dryden Press, 1957. P. 177.
25. Toshchenko Zh.T. *Paradoksal'nyi chelovek* [Paradoxical Person]. Edition 2. Moscow: YuNITI-DANA, 2008. P. 543.

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PUBLIC OPINION MONITORING

Public Opinion Monitoring of the State of the Russian Society

As in the previous issues, we publish the results of the monitoring of public opinion concerning the state of the Russian society. The monitoring is conducted by VolRC RAS in the Vologda Oblast [1].

The following tables show the dynamics of several parameters indicating the social feeling and socio-political sentiment of the Vologda Oblast population in October – December 2018, and also on average for the latest six surveys (February – December 2018).

The results of the research are compared with the data for 2007 (the last year of Vladimir Putin's second presidential term, when the assessment of the President's work was the highest), for 2011 (the last year of Dmitry Medvedev's presidency), and for 2012 (the first year of V. Putin's third presidential term).

The yearly dynamics of the data are presented for the last two years (2016–2017).

In October – December 2018, we observe a continuing declining trend in people's support for the work of the head of state; the trend has been observed since June. Over the past two months, the share of positive assessments decreased by 2 p.p. (from 64 to 62%), and on the whole in June – December 2018 – by 8 p.p. (from 70 to 62%).

As for the dynamics of assessments of the Prime Minister's work, we see that the share of negative judgments has also increased since June 2018: in the last two months – by 2 p.p. (from 35 to 37%), from June to December – by 9 p.p. (from 28 to 37%).

[1] The polls are held six times a year in Vologda, Cherepovets, and in eight districts of the oblast (Babayevsky District, Velikoustyugsky District, Vozhegodsky District, Gryazovetsky District, Kirillovsky District, Nikolsky District, Tarnogsky District and Sheksninsky District). The method of the survey is a questionnaire poll by place of residence of respondents. The volume of a sample population is 1,500 people 18 years of age and older. The sample is purposeful and quoted. The representativeness of the sample is ensured by the observance of the proportions between the urban and rural population, the proportions between the inhabitants of settlements of various types (rural communities, small and medium-sized cities), age and sex structure of the Oblast's adult population. Sampling error does not exceed 3%.

More information on the results of VolRC RAS polls is available at http://www.vscc.ac.ru/.

For reference:

In general, the level of approval of the President's work in October – December 2018 has not changed significantly and amounted to 64%. The share of positive assessments of the Government's work also remains stable (37%). According to Levada-Center, in October – November 2018, the share of positive assessments of the head of state is 66%, the Government – 34%.

How do you assess the current performance of..? (percentage of respondents)

Answer	2007	2011	2012	2016	2017	Feb. 2018	Apr. 2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Average for the latest 6 surveys	Dynamics (+/-), the latest 6 surveys compared to …		
													2017	2011	2007
RF President															
I approve	75.3	58.7	51.7	67.8	67.3	68.7	68.1	70.1	65.9	63.5	61.9	66.4	-1	+8	-9
I don't approve	11.5	25.6	32.6	18.8	20.0	20.8	18.4	17.5	22.1	24.1	27.0	21.7	+2	-4	+10
Chairman of the RF Government*															
I approve	-*	59.3	49.6	52.3	49.5	48.3	49.9	52.0	47.4	45.2	45.3	48.0	-1	-11	-
I don't approve	-	24.7	33.3	27.6	31.1	30.8	27.8	27.5	31.9	34.8	36.9	31.6	+1	+7	-
Governor															
I approve	55.8	45.7	41.9	37.7	39.8	39.3	39.5	40.5	37.3	35.7	38.3	38.4	-1	-7	-17
I don't approve	22.2	30.5	33.3	39.3	39.3	37.9	36.1	35.3	36.9	39.1	40.3	37.6	-2	+7	+15

* Included in the survey since 2008.

Over the past two months, there have been ambiguous changes in the dynamics of assessments of the President's success in addressing the country's key problems. For example, from October to December 2018, the share of people who believe that the head of state is successfully coping with the issues of strengthening Russia's international positions increased (by 3 p.p., from 51 to 54%). At the same time, the share of those who negatively assess the President's work to restore order in the country decreased by 2 p.p. (from 49 to 47%)

Assessment of V. Putin's work to protect democracy and increase the welfare of citizens did not change significantly over the past two months (37 and 30%, respectively).

