FEDERAL STATE BUDGETARY INSTITUTION OF SCIENCE
VOLOGDA RESEARCH CENTER OF THE RUSSIAN ACADEMY OF SCIENCES

ECONOMIC AND SOCIAL CHANGES:

FACTS, TRENDS, FORECAST

Volume 13, Issue 5, 2020

The journal was founded in 2008

Publication frequency: bimonthly

According to the Decision of the Ministry of Education and Science of the Russian Federation, the journal *Economic and Social Changes: Facts, Trends, Forecast* is on the List of peer-reviewed scientific journals and editions that are authorized to publish principal research findings of doctoral (candidate's) dissertations in scientific specialties:
08.00.00 – economic sciences;
22.00.00 – sociological sciences.

The journal is included in the following abstract and full text databases:
Web of Science (ESCI),
ProQuest,
EBSCOhost,
Directory of Open Access Journals (DOAJ),
RePEc,
Ulrich's Periodicals Directory,
VINITI RAS,
Russian Science Citation Index (RSCI).

The journal's issues are sent to the U.S. Library of Congress and to the German National Library of Economics.

All research articles submitted to the journal are subject to mandatory peer-review.
Opinions presented in the articles can differ from those of the editor. Authors of the articles are responsible for the material selected and stated.

ISSN 2307-0331 (Print)
ISSN 2312-9824 (Online)

Internet address: **http://esc.volnc.ru**

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.

MAIN RESEARCH DIRECTIONS

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.

INTERNATIONAL TIES AND PROJECTS

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 agreements are signed with Jiangxi Academy of Social Sciences (China, 2014), National Academy of Sciences SM TsSaiSI (Belarus, 2014). Protocols of intent are signed with the Academy of Social Sciences Jiangxi Mao Zhiyong (China, 2014), National Institute of Languages and Civilizations (France, Jean Verkey, 2014).

2015 – Protocol of intent is signed with the Academy of Social Sciences, Jiangxi Province (China, 2015). Cooperation agreement is signed with the Institute of Sociology of the National Academy of Sciences of Belarus (Belarus, 2015).

2016 – Cooperation agreements are signed with EHESS Ecole des Hautes Etudes en Sciences Sociales (Paris, France, 2016), Institute of Philosophy, Sociology and Law of NAS RA (Yerevan, Armenia, 2016), Yerevan Northern University (Armenia, 2016), Yerevan State University (Armenia, 2016). Protocols of intentions are signed with Academy of Social Sciences in province Jiangxi (China, 2016).

CONTENT

TO THE 30TH ANNIVERSARY OF THE VOLOGDA RESEARCH CENTER OF RAS

PUBLIC ADMINISTRATION EFFICIENCY

Editorial

REGIONAL ECONOMY

MODELING AND FORECAST OF SOCIO-ECONOMIC PROCESSES

THEORETICAL ISSUES

INNOVATION DEVELOPMENT

LABOR ECONOMICS

ECONOMICS AND SOCIOLOGY OF PUBLIC HEALTH AND HEALTHCARE

SOCIAL DEVELOPMENT

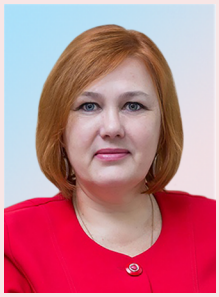
FOREIGN EXPERIENCE

PUBLIC OPINION MONITORING

TO THE 30TH ANNIVERSARY OF THE VOLOGDA RESEARCH CENTER OF RAS

DOI: 10.15838/esc.2020.5.71.1
UDC 338(470); LBC 65.050.11(2Rus)

Public Administration Efficiency in Studies of the Vologda Research Center of RAS*



Alexandra A. SHABUNOVA
Vologda Research Center of RAS
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: aas@vscc.ac.ru
ORCID: 0000-0002-3467-0921; ResearcherID: E-5968-2012

Sergey A. KOZHEVNIKOV
Vologda Research Center of RAS
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: kozhevnikov_sa@bk.ru
ORCID: 0000-0001-9063-6587; ResearcherID: I-8373-2016

Abstract. The article discusses the relevance of the problem for modern Russia, the main stages of development, and key research areas of employees of the Vologda Research Center RAS on the issues of evaluating and ensuring public administration efficiency. This topic has been a cross-cutting issue in the work of the Center employees since its foundation in 1990. The authors have proved that the variety of the studied issues, as well as the used methods, has been constantly developing. The paper demonstrates the formation of the agenda and subject of the work, and presents the achieved results, their scientific and practical significance, and promising areas for further studies on this topic. The authors reveal low public administration efficiency in Russia during the period of market reforms in the 1990s, which led to the crisis consequences in the economy and society. The article explores the key issues of public and municipal administration in the 2000s and at the current stage, limiting the implication of modernization processes in the country. The research makes it possible to evaluate the contribution of Vologda scientists

* The article was prepared in accordance with FSBIS VolRC RAS state assignment, research work no. 0168-2019-0004 "Improving the mechanisms of development and efficient usage of the potential of the socio-economic system".

For citation: Shabunova A.A., Kozhevnikov S.A. Public administration efficiency in studies of the Vologda Research Center of RAS. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no 5, pp. 9–21. DOI: 10.15838/esc.2020.5.71.1

to the development of theory, methodology, and tools for evaluating and improving the efficiency of public and municipal administration in Russia.

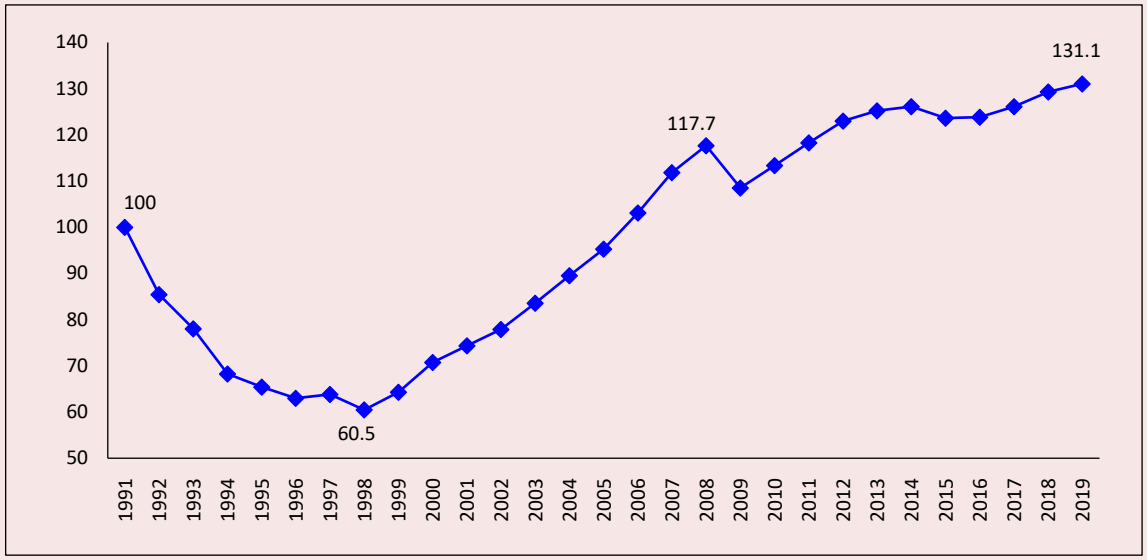
Key words: public administration, public administration efficiency, municipalities, evaluation methods.

Introduction

The destruction of the planned economic system and Russia's "shock" transition to the market in the 1990s led to a sharp aggravation of the socio-economic development of the country, reduction of the standard and quality of life of population. For example, after 1991, there was a collapse in GDP with an annual rate for more than 6%, as a result of which Russian economy had shrunk by almost 40% by 1998 (*Fig. 1*), and citizens' real disposable income had fallen more than twice (by 1999, more than a quarter of population (41.6 million people) had incomes below the subsistence minimum).

That situation required increasing state's role in regulating socio-economic processes, which was recognized at the highest government level. For example, in 1999, the future President of the Russian Federation, Vladimir V. Putin, in his election article "Russia at the turn of the Millennium", drew attention to the need to strengthen role of the state and civil society institutions in modernization of the economy and the country's life as a whole[1]. In the future, top public officials repeatedly focused on the importance of improving the administration efficiency[2].

Figure 1. Dynamics of Russia's GDP in 1991–2019, % to 1991



Source: Rosstat data.

[1] Putin V.V. Russia at the turn of the Millennium. *Rossiyskaya Gazeta*, dated December 30, 1999.

[2] V.V. Putin, "The most important is the improvement of the efficiency of administration of industries and the economy as a whole... with full personification of responsibility for this achievement or, vice versa, for the lack of results" (Source: Putin demanded the improvement of the efficiency of the economic management. *Delovaya Gazeta "Vzglyad"*, dated July 13, 2016. Available at: http://vz.ru/news/2016/7/13/821281.html). D.A. Medvedev: "Low public administration efficiency is one of the key factors which hinder the development of the country" (Source: From Dmitry Medvedev's remarks at Sochi International Investment Forum "Sochi-2016". Available at: http://government.ru/news/24729/).

However, the current system of public administration in the country still does not meet the set of issues, and does not contribute to the full solution of the accumulated problems, in spite of the numerous attempts to reform it. The scientists see the origin of the later one in the discrepancy between the philosophy of the reforms and their instrumental organization, inefficiency of the ruling elites to meet the population's essential needs in improving life quality and ensuring social justice [1].

The aforementioned circumstances actualize the task of scientific justification and practical implementation of a set of measures to improve efficiency of the public administration in Russia, taking into account the achievements of foreign and domestic science.

The most significant contribution to the study of the theory of evaluation and practice of improving the public administration efficiency (in the economic, social, political, and legal spheres) was made by such well-known foreign scientists as S. Grandi [2], D. Kettl [3], M. Crozier [4], S. Lazar [5], A. Manzoor[3], S. Newland [6], D. Sink [7], J. Stiglitz [8], V. Thompson [9], and others.

It was the transition to the market and transformation processes in Russian public administration system in the 1990s that led to the growth of the scientific interest of Russian researches in the field of improving public administration efficiency. We can highlight the works of L.I. Abalkin [10], G.V. Atamanchuk [11], H. Wolmann [12], S.Yu. Glazyev [13], N.I. Glazunova [14], A.G. Granberg [15], M.G. Delyagin [16], B.A. Denisov[4], N.V. Zubarevich [17], V.A. Ilyin [18], V. Inozemtseva [19], S.G. Kara-Murzy [20], V.N. Lazhentsev [21], V.N. Leksin [22], D.S. L'vov [23], O.S. Sukharev [24], S.S. Sulakshin [25], A.V. Klimenko [26], A.I. Tatarkin [27], A.N. Shvetsov [28], and others among the leading Russian authors dealing with the issue, including those who work in the sphere of development of theoretical and methodological foundations and the practice of implementing regional socio-economic policy.

Researchers of the Vologda Research Center of RAS, which celebrates the 30th anniversary of its foundation this year, also made a significant contribution to the development of theoretical and methodological basis and tools for improving administration efficiency at the regional and municipal levels.

Public administration efficiency, priority research topics of the Vologda Research Center of RAS

Since its foundations in 1990, the research problems of the Vologda Research Center of RAS (VolRC of RAS, earlier – Vologda Scientific Coordinating Center of RAS) have been devoted to the issues of evaluating and ensuring administration efficiency of the national and regional economy to improve the standard and quality of living of the population. Research Supervisor of the Center, RAS Corresponding Member, Doctor of Sciences (Economics), Professor, Vladimir A. Ilyin is the idea initiator and research supervisor.

We should emphasize that this topic is cross-cutting, and, in fact, it integrates all other research areas of the Center methodologically and ideologically. A team of experienced and young researchers was formed at the Vologda Research Center of RAS from scratch in quite a short period of time by scientific and historical standards (30 years). They face non-trivial challenges not only of scientific but also of practical nature, which are successfully solved. In particular, it is proved by close cooperation of the Center with leading Russian

[3] Manzoor A.A. Look at Efficiency in Public Administration: Past and Future. *SAGE Open*, October-December 2014: 1–5. Available at: http://journals.sagepub.com/doi/pdf/10.1177/2158244014564936

[4] Denisov B.A., Bogacheva G.N. *Ten Essays on Political Economy, State Institute of Management, Institute of Financial Management, Department of Political Economy.* Moscow: Publishing House GUU, 2001. 90 p.

science institutions, regional authorities, and municipalities when formulating strategic documents for the socio-economic development of territories and particular branches, etc. A number of employees of the organization currently continue their career in management positions in public authorities.

The subject of the scientific research has always met the challenges of the time, and it was devoted to the search for the root causes and possible consequences of certain phenomena and the development of appropriate mechanisms for improving public administration efficiency at all levels. Active usage of the results of their own field work also promoted it. In fact, a comprehensive mechanism for evaluating public administration efficiency was developed within the framework of the research area in the Vologda Research Center of RAS, based on official statistics, expert and sociological surveys of business and population.

In our opinion, it is advisable to consider the specifics of the research evolution at each stage in more detail for deeper understanding of the range of issues, as well as the used methods.

At the first stage (in 1990–2000) the scientists of VolRC RAS paid attention to the acute crisis in the economy, methodology development (based on the works of L.I. Abalkin, A.G. Granberg, A.E. Kogut, D.S. L'vov, A.I. Tatarkin, V.N. Lazhentsev), the development of methodological recommendations, and tools for adapting administrative systems at the regional and municipal authorities levels of market conditions of management.

The monograph "The Vologda Oblast: Movement to the Market" was published during this period (*V.A. Ilyin (Research Supervisor), A.A. Pashko, M.F. Sychev*) [29]. In the book, the authors showed the complexity and contradictions of the transformation processes of economic and social processes in the region during the reform, and their impact on people's life in the region; they scientifically proved the recommendations for further realization of economic reforms and their efficiency improvement.

Problems of industrial sector development in the Vologda Oblast (for example, industrial decline in the region in 1990–1997 by 42%; investment activity reduction, tax increase, etc.) and measurements to improve administrative efficiency in this area are reflected in the comprehensive work "Modernization of the Industrial Sector of the Region" (*V.A. Ilyin*) [30].