In your opinion, how successful is the RF President in coping with challenging issues?*
(percentage of respondents)

Answer	2007	2011	2012	2016	2017	Feb. 2018	Apr. 2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Average for the latest 6 surveys	Dynamics (+/-), the latest 6 surveys compared to …		
													2017	2011	2007
Strengthening Russia's international standing															
Successful	58.4	46.2	43.1	51.2	55.7	55.2	56.1	55.6	53.3	51.3	53.5	54.2	-2	+8	-4
Unsuccessful	24.9	33.7	37.9	29.9	26.8	26.9	26.9	26.7	29.1	30.7	30.3	28.4	+2	-5	+4
Success index	133.5	112.5	105.2	121.3	129.0	128.3	129.2	128.9	124.2	120.6	123.2	125.7	-3	+13	-8
Imposing order in the country															
Successful	53.2	36.6	35.4	49.2	50.6	50.9	54.2	55.1	51.0	48.5	46.9	51.1	0	+15	-2
Unsuccessful	34.0	50.0	50.7	36.7	36.1	32.7	30.8	32.9	36.2	37.9	39.5	35.0	-1	-15	+1
Success index	119.2	86.6	84.7	112.6	114.5	118.2	123.4	122.2	114.8	110.6	107.4	116.1	+2	+30	-3
Protecting democracy and strengthening citizens' freedoms															
Successful	44.4	32.4	28.8	36.6	40.3	42.8	42.9	43.4	39.8	37.3	36.5	40.5	0	+8	-4
Unsuccessful	37.0	48.3	52.3	44.3	40.2	38.7	37.1	38.1	41.4	42.7	43.3	40.2	0	-8	+3
Success index	107.4	84.1	76.5	92.3	100.2	104.1	105.8	105.3	98.4	94.6	93.2	100.2	0	+16	-7
Economic recovery and increase in citizens' welfare															
Successful	47.2	30.7	28.5	27.2	29.3	31.0	31.3	32.3	30.6	30.6	29.9	31.0	+2	0	-16
Unsuccessful	39.1	56.1	57.9	59.4	56.9	53.7	55.3	55.2	58.3	57.2	57.6	56.2	-1	0	+17
Success index	108.1	74.6	70.6	67.8	72.4	77.3	76.0	77.1	72.3	73.4	72.3	74.7	+2	0	-33

* Ranked according to the average value of the index of success for 2016.

According to the results of the surveys, the dynamics of public opinion assessments of V. Putin's work in the first months of his fourth presidential term are more negative than in the corresponding period of 2012. In June – December 2012, the corresponding figure was 53–54%; in June – December 2018, it decreased by 8 p.p. (from 70 to 62%).

Assessment of the Russian President's work in the first months of his third and fourth presidential terms

Answer	June 2012	Aug. 2012	Oct. 2012	Dec. 2012	Dynamics (+/-), Dec. 2012 to June 2012	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Dynamics (+/-), Dec. 2018 to June 2018
Assessment of the Russian President's work:										
I approve	54.5	53.7	50.9	53.3	-1	70.1	65.9	63.5	61.9	-8
I don't approve	28.9	31.1	32.1	34.6	+6	17.5	22.1	24.1	27.0	+10
Success in addressing key issues:										
Strengthening Russia's international standing										
Successful	43.3	47.2	41.9	44.1	+1	55.6	53.3	51.3	53.5	-2
Unsuccessful	37.8	34.9	39.4	39.0	+1	26.7	29.1	30.7	30.3	+4
Success index	105.5	112.3	102.5	105.1	0	128.9	124.2	120.6	123.2	-6
Imposing order in the country										
Successful	35.3	40.9	34.8	37.5	+2	55.1	51.0	48.5	46.9	-8
Unsuccessful	51.8	45.6	50.1	50.7	-1	32.9	36.2	37.9	39.5	+7
Success index	83.5	95.3	84.7	86.8	+3	122.2	114.8	110.6	107.4	-15
Protecting democracy and strengthening citizens' freedoms										
Successful	30.1	33.0	26.7	28.5	-2	43.4	39.8	37.3	36.5	-7
Unsuccessful	51.4	48.1	54.0	54.7	+3	38.1	41.4	42.7	43.3	+5
Success index	78.7	84.9	72.7	73.8	-5	105.3	98.4	94.6	93.2	-12
Economic recovery and increase in citizens' welfare										
Successful	29.1	34.7	25.3	29.3	0	32.3	30.6	30.6	29.9	-2
Unsuccessful	57.1	51.4	61.1	59.6	+3	55.2	58.3	57.2	57.6	+2
Success index	72	83.3	64.2	69.7	-2	77.1	72.3	73.4	72.3	-5

In October – December 2018, the structure of Vologda Oblast residents' preferences concerning political parties did not change significantly. Support for the United Russia party is 36%, support for LDPR and KPRF is 9% each, and for the Just Russia party – 3%.