During this period, several works were devoted to the search of reserves improving administrative efficiency of timber industry (*V.V. Grachev, V.A. Ilyin, M.F. Sychev, A.S. Shulev*) [31] and agro-industrial *(A.A. Pashko, M.F. Sychev, V.A. Ilyin*) [32] complexes, small enterprises development (*V.A. Ilyin*) [33], public finances of the region (*a group of authors supervised by V.A. Ilyin and M.F. Sychev*) [34], and substantiation of "growth points" of the regional economy (*a group of authors supervised by V.A. Ilyin and M.F. Sychev*) [35].

Regular surveys of managers of industrial and agricultural enterprises were organized in the Center at that period in order to expand the empirical base of the studies on the progress and consequences of market reforms and to get feedback on the efficiency of the implemented administrative measures (monitoring the functioning of the Vologda Oblast industry; functioning and development of agricultural organizations in the region (since 1993); later the certificates of databases state registration were received). The monitoring results showed low public administrative efficiency in these areas (in 1993–1994, almost two thirds of the surveyed managers of industrial enterprises in the region considered the federal economic policy to be incorrect), and the need to strengthen state regulation of the economy, using a wide range of direct and indirect methods.

First sociological surveys of population have begun in the Center since 1993 (monitoring measurements of public opinion of the Vologda Oblast in the estimation of the political and economic situation in the country and region). Regional representative sample has being built since autumn in 1995; the surveys have already been carried out using the same methodology in Vologda, Cherepovets and 7 districts of the Oblast (Babayevsky, Velikoustygsky, Vozhegosky, Gryazovetsky, Kirillovsky, Nikolsky, and Tarnogsky). The results showed that more than 60% of respondents negatively assessed changes in the country in the 1990s.

Since 2000, Sheksninsky District has been included in the regional sample[5]. Such tools have been extended to the territory of the Northwestern Federal District since 2005. The conducted surveys allow measuring public administration efficiency for which the information of Rosstat and its territorial authorities does not show a complete picture (for example, the attitude of people to various spheres of public life, the activities of government structures, and the stability of the political and economic situation in the country) and identifying the underlying causes and possible consequences of certain social processes.

The obtained sociological data are not only of purely scientific interest but also serve as information base for making administrative decisions, and it is the subject of wide discussions at meetings of regional and municipal authorities, and also civil society institutions, in the media, etc. Thus, a comprehensive mechanism for evaluating the public administration efficiency, based on official statistics, expert and sociological surveys of business and population, was developed and tested in VolRC RAS in the first period of its formation as a research center.

In this period, the problems at the municipal level of socio-economic development were identified as especially acute, and it required scientific studies on the organization of planning and improving the administrative efficiency of socio-economic development of municipalities under market conditions (*V.A. Ilyin (Research Supervisor), A.S. Yakunichev, A.N. Zuev, T.V. Uskova*) [36]. The authors proved the necessity to apply a strategic approach to administration of the socio-economic development of territories, and they made a number of proposals for organizing a system for planning the expansion of Vologda, taking into account the successful experience of European towns.

The empirical basis for formulating scientific-based recommendations for improving the administrative efficiency of the socio-economic development of the town during this period was the monitoring of the living conditions of Vologda population since 1994 (a certificate of state registration of this database was obtained in 2012). The research allowed assessing the level of citizens' satisfaction with living conditions both in the town as a whole and in their own neighborhood, with the municipal government activities, which is extremely important in developing recommendations for improving the socio-economic town policy.

A reasonable strategic approach to administration was successfully tested and implemented by the Center's team (*supervised by V.A. Ilyin*) working together with the authorities to design concepts of socio-economic development of territories for the long-term period (Vologda (late 90's), the Vologda and Gryazovetsky municipal districts), particular industries (for example, the Concept of work stabilization and development of the Vologda Oblast's timber industry for the period from 1998 to 2005).

[5] The survey is bimonthly, the sample covers 1,500 residents of the region aged 18 and older (error does not exceed 3%). The main method of the monitoring is a questionnaire survey at the respondents' place of residence.

At the second stage (2000–2008), the evolution of the Center's studies on public administration issues of the territories and industries was going on in the conditions of relative stabilization of the situation in the country and economic growth due to favorable conditions on world energy markets, the beginning of administrative reform, and also the institute reform of municipal self-government.

Studies related to the problems of administrating the complex economic progress of the Vologda Oblast (*a group of authors supervised by V.A. Ilyin* [37; 38; 39]), ensuring its sustainable development (*T.V. Uskova* [40]), including through *the implementation of cluster policy* [41], and activating investment processes in the region (*E.S. Gubanova* [42]) expanded and deepened during this period. The authors proposed specific directions and mechanisms for the formation of industrial policy, based on the study of the ongoing processes (*O.S. Moskvina* [43]), and developed a set of measures to improve the efficiency of such industries as mechanical engineering, ferrous metallurgy, etc.

A fairly wide range of the Center's studies during this period was devoted to improving administrative efficiency of the socio-economic development of municipalities in the region. VolRC RAS has been monitoring the evaluation results of the local self-government institute's reform, identifying the problems and developing recommendations for improving the efficiency of regional and municipal authorities since 2007. A certificate of state registration of the database was obtained in 2014. A special questionnaire is sent annually to all municipalities of the Vologda Oblast (municipal districts, urban districts, urban and rural settlements). The results of the analysis indicate a decrease in the capacity of municipalities to solve the existing problems (for example, more than a quarter of the heads of rural region settlements indicate it in their responses) and low efficiency of interaction between regional and municipal authorities, government, business, and population.

During this period, the researchers worked out methodological tools for creating a multi-level system of indicative planning of socio-economic development of a municipality (*V.A. Ilyin, A.S. Yakunichev, A.N. Zuev, T.V. Uskova, A.A. Smirnov*) [44; 45], and scientifically substantiated the need for the formation of a continuous planning system that organically combined elements of tactical (medium-term) and operational planning, which can act as a mechanism for implementing the strategy (*T.V. Uskova*) [46]. Methodological tools to assess administration efficiency of municipality socio-economic development were created; efficient forms of interaction between regional, district, and settlement authorities were proposed (*D.E. Amelin, D.P. Zharavin, N.A. Pakholkov*) [47; 48], etc.

Acute financial and economic crisis of 2008–2009 was in a sense a turning point in the development of Russia's economy: it has led to the production decline in most industries and investment activity in the private sector; the reduction of prices for the raw material in world markets intensified the problems in the budget system of the regions. These circumstances actualized the task of improving the public administration system, including on the basis of scientific search for new factors of economic growth.

The third stage (2009 – present time) of the development of the Center's studies related to the issues of public administration efficiency, characterized by expanding the range of scientific questions and the transition from the research of processes mainly in the Vologda Oblast, to the consideration of the present condition and problems of socially-economic development of the regions of the Northwestern Federal District and the Russian economy as a whole.

Special attention should be paid to comprehensive studies of this period, devoted to the analysis of the features and problems of socio-economic development of Russia from the point of view of ensuring its national security. The author's team led by *V.A. Ilyin and T.V. Uskova* [49] identified the key threats and opportunities to ensure Russia's economic growth in the conditions of exhaustion of the export-raw material development model; effective mechanisms for industrial diversification and the formation of a neo-industrial economy have been scientifically substantiated, based on successful international experience, and the tasks and directions for reforming inter-budgetary relations in Russia have been defined.

Budgetary policy, which is one of the basic aspects of public administration, is in the focus of the scientists' attention in this period. In 2010–2014, there was a research, devoted to the study of the budget crisis features in the regions of the Russian Federation, and methods for improving their budgetary availability [50; 51] (*V.A. Ilyin (Research Supervisor), T.V. Uskova, A.I. Povarova, V.S. Orlova*). The research proved that the level of budgetary availability of the Vologda Oblast increased due to the negative impact of the world financial and economic crisis. Among the key factors for this are a significant reduction in tax revenues (in 2009, the consolidated budget's tax revenues decreased by 40% in 2009, compared to the level of 2008; in 2010 – by 21%), increased dependence of the regions on assistance from the federal center, budget deficit, increased debt obligations, and a high level of preferential taxation. A methodology for evaluating the efficiency of inter-budget regulation (*A.I. Povarova, M.A. Pechenskaya*) [52], conceptual proposals for strengthening the incentive and investment functions of inter-budget relations and expanding the organizational and economic tools of state regulation in this area were developed to assess the level of budget security in the region.

Separate area of studies during this period is devoted to the research of efficiency of budget expenditures for the implementation of long-term target programs (*T.V. Uskova, A.I. Povarova, and A.V. Galukhin*)[6]. A methodology for evaluating the efficiency of budget expenditures in the framework of long-term target programs has been developed, the testing results of which proved a low efficiency of several state programs in the Vologda Oblast.

A new milestone in the development of the public administration system in Russia was marked by the adoption of the Federal Law "On Strategic Planning in the Russian Federation" no. 172-FZ, dated June 28, 2014. VolRC RAS researchers focused on a number of unresolved issues in the strategic planning system, formulated their proposals for further improvement of legislation related to the organization of strategic planning in the country, along with the undoubted timeliness and advantages of this document [53].

During this period, a large research began to study the influence of the interest of the metallurgical corporations owners on the regions' socio-economic development and the state of their budgetary system (*V.A. Ilyin (Research Supervisor), A.I. Povarova, M.F. Sychev*) [54; 55]. Based on a methodological approach to the reporting analysis of vertically integrated structures in accordance with international and Russian standards, the researchers made an assessment of the production and financial activities of large subjects of ferrous metallurgy in Russia from the point of view of the influence of the economic interests of corporate owners on sustainable socio-economic national and regional development.

[6] Uskova T.V., Povarova A.I., Galukhin A.V. *Efficiency of Budget Expenditures for the Implementation of Long-Term Target Programs (the Case Study of the Vologda Oblast): Final Research Report*. Vologda, 2013. 120 p.

The authors showed that state regulation of activities of the largest economic entities in the raw material sectors of the Russian economy in distribution relations is inefficient. For example, the share of the head assets of metallurgical holdings in the budget formation of the regions decreased by 1.3–2.5 times after the crisis in 2008: for example, the shares of Cherepovets Steel Mill decreased from 40 to 13%, Magnitogorsk Iron & Steel Works – from 20 to 8%, Novolipetsk Steel – from 50 to 30%, Mining and Metallurgical Company "Norilsk Nickel" – from 30 to 24%, Bratsk Aluminum Smelter – from 3 to 1.5% [56]. At the same time, the authors have proved that metallurgical corporations were compensated annually for more than 40 billion rubles, or 40–100% of the taxes actually paid, on the background of a steady fall in payments to the budget as the returning export VAT. This devalued their participation in the mobilization of the budget revenues.

The proposals for overcoming the oligarchic nature and content of the activities of Russian metallurgical corporations are scientifically substantiated. The main ones relate to legislative measures regarding the establishment of taxes on the export of capital, the introduction of a single tax rate on dividends, the abolition of the return of export VAT, the revision of the administration of income tax, and the improvement of pricing policy in relation to large businesses [57]. According to the authors' calculations, the implementation of these measures will increase additional tax revenues from ferrous metallurgy corporations (PAO "Severstal", PAO "Magnitogorsk Iron & Steel Works", and "Novolipetsk Steel") to the consolidated budget of the Russian Federation and the territorial budgets of the constituent entities of the Russian Federation.

The research was not limited to studying the activities of ferrous metallurgy enterprises: the authors also analyzed the impact of financial results of oil and gas corporations on the formation of budgets and justified the proposals for improving the public administration efficiency in terms of adjusting monetary policy in the interests of stabilizing the macroeconomic situation in the country, and advancing development, reforming the budget system, etc. [58].

In our opinion, the readers will be interested in the monographs [59; 60], which combine the key articles of the Research Supervisor of VolRC RAS, RAS Corresponding Member, Doctor of Sciences (Economics), Editor-in-Chief of the journal "Economic and Social Changes: Facts, Trends, Forecast", Professor V.A. Ilyin which opened the issues in the period from 2012 to 2018. The cross-cutting theme of all publications is the political and socio-economic discourse on the public administration efficiency at all levels of government (federal, regional, municipal). There is extensive and deep analytical material about the ways of solving this problem, based on own studies of the author and the Center's research team.

V.A. Iliyn identified the "pressure points" that slow down economic and social transformation in the country: the attachment of the power elites to comprador oligarchic capital, corruption at all stages of the power, and the growing differentiation of population's living standards. The authors proposed specific measures to protect the security of the country and regions, to ensure the principals dominance of social justice in Russia, and to constantly increase the human capital. The books materials are illustrated by tables and graphs, describing the dynamics of population's attitude to various branches of power, based on long-term monitoring sociological measurements carried out by VolRC RAS.

In-depth analysis of the results of the Center's ongoing surveys is reflected in the bulletin "Public Administration Efficiency in Population Assessments", which has been published regularly since 2013.

Similar problems are considered in the works of young researchers of VolRC RAS. For example, in the monograph "Public Administration Efficiency: Issues and Methods of Improvements" (*S.A. Kozhevnikov, E.D. Kopytova*), the authors proved low public administration efficiency in Russia and its regions in the post-Soviet period which led to crisis phenomena (budget crisis, reduction of investment and innovation activity, further increase in income inequality, etc.), taking into account justified methodological approaches (target and functional). Based on the analysis of normative-legal, program documents and practice, the researchers substantiated that the specific features of management at the present stage, reducing its efficiency, are inconsistency of authorities' actions, contradiction of administration decisions, made at various levels, poor quality of strategic planning, etc.

In this context, the task of improving administration becomes extremely urgent, including through the usage of modern methods (benchmarking, crowdsourcing, SMART technologies, public-private partnership, etc.). The article demonstrates that a new industrial policy should play an important role, among the fundamental directions of which is to stimulate the development of high-value chains in key economy sectors; and its priority directions are substantiated. The efficiency of implementing project administration in activities of government structures is proved on the example of successful domestic practice; the research confirmed that the activation of these processes requires a developed institutional, legal, and organizational environment [61].