It is necessary to point out that the share of Vologda Oblast residents who believe that today none of the parliamentary parties express their interests increased noticeably in the past two months (by 3 p.p., from 29 to 32%, which is the highest figure for 2016–2018).

Which party expresses your interests? (% of respondents)

Party	2007	Election to the RF State Duma 2007, fact	2011	Election to the RF State Duma 2011, fact	2012	2016	Election to the RF State Duma 2016, fact	2017	Feb. 2018	Apr. 2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Average for the latest 6 surveys	Dynamics (+/-), the latest 6 surveys compared to …		
																2017	2011	2007
United Russia	30.2	60.5	31.1	33.4	29.1	35.4	38.0	34.7	38.4	39.7	38.9	38.1	36.5	36.0	37.9	+3	+7	+8
LDPR	7.5	11.0	7.8	15.4	7.8	10.4	21.9	11.0	10.1	9.6	9.7	9.7	9.7	8.8	9.6	-1	+2	+2
KPRF	7.0	9.3	10.3	16.8	10.6	8.3	14.2	7.6	7.1	8.1	8.7	10.3	11.1	9.9	9.2	+2	-1	+2
Just Russia	7.8	8.8	5.6	27.2	6.6	4.2	10.8	4.8	3.5	2.5	2.3	2.7	3.4	2.8	2.9	-2	-3	-5
Other	1.8	–	1.9	–	2.1	0.3	–	0.5	0.9	1.2	0.5	0.6	0.4	0.4	0.7	0	-1	-1
None	17.8	–	29.4	–	31.3	29.4	–	29.2	28.8	26.2	26.7	28.5	29.0	31.9	28.5	-1	-1	+11
It's difficult to answer	21.2	–	13.2	–	11.7	12.0	–	12.2	11.1	12.7	13.3	10.0	9.9	10.2	11.2	-1	-2	-10

Assessment of social mood in October – December 2018 did not change significantly: the proportion of people who experience mostly positive emotions is 71%; the proportion of those who believe that "everything is not so bad and it is possible to stand it" is 77%.

The share of Vologda Oblast residents who consider themselves "poor and extremely poor" remains stable (45%). During the past three years, it has been slightly (3-4 percentage points) higher than the proportion of those who say their income is average.

The consumer sentiment index since August 2018 is 89 points, which is 3 points lower than in June 2018. We should note that the value of the index below 100 points indicates the pessimistic forecasts of the population regarding the prospects of development of their own financial situation and the economy as a whole.

Estimation of social condition (% of respondents)

Answer	2007	2011	2012	2016	2017	Feb. 2018	Apr. 2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Average for the latest 6 surveys	Dynamics (+/-), the latest 6 surveys compared to …		
													2017	2011	2007
Mood															
Usual condition, good mood	63.6	63.1	67.3	68.0	70.4	68.6	71.5	72.5	72.5	71.3	70.7	71.2	+1	+8	+8
I feel stress, anger, fear, depression	27.8	28.9	27.0	26.2	24.2	23.4	23.1	22.8	22.5	23.1	23.5	23.1	-1	-6	-5
Stock of patience															
Everything is not so bad; it's difficult to live, but it's possible to stand it	74.1	74.8	76.6	78.0	77.7	76.2	79.0	76.5	78.0	75.7	77.1	77.1	-1	+2	+3
It's impossible to bear such plight	13.6	15.3	15.8	15.6	15.8	16.3	14.8	16.6	15.5	17.1	17.5	16.3	+1	+1	+3
Social self-identification*															
The share of people who consider themselves to have average income	48.2	43.1	44.7	42.1	43.1	41.2	41.8	43.1	43.3	42.8	41.6	42.3	-1	-1	-6
The share of people who consider themselves to be poor and extremely poor	42.4	44.3	44.5	49.0	46.6	46.2	46.5	45.3	44.1	45.4	44.7	45.4	-1	+1	+3
Consumer sentiment index															
Index value, points	105.9	89.6	91.5	77.7	84.6	89.2	90.3	92.2	89.2	89.2	89.1	89.9	+5	0	-16

* Question: "Which category do you belong to, in your opinion?"