The problems of administration efficiency improvement are also very significant for the municipal level, since the institution of local self-government is constantly being reformed; local authorities face acute challenges that require finding appropriate responses. The research, carried out during these years, allowed determining the main vectors for improving the efficiency of territorial development management, including ones on the basis of regional socio-economic policy improvement in relation to municipalities as a whole[7] [62] and individual territories (single-industry towns [63], rural territories [64], etc.). The list of proposals (*T.V. Uskova, N.V. Voroshilov, S.A. Kozhevnikov, E.A. Gutnikov*) [65] at the municipal level includes the organization of territorial public self-government and application of the mechanism of citizens' self-taxation as a form of improving their participation in local government; introduction of mechanisms of public-private partnerships, and formation of an efficient mechanism for regional settlement interaction.

The development of the institute of public-private (municipal-private) partnership is a significant tool of regional policy for solving socio-economic issues of municipal territories. When studying these issues (*S.A. Kozhevnikov*), the author formulated conceptual foundations for administration of the region's economy based on the development of partnership between the government and business structures in such an important area for ensuring municipalities' activity as housing and communal services; proposed the method of integrated assessment of the state of municipal housing and utilities and methodological tools for evaluating the efficiency of partnership projects at all stages of their life cycle, taking into account the balance of interests of all major participants [66].

Public administration efficiency at the present stage and research perspectives

National goals and strategic objectivities for the development of the Russian Federation for the period up to 2024 were defined by the Decree of the Russian President V.V. Putin no. 204, dated May 7, 2018, and by Decree no. 474, dated July 21, 2020 – until 2030[7].

[7] Uskova T.V., Voroshilov N.V. *Regional Policy for the Development of Municipalities.* Vologda: FSBIS VolRC RAS, 2017. 136 p.

Thirteen national development projects of Russia serve as instrumental support for the implementation of these goals for the period from 2019 to 2024.

The VolRC RAS team carried out a comprehensive research devoted to the analysis of the main provisions of these documents, and the key risks of their implementation[8]. The findings, obtained by the authors, largely correlate with the opinion of the leading experts from science, government, and public areas regarding the bottle-neck of these strategic documents implementation. The studies proved that the key risks of the realization of national projects at the present stage are: poor consideration of regional components and territorial features of development, insufficient elaboration of mechanisms for their implementation, weak correlation of national projects with federal and regional state programs, international documents, and some targets being insufficiently justified or rather challenging, etc. [67].

In our opinion, a research of the ways of the administration system transformation at all levels should be among promising areas for studies on this issue in order to find the answers to the challenges and threats of development associated with deep processes in the world economy (for example, the transition to a new technological way) and the agenda which became especially relevant only in 2020 (the outbreak of the new coronavirus infection, etc.).

References

1. Ilyin V.A. The ruling elites: A problem for Russia's national security. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2016, no. 4, pp. 9–34 (in Russian).
2. Grandy C. The "efficient" public administrator: Pareto and a well-rounded approach to public administration. *Public Administration Review*, 2009, no. 69, pp. 1115–1123.
3. Kettl D.F. The future of public administration. *Journal of Public Affairs Education*, 1999, no. 5, pp. 127–134.
4. Crozier M., Friedberg E. *L'Acteur et le Système*. Reis: Seuil, 1977. 512 p.
5. Lazar C.G. The principle of efficiency and public administration reform. Case study: Organizational change. In: *National and European values of public administration in the Balkans. International Conference on National and European Values of Public Administration in the Balkans*, 2011, no. 4. Pp. 300–309.
6. Newland C.A. The Public Administration Review and ongoing struggles for connectedness. *Public Administration Review*, 2000, vol. 60, no.1, pp. 20–38.
7. Sink D.S. *Upravlenie proizvoditel'nost'yu: planirovanie, izmerenie i otsenka, kontrol' i povyshenie* [Productivity Management: Planning, Measurement and Evaluation, Control]. Translated from English. Editorship and the introduction article of V.I. Danilov-Danil'yan. Moscow: Progress, 1989. 528 p.
8. Stiglitz J.E. Redefining the role of the state: What should it do? How should it do it? And how should these decisions be made? In: *Paper Presented at the Tenth Anniversary of MITI Research Institute*. Tokyo, 1998.
9. Thompson W. *Practical Directions for the Speedy and Economical Establishment of Communities on the Principles of Mutual Co-operation, United Possessions and Equality of Exertions and the Means of Enjoyments*. London: Strange and E. Wilson, 1830.

[7] On the national development goals of the Russian Federation through 2030: Decree of the RF President no. 474, dated July 21, 2020.

[8] Ilyin V.A., Uskova T.V., Shabunova A.A., Kozhevnikov S.A., Voroshilov N.V., Patrakova S.S., Sekushina I.A., Lebedeva M.A. *National Projects in 2019–2024: Analysis and Key Risks of Their Implementation. Economic Block: Scientific Analysis Edition*. Vologda: VolRC RAS, 2019. 93 p.; Ilyin V.A., Mazilov E.A., Shabunova A.A., Kremin A.E., Uskov V.S., Alferov D.A., Kuznetsova E.P., Yakushev N.O. *National Projects in 2019–2024: Analysis and Key Risks of Their Implementation. Scientific and Technological Sphere and Entrepreneurship: Scientific Analysis Edition*. Vologda: VolRC RAS, 2019. 75 p.; Shabunova A.A., Ilyin V.A., Kalachikova O.N., Leonidova G.V., Golovchin M.A., Gruzdeva M.A., Ipatov S.S., Kalashnikov K.N. *National Projects in 2019–2024: Analysis and Key Risks of Their Implementation. Social Sphere: Scientific Analysis Edition*. Vologda: VolRC RAS, 2019. 68 p.

10. Abalkin L.I. *Logika ekonomicheskogo rosta* [Logic of Economic Growth]. Moscow: Institut ekonomiki RAN, 2002. 228 p.
11. Atamanchuk G.V. Problems of increasing the efficiency of administrative and legal regulation of public administration in the Russian Federation. *Vestnik Moskovskogo universiteta. Seriya 26. Gosudarstvennyi audit=Bulletin of Moscow University. Series 26.State Audit*, 2013, pp. 34–47 (in Russian).
12. Wohlman H. Assessing state government reforms: The third wave. *SotsIs=Socis*, 2010, no. 10, pp. 93–99 (in Russian).
13. Glaz'ev S.Yu., Batchikov S.A. *Effektivnost' gosudarstvennogo upravleniya* [Effectiveness of Public Administration]. Under the general editorship of S.Yu. Glaz'ev. Moscow: Fond Za ekonomicheskuyu gramotnost', Rossiiskii ekonomicheskii zhurnal, Izdatel'stvo OOO Konsaltbankir, 1998. 848 p.
14. Glazunova N.I. *Gosudarstvennoe upravlenie kak Sistema* [Public Administration as a System]. Moscow: Izd. tsentr GUU, 2001. 373 p.
15. Granberg A.G. Strategy of territorial socio-economic development of Russia: From idea to implementation. *Voprosy ekonomiki=Voprosy Ekonomiki*, 2001, no. 9, pp. 15–28 (in Russian).
16. Delyagin M.G. *Ideologiya vozrozhdeniya. Kak my uidem iz nishchety i marazma* [The Ideology of Rebirth. How we will get out of Poverty and Insanity]. Moscow: Forum, 2000. 192 p.
17. Zubarevich N.V. *Regiony Rossii: neravenstvo, krizis, modernizatsiya* [Regions of Russia: Inequality, Crisis, Modernization]. Moscow: Nezavisimyi institut sotsial'noi politiki, 2010. 160 p.
18. Ilyin V.A. *Effektivnost' gosudarstvennogo upravleniya: tochka zreniya glavnogo redaktora* [Public Administration Efficiency: Chief Editor's Point of View]. Vologda: ISERT RAN, 2015. 320 p.
19. Inozemtsev V.L. *Chto sluchilos' s Rossiei* [What happened to Russia]. Moscow: Algoritm, 2014. 256 p.
20. Kara-Murza S.G. *Anomiya v Rossii: prichiny i proyavleniya* [Anomie in Russia: Causes and Manifestations]. Moscow: Nauchnyi ekspert, 2013. 264 p.
21. Lazhentsev V.N. *Soderzhanie, sistemnaya organizatsiya i planirovanie territorial'nogo razvitiya* [The Content, System Organization and Planning of Territorial Development]. Ekaterinburg–Syktyvkar, 2014. 236 p.
22. Leksin V.N. Effectiveness of regional and local authorities: purposes and possibilities of the correct assessment. *Region: ekonomika i sotsiologiya=Region: Economics and Sociology*, 2012, no. 1 (73), pp. 3–39 (in Russian).
23. *Strategicheskoe upravlenie: region, gorod, predpriyatie* [Strategic Management: Region, City, Enterprise]. Ed. by D.S. L'vov, A.G. Granberg, A.P. Egorshin. 2nd edition, add. Moscow: Ekonomika, 2005. 603 p.
24. Sukharev O.S. *Teoriya effektivnosti ekonomiki* [Economic Efficiency Theory]. Moscow: Finansy i statistika, 2009. 369 p.
25. Yakunin V.I., Sulakshin S.S., Bagdasaryan V.E., Orlov I.B., Stroganova S.M. *Kachestvo i uspeshnost' gosudarstvennykh politik i upravleniya: monografiya* [Quality and Efficiency of State Policy and Administration: Monograph]. Moscow: Nauchnyi ekspert, 2012. 496 p.
26. Klimenko A.V. Modernization of the functional of the executive branch and its results. In: *Problemy sovremennogo gosudarstvennogo upravleniya v Rossii: mat. nauch. seminara. Vyp. 4 (25) «Problema otsenki kachestva gosudarstvennogo upravleniya»* [Issues of modern public administration in Russia: Proceedings of a scientific workshop. Issue 4 (25) "The issue of assessing the quality of public administration"]. Moscow: Nauchnyi ekspert, 2009. Pp. 6–47 (in Russian).
27. Tatarkin A.I. Assessment of state property governance efficiency. *Journal of new economy*, 2005, no. 11, pp. 3–8 (in Russian).
28. Shvetsov A.N. *Sovershenstvovanie regional'noi politiki: kontseptsii i praktika* [Improvement of Regional Policy: Concepts and Practice]. Moscow: KRASAND, 2010. 320 p.
29. Ilyin V.A., Pashko A.A., Sychev M.F. *Vologodskaya oblast': dvizhenie k rynku* [Vologda Oblast: Movement to the Market. Vologda: VNKTs RAN, 1995. 132 p.
30. Ilyin V.A. *Modernizatsiya promyshlennogo sektora regiona* [Modernization of the Industrial Sector of the Region]. Vologda: Volog. nauch.-koordinats. tsentr TsEMI RAN, 1998. 178 p.
31. Grachev V.V., Ilyin V.A., Sychev M.F., Shulev A.S. *Lesopromyshlennyi kompleks: problemy i resheniya* [Timber Industry Complex: Problems and Solutions]. 2nd edition. Vologda: Volog. nauch.-koordinats. tsentr TsEMI RAN, 1999. 56 p.
32. Pashko A.A., Sychev M.V., Ilyin V.A. *Agropromyshlennyi kompleks raiona: reforma i razvitie* [Agro-Industrial Complex of the Region: Reform and Development]. Vologda, 1997. 98 p.

33. Ilyin V.A. *Maloe predprinimatel'stvo v Vologodskoi oblasti* [Small business in the Vologda region]. St. Petersburg, 1998. 39 p.
34. *Obshchestvennye finansy regiona: sostoyanie, faktory, perspektivy* [Public Finances of the Region: State, Factors, Prospects]. Vologda: Volog. nauch.-koordinats. tsentr TsEMI RAN, 2000. 154 p.
35. Sychev M.F., Pashko A.A., Moskvina O.S. et al. *Rezervy ekonomicheskogo rosta* [Reserves of Economic Growth]. Vologda, 2000. 107 p.
36. Ilyin V.A., Yakunichev A.S., Zuev A.N., Uskova T.V. *Strategiya upravleniya munitsipal'nymi obrazovaniyami: Monografiya* [Municipal Management Strategy: Monograph]. Vologda: Vologod. nauch.-koordinats. tsentr TsEMI RAN, 2000. 114 p.
37. Ilyin V.A. et al. *Strategiya razvitiya regiona: monografiya* [Regional Development Strategy: Monograph]. Vologda: Volog. nauch.-koordinats. tsentr TsEMI RAN, 2004. 227 p.
38. Ilyin V.A. et al. *Regional'naya strategiya ekonomicheskogo rosta-2015: monografiya* [Regional Strategy of Economic Growth–2015: Monograph]. Vologda: VNKTs TsEMI RAN, 2005. 220 p.
39. Ilyin V.A. et al. *Problemy regional'nogo razvitiya: 2009 – 2012: monografiya* [Regional Development Problems: 2009–2012: Monograph]. Vologda: VNKTs TsEMI RAN, 2009. 215 p.
40. Uskova T.V. *Upravlenie ustoichivym razvitiem regiona: monografiya* [Management of Sustainable Development of the Region: Monograph]. Vologda: ISERT RAN, 2009. 355 p.
41. *Proizvodstvennye klastery i konkurentosposobnost' regiona: monografiya* [Industrial Clusters and Competitiveness of the Region: Monograph]. Supervised by T.V. Uskova. Vologda: In- t sotsial'no-ekonomicheskogo razvitiya territorii RAN, 2010. 246 p.
42. Gubanova E.S. *Investitsionnaya deyatel'nost' v regione* [Investment activity in the region]. 2nd ed. Vologda: VNKTs TsEMI RAN, 2003. 135 p.
43. Moskvina O.S. *Promyshlennaya politika-yadro modernizatsii ekonomiki* [Industrial Policy is the Core of Economic Modernization]. Vologda: VNKTs TsEMI, 2003. 136 p.
44. Ilyin V.A., Yakunichev A.S., Zuev A.N., Uskova T.V. *Strategiya upravleniya munitsipal'nymi obrazovaniyami: Monografiya* [Municipal Management Strategy: Monograph]. Vologda: Vologod. nauch.-koordinats. tsentr TsEMI RAN, 2000. 114 p.
45. Uskova T.V., Zuev A.N., Smirnov A.A. et al. *Monitoring razvitiya munitsipal'nykh obrazovanii* [Monitoring of the Development of Municipalities]. Vologda: Volog. nauch.-koordinats. tsentr TsEMI RAN, 2002. 125 p.
46. Uskova T. V. *Indikativnoe planirovanie razvitiya munitsipal'nykh obrazovanii* [Indicative planning for the development of municipalities]. Vologda: Vologod. nauch.-koordinats. tsentr TsEMI RAN, 2003. 158 p.
47. Amelin D. E. *Mestnoe samoupravlenie v regional'nom razvitii* [Local Government in Regional Development]. Vologda: VNKTs TsEMI RAN, 2006. 180 c.
48. Zharavin D.P., Pakholkov N.A. *Strategicheskoe upravlenie sotsial'no-ekonomicheskim razvitiem munitsipal'nogo obrazovaniya: strateg. tseli i prioritety razvitiya territor. obrazovanii, org. upr. na munitsip. urovne, monitoring realizatsii strategii sots.-ekon. razvitiya r-na: monografiya* [Strategic Management of the Socio-Economic Development of a Municipal Formation: Strategic Goals and Priorities for the Development of Territorial Entities, Organization of Management at the Municipal Level, Monitoring of the implementation of the strategy of Socio-Economic Development of the Region: Monograph]. Vologda: VoGTU, 2005. 143 p.
49. *Natsional'naya bezopasnost' Rossii: problemy obespecheniya ekonomicheskogo rosta: monografiya* [National Security of Russia: Problems of Ensuring Economic Growth: Monograph]. Team of authors; supervised by RAS corresponding member V.A. Ilyin and Doctor of Sciences (Economics) T.V. Uskova. Vologda: ISERTRAN, 2016. 300 p.
50. Uskova T.V., Povarova A.I., Orlova V.S. *Obshchestvennye finansy regionov: prioritety modernizatsii* [Public Finances of the Regions: Modernization Priorities]. Vologda: ISERT RAN, 2010. 166 p.
51. Povarova A.I. *Metody povysheniya byudzhetnoi obespechennosti regiona: preprint* [Methods for Increasing the Budgetary Provision of the Region: Preprint]. Vologda, 2011. 40 p.
52. Pechenskaya M.A. *Mezhbyudzhetnye otnosheniya: sostoyanie, regulirovanie, otsenka rezul'tativnosti: monografiya* [Inter-Budgetary Relations: State, Regulation, Performance Assessment: Monograph]. Vologda: ISERT RAN, 2015. 164 p.
53. Uskova T.V., Chekavinskii A.N. Law on strategic planning in the Russian Federation: advantages and unresolved issues (expert evaluation). *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2014, no. 4 (34), pp. 63–67. DOI: 10.15838/esc/2014.4.34.6 (in Russian).