In October – December 2018, negative changes in the dynamics of assessments of social well-being are registered in 7 out of 14 socio-demographic groups. The proportion of people who positively characterize their daily mood decreased by 2–4 p.p. among women (from 72 to 68%), among people under the age of 30 (from 85 to 82%), among people with secondary vocational education (from 74 to 71%) and higher education (from 77 to 74%), among people who by self-assessment of their income belong to the category of 60% of middle-income residents of the Vologda Oblast (from 73 to 70%), and among residents of Vologda (from 69 to 67%) and Cherepovets (from 78 to 75%).

Positive changes in the dynamics of social mood for the period from October to December 2018 are observed in three socio-demographic groups: men (the share of positive judgments increased from 71 to 73%); persons with secondary and incomplete secondary education (from 64 to 68%), people who by self-assessment of their income belong to 20% of the most affluent residents of the Vologda Oblast (from 81 to 83%).

Social mood in different social groups (answer: "Good mood, normal condition", % of respondents)

Population group	2007	2011	2012	2016	2017	Feb. 2018	Apr. 2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Average for the latest 6 surveys	Dynamics (+/-), the latest 6 surveys compared to …		
													2017	2011	2007
Sex															
Men	65.9	64.5	69.1	68.8	70.6	71.0	73.4	74.5	73.9	70.8	73.4	72.8	+2	+8	+7
Women	61.7	62.0	65.8	67.4	70.2	66.6	70.0	70.9	71.3	71.8	68.4	69.8	0	+8	+8
Age															
Under 30	71.3	70.0	72.3	76.4	78.1	74.2	79.6	81.3	77.9	85.1	81.6	80.0	+2	+10	+9
30-55	64.8	62.5	67.9	67.4	71.5	68.8	74.0	75.1	74.9	70.9	71.6	72.6	+1	+10	+8
Over 55	54.8	58.3	62.1	64.0	64.9	65.6	64.2	64.7	66.5	65.4	64.7	65.2	0	+7	+10
Education															
Secondary and incomplete secondary	58.4	57.4	57.2	62.1	63.6	60.5	65.5	64.8	66.5	63.8	67.8	64.8	+1	+7	+6
Secondary vocational	64.6	63.6	66.7	68.4	72.0	68.9	72.7	74.9	72.6	73.5	70.5	72.2	0	+9	+8
Higher and incomplete higher	68.6	68.3	77.0	74.3	75.8	77.9	76.2	77.4	78.4	76.5	74.1	76.8	+1	+8	+8
Income groups															
Bottom 20%	51.6	45.3	51.5	52.5	52.9	47.7	61.8	60.0	53.1	59.6	61.3	57.3	+4	+12	+6
Middle 60%	62.9	65.3	68.7	69.4	72.0	70.3	71.7	72.3	74.5	73.1	69.7	71.9	0	+7	+9
Top 20%	74.9	75.3	81.1	80.9	83.7	82.2	81.5	85.5	83.4	81.3	83.4	82.9	-1	+8	+8
Territories															
Vologda	63.1	67.1	73.6	69.9	72.6	71.0	73.5	75.4	70.4	68.8	67.1	71.0	-2	+4	+8
Cherepovets	68.1	71.2	76.2	71.7	75.7	71.5	75.0	76.7	79.1	77.7	74.5	75.8	0	+5	+8
Districts	61.6	57.1	59.8	64.8	66.1	65.6	68.3	68.6	69.8	69.2	70.5	68.7	+3	+12	+7
Oblast	63.6	63.1	67.3	68.0	70.4	68.6	71.5	72.5	72.5	71.3	70.7	71.2	+1	+8	+8

Conclusion

According to the research results, despite gradual "routinization of the issue"[2] concerning the increase in the retirement age, so far there are no sustainable positive changes in the dynamics of public opinion on key issues related to the assessment of the work of the authorities, the situation in the country and personal self-perception.