54. Ilyin V.A., Povarova A.I., Sychev M.F. *Vliyanie interesov sobstvennikov metallurgicheskikh korporatsii na sotsial'no-ekonomicheskoe razvitie: preprint* [Influence of Metallurgical Corporation Owners' Interests on Socio-Economic Development: Preprint]. Vologda: ISERT RAN, 2012. 102 p.
55. Ilyin V.A., Povarova A.I. *Problemy effektivnosti gosudarstvennogo upravleniya. Byudzhetnyi krizis regionov: monografiya* [Problems of Public Administration Efficiency. Regional Budget Crisis: Monograph]. Vologda: ISERT RAN, 2013. 128 p.
56. Ilyin V.A., Povarova A.I. *Krupneishie metallurgicheskie korporatsii i ikh rol' v formirovanii byudzhetnykh dokhodov: monografiya* [The Largest Metallurgical Corporations and their Role in the Formation of Budget Revenues: Monograph]. Vologda: VolNTs RAN, 2019. 204 p.
57. Ilyin V.A., Povarova A.I. *Problemy effektivnosti gosudarstvennogo upravleniya. Tendentsii rynochnykh transformatsii. Krizis byudzhetnoi sistemy. Rol' chastnogo kapitala. Strategiya – 2020: problemy realizatsii: monografiya* [Problems of Public Administration Efficiency. Trend of Market Transformation. Crisis of the Budgetary System. Role of Private Capital. Strategy 2020: Problems of Realization: Monograph]. Vologda: ISERT RAN, 2014. 188 p.
58. Ilyin V.A., Povarova A.I. *Effektivnost' gosudarstvennogo upravleniya. 2000–2015. Protivorechivye itogi – zakonomernyi rezul'tat: monografiya* [Public Administration Efficiency. 2000–2015. Contradictory Outcomes – an Expected Result: Monograph]. Vologda: ISERT RAN, 2016. 304 p.
59. Ilyin V.A. *Effektivnost' gosudarstvennogo upravleniya: tochka zreniya glavnogo redaktora* [Public Administration Efficiency: Chief Editor's Point of View]. Vologda: ISERT RAN, 2015. 320 p.
60. Ilyin V.A., Morev M.V. *Effektivnost' gosudarstvennogo upravleniya. Politicheskii tsikl 2012-2018: tochka zreniya glavnogo redaktora* [Public Administration Efficiency. Political Cycle 2012–2018: Chief Editor's Point of View]. Vologda: VolNTs RAN, 2019. 411 p.
61. Kozhevnikov S.A., Kopytova E.D. *Effektivnost' gosudarstvennogo upravleniya: problemy i metody povysheniya: monografiya* [Public Administration Efficiency: Problems and Methods of Improvement: Monograph]. Vologda: VolNTs RAN, 2018. 208 p.
62. Voroshilov N.V. Regional policy on the development of municipalities: Efficiency assessment and implementation specifics in the current context. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2019, vol. 12, no. 5, pp. 58–75. DOI: 10.15838/esc.2019.5.65.4 (in Russian).
63. Uskova T.V., Iogman L.G., Tkachuk S.N., Nesterov A.N., Litvinova N.Yu. *Monogorod: upravlenie razvitiem* [Monotown: Development Management]. Ed. by Doctor of Sciences (Economics) T.V. Uskova. Vologda: ISERT RAN, 2012. 220 p.
64. Uskova T.V., Voroshilov N.V. Integrated development of rural territories – a task of national importance. *Problemy razvitiya territorii=Problems of Territory's Development*, 2019, no. 6 (104), pp. 7–20. DOI: 10.15838/ptd.2019.6.104.1 (in Russian).
65. Uskova T.V., Voroshilov N.V., Gutnikova E.A., Kozhevnikov S.A. *Sotsial'no-ekonomicheskie problemy lokal'nykh territorii: monografiya* [Socio-Economic Problems of Local Territories: Monograph]. Vologda: ISERT RAN, 2013. 196 p.
66. Kozhevnikov S.A., Uskova T.V. *Gosudarstvenno-chastnoe partnerstvo v zhilishchno-kommunal'nom khozyaistve regiona: problemy i perspektivy razvitiya: monografiya* [Public-Private Partnership in the Housing and Communal Services of the Region: Problems and Development Prospects: Monograph]. Vologda: ISERT RAN, 2016. 148 p.
67. Kozhevnikov S.A. Problems of project management development in the public sector in the perspective of achieving national goals. *Problemy razvitiya territorii=Problems of Territory's Development*, 2020, no. 1 (105), pp. 64–77. DOI: 10.15838/ptd.2020.1.105.5 (in Russian).