The downward trend in the number of positive assessments of the work of the President that started in June 2018 continued in October – December 2018 (from June to December, it decreased by 8 p.p., from 70 to 62%). The share of people who believe that the head of state is successfully coping with the problem of economic recovery and growth of citizens' welfare remains consistently low (30%). There are no positive changes in the dynamics of the financial situation: the share of "the poor and extremely poor" is 45% (which is more than the share of people with "average income" – 42%), the consumer sentiment index since August 2018 is 89 points, which indicates the predominance of pessimistic forecasts about the prospects of development of the economic situation in the country and personal financial well-being.

The absence of positive changes in public opinion is largely due to the real dynamics of the standard of living and quality of life. Thus, according to the data of Vologdastat, real incomes of the population amounted to 96.9% in September 2018 compared to the previous month, real wages – 98.1% (for comparison: these figures in 2017 were slightly better: real cash incomes in September were 102.5% compared to August, and real wages – 99.9%)[3].

In general, the assessment of the President's work in the first months of V. Putin's fourth presidential term (2018) still looks somewhat worse than in the corresponding period of his third presidential term (2012). The level of support for the head of state in 2012 was about 54%; in 2018, it decreased from 70 to 62%, which is obviously due to a number of reforms negatively perceived by the population (primarily raising the retirement age and VAT). Lack of mutual understanding between the society and the authorities on the major development direction announced by V. Putin in his Address to the Federal Assembly on March 1, 2018 (a breakthrough in improving the dynamics of the standard of living and quality of life) so far makes us doubt the effectiveness of the implementation of the key tasks of the May 2018 Decree. Apparently, the solution to this issue is postponed for the next year, although it should be noted that V. Putin's last (according to the current Constitution of the Russian Federation) presidential term leaves less time for postponing actual measures, and each month is exacerbating the need for social justice and sustainable positive dynamics of well-being.

The materials were prepared by M.V. Morev, I.V. Paranicheva, I.M. Bakhvalova.

[2] Trust ratings of politicians, ratings of approval of the work of state institutions, ratings of the parties: VTsOM Press Release. 2018. No. 3788. 12 October. Available at: https://wciom.ru/index.php?id=236&uid=9363 (comment of M. Mamonov, head of the practice of political analysis and consulting of at the research department)

[3] Operational indicators characterizing the standard of living. Official website of the territorial office of the Federal State Statistics Service. Available at: http://vologdastat.gks.ru/wps/wcm/connect/rosstat_ts/vologdastat/ru/statistics/standards_of_life/

Index of Articles Published in 2018

AUTHOR GUIDELINES
for Submission of Manuscripts to the Editor of the Scientific Journal
Economic and Social Changes: Facts, Trends, Forecast

The Journal publishes original theoretical and experimental articles that fall within the scope of the journal. The manuscript should be of no less than 16 pages (30,000 characters with spaces). The maximum length of the paper submitted to publication is 25 pages (approximately 50,000 characters with spaces). Book reviews, information on scientific conferences, scientific chronicles are also submitted to publication. The papers should contain research findings of completed and methodologically proper works.

The decision for publication is made by the Journal's Editorial Staff on the basis of the reviewer's report. The novelty, scientific importance and relevance of submitted material are also taken into consideration. Articles rejected by the Editorial Staff will not be reconsidered.

Requirements to the package of materials submitted

The following materials are submitted to the editorial office in electronic form:

1. A file containing the article in a Microsoft Word document, format .docx. The name of the file is typed in the Roman characters and reflects the author's last name (e.g.: Ivanova.docx).
2. Full information about the author on a separate page: full name, academic degree and title, place of work and position, contact information (postal address, telephone, e-mail – if available), ORCID, Researcher ID. The information should be arranged in a table.
3. Scanned copy of the commitment of the author not to publish the article in other publications.
4. A color photo of the author in the .jpeg / .jpg format of no less than 1 MB.

The package of materials is to be sent to the editor's email address: common@vscc.ac.ru.

Text design requirements

1. Margins

Right – 1 cm, others – 2 cm.

2. Font

Font size of the article's text – 14, type – Times New Roman (in case a special type font is needed, when typing Greek, Arab, etc. words, Windows default fonts are to be used). In case the paper contains seldom used fonts, they (font family) are to be submitted along with the file. Line interval – 1,5.

3. Indent – 1.25. Made automatically in MS Word.

4. Numbering

Page numbers are placed in the lower right corner of the page automatically with the use of MS Word tools.

5. First page of the article

In the upper right corner, the UDC is placed, under it, after the 1.5 spacing – the LBC, then – the symbol ©, indent (spacing), and the name and initials of the author in semi-bold. After the 2-spacing indent, the title of the article is given. Central alignment is used for the title of the article given in semi-bold. The abstract and key words are given below, after the 2-spacing indent, without a paragraph indent, in italics and aligned by width. Then, after the 2-spacing indent, the text of the article is placed.

6. Abstract

The abstract contains from 200 to 250 words. The abstract states the purpose of the research, points out its undoubted scientific novelty and its differences from similar works of other scientists; contains the methods used by the author and the main results of the work performed; identifies areas of application of the results of the study; briefly formulates the prospects for further research in this area.

Examples of good abstracts for different types of articles (reviews, scientific articles, conceptual articles, application articles) are available at: http://www.emeraldinsight.com/authors/guides/write/abstracts.htm?part=2&PHPSESSID=hdac5rtkb73ae013ofk4g8nrv1.

7. Key words

There should be not more than eight words or word combinations. Key words should reflect the content of the manuscript to the fullest extent. The number of words within a phrase should not exceed three.

8. Tables

The caption of the table and its number (if present) are given in normal font, without highlighting. The caption runs in bold and is center aligned.

Tables are inserted; drawing tools and AutoShapes are not allowed; column and cell alignment using spaces or tabs is not allowed. MS WORD table editor is used for tables. Each piece of data of the stub and head of the table correspond to discrete cell. Only editor standard tools are applied for creating and formatting tables, no pilcrows, spaces and extra blank lines for semantic breakdown and line adjustment are allowed.

9. Figures (schemes, graphs, diagrams)

The caption and its number are placed below the figure. The word "Figure" is in normal font (without highlighting). The caption runs in bold, center alignment, single-spaced.

MS EXCEL is to be used for creating charts, MS WORD, MS VISIO – for flow charts, MS Equation for formulas.

Figures and charts, created in MS WORD are to be grouped within one single object. No scanned, exported or taken from the Internet graphic materials are allowed in the article.

Algorithm of charts insertion from MS EXCEL to MS WORD:

1) in MS EXCEL select the chart, using the mouse, right click and select "copy" from the list of options;

2) in MS WORD right-click, select "paste" from the list of options, click on "paste special", "Microsoft Excel chart".

The title of the figure and its number are placed below the figure. The word "Fig." is in common type face. The caption is given in bold and is center aligned.

10. Bibliographic description of the sources under tables and figures

Write: either "Source", or "Compiled with the use of", or "Calculated with the use of", etc., after that – information about the source.

11. Page footnotes

Page footnotes are executed according to GOST R 7.0.5 – 2008.

12. References

The word "References" is given after a 1.5 spacing after the body of the article in lower-case letters, semi-bold italics, center alignment. Then, the list of references is given after the 1.5 spacing.

The sources are not arranged alphabetically, but they are given in the same order as they appear in the body of the article (Vancouver style is used).

In case the paper has a DOI, it is given in the References.

References to Russian-language sources are given in accordance with GOST 7.0.5 – 2008. References to English-language sources are given in accordance with the Harvard standard[1].

The list of references contains links to scientific works used by the author in the preparation of the article. It is obligatory that the author provides links to all the sources from the list of references in the body of the article.

In accordance with international publishing standards, the recommended number of sources in the References should be at least 20, of which at least 30% should be foreign sources.

The number of links to the author's works should not exceed 10% of the total number of references given in the list.

It is not recommended to include the following sources in the list of references:

1) articles from any non-scientific magazines and newspapers;
2) regulatory and legislative acts;
3) statistical compilations and archival materials;
4) sources without attribution of the author (for example, collections under someone's editorship);
5) dictionaries, encyclopedias, other reference books;
6) reports, records, memos, protocols;
7) textbooks, etc. It is recommended to provide the corresponding page footnotes for these sources.

[1] Information about the modified Harvard standard is given in the book: Kirillova O.V. *Redaktsionnaya podgotovka nauchnykh zhurnalov po mezhdunarodnym standartam: rekomendatsii eksperta BD Scopus* [Editorial Preparation of Scientific Journals according to International Standards: Recommendations of a Scopus Expert]. Moscow, 2013. Part 1. 90 p.

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