Information about the Authors

Alexandra A. Shabunova – Doctor of Sciences (Economics), Associate Professor, Director, Vologda Research Center of the Russian Academy of Sciences (56A, Gorky Street, Vologda, 160014, Russian Federation; e-mail: aas@vsccac.ru)

Sergey A. Kozhevnikov – Candidate of Sciences (Economics), Deputy Director, Leading Researcher, Vologda Research Center of the Russian Academy of Sciences (56A, Gorky Street, Vologda, 160014, Russian Federation; e-mail: kozhevnikov_sa@bk.ru)

Received September 24, 2020.

Editorial

DOI: 10.15838/esc.2020.5.71.2
UDC 323.2; LBC 60.527

Announced in 2018, V. Putin's "Decisive Breakthrough" is Now Stuck

Vladimir A. ILYIN
Vologda Research Center of RAS
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: ilin@vscc.ac.ru
ORCID: 0000-0003-4536-6287; ResearcherID: N-4615-2017

Mikhail V. MOREV
Vologda Research Center of RAS
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: 379post@mail.ru
ORCID: 0000-0003-1396-8195; ResearcherID: I-9815-2016

Abstract. Over the last 10 years, the journal "Economic and Social Changes: Facts, Trends, Forecast" has been presenting articles on relevant problems of Russian society and government in its "Editorial" section once in every two months. Based on expert opinions of a wide range of scientists, sociologists, economists, political and social activists, and a set of factual data, acquired using sociological and statistical tools, a long-term monitoring of the public administration efficiency has been conducted, which allowed assessing the current situation in the country in real time. In Editor-in-Chief's previous article, published in the journal "Economic and Social Changes: Facts, Trends, Forecast" no.4, we focused on the results of the all-Russian vote on amendments to the Constitution of the Russian Federation, held on July 1, 2020. Amended Constitution significantly strengthens social obligations of the government, and it is

For citation: Ilyin V.A., Morev M.V. Announced in 2018, V. Putin's "decisive breakthrough" is now stuck. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 22–54. DOI: 10.15838/esc.2020.5.71.2

aimed at the protection of Russia's national interests. Besides, the nature of the new Constitution turned out to be relevant in terms of civilizational challenges, because common practice of border shutdowns during COVID-19 epidemic forms new outlines of the world order that strengthen a value of national interests and weaken globalization values, which have been dominant over the last 50 years. Nethertheless, many experts noted after the all-Russian vote that the consolidation of society around constitutional amendments did not work out. The results of our analysis, conducted according to data of the Central Election Commission of the Russian Federation, showed that the share of people, who voted against amendments, exceeded average national numbers in 47 Russian regions out of 86; it was even higher in some oblast centers. Its main reason is people's disbelief in a desire and abilities of the ruling elites to implement election promises of the President. This situation is primarily caused by a lack of noticeable positive changes in the dynamics of the level and quality of life in the last ten years. In order to enhance this topic, we decided to analyze some key aspects of the whole process of the formation of the new post-Soviet statehood. The President himself initiated and publically announced this reform back in 1999, and he has been controlling its implementation ever since.

Key words: historical process, national interests, efficiency of public administration, presidential elections, Constitution of the Russian Federation, public opinion.

Even before 2000, when V.V. Putin first became the President, he had written that "communism vividly demonstrated its inaptitude for sound self-development, dooming our country to a steady lag behind economically advanced countries... Where there is a state ideology blessed and supported by the state, there is, strictly speaking, practically no room for intellectual and spiritual freedom, ideological pluralism and freedom of the press, that is, for political freedom. I am against the restoration of an official state ideology in Russia in any form"[1].

This idea runs through a whole relatively recent history of the formation and development of the young post-Soviet state, and it will probably not stop in the upcoming decades. Thus, one of the main points of the RF Constitution of 1993 – "In the Russian Federation ideological diversity shall be recognized. No ideology may be established as state or obligatory one" – remained unchanged in the new edition of the country's fundamental document which entered into force after the all-Russian vote on July 1, 2020. Today, during the chaotic destruction of customary norms and values, which inevitably follows the process of the transition from modern to postmodern, many experts consider the "de-ideologized and pragmatic" nature of Russia's policy one of its main geopolitical advantages.

The de-ideologization involves non-intrusion of its value system into other countries in foreign policy and provision of its own citizens with the amplest possible opportunities for self-realization in domestic policy: it is a principle position and distinctive feature of post-Soviet Russia, though many experts disagree with this and believe that "the absence of ideology is the same as a lack of purpose"[2].

[1] Putin V.V. Russia at the Turn of the Millennium. Available at: https://www.ng.ru/politics/1999-12-30/4_millenium.html

[2] See, for example: Sulakshin S.S. *Quality and Success of Public Policies and Administration*. Series "Political axiology". Moscow: Nauchny Ekspert, 2012; Starikov N. V. Russia must formulate a national idea. *N. Starikov's official blog*. June 21, 2019. Available at: https://nstarikov.ru/starikov-rossiya-dolzhna-sformulirovat-natsionalnuyu-ideyu-104991

Excerpt from the report of NRU HSE, prepared according to the results of the situation analysis under the auspices of the Russian MFA with the support of the Committee on International Affairs of the State Duma of the Federal Assembly of the Russian Federation and the International Public Fund "Russian Peace Foundation", the Council for Foreign and Defense Policy and the journal "Russia in Global Affairs": "We do not suggest that Russia adopts a particular state ideology in a classical understanding, which implies the development of "only correct" views on historical development and claims the truth and universality of the value system, as well as the imposition of views and values on everyone else. We and the world had enough of such ideologies in the 20th century. Now we see a predictable collapse of another the "only correct" ideology –"liberal democracy". ***The beneficial difference between Russia's foreign policy is its de-ideologized and pragmatic nature"***[3].

"The USSR is the example of defeat due to the death of grand ideas, where the communist ideology, uniting the country, weakened and degenerated in the 1970s–1980s. The current case – EU Europe. It rejected national ideas of great states, and this decision made them mediocre ones (only France tries to cling to the previous status); it named European peace a purpose and achieved it (but mostly due to assistance of the USSR/Russia and the USA with their nuclear weapons), and now it slowly slides down. The EU had a chance for a grand new idea — to create a space of security and cooperation from Lisbon to Vladivostok, combining Europe's technology and finance with Russia's resources, human capital, and strategic power. But it refused such project"[4].

At the same time, the absence of ideology does not mean that grand ideas are not in demand (for Russian society and Russia as a whole, as an active subject of the multipolar world). On the contrary, a whole Russian history over the last 100 years has been going on under this sign, whether it was the construction of communism, the defense of the Motherland from foreign invaders, space exploration, or socialist slogans of Soviet "five-year plans".

It was the weakening of a grand idea to build communism in minds and hearts of people that became one of the main reasons for the collapse of the Soviet Union, since the factor of external interference and betrayal of the elites at that crucial historical moment would hardly have mattered if it had not been for the tacit consent of the majority of Soviet citizens tired of the "iron curtain".

Today, many experts note that global projects of "Western liberalism" and "United Europe" go down the same path, when the values of national sovereignty are still preserved despite active globalization processes. At the same time, the coronavirus pandemic and common shutdowns of state borders in order to prevent its spread have significantly increased the importance of national interests not only in Europe but in the whole world.

From the collapse of the Soviet Union in 1991 until now, the history of post-Soviet Russia can be seen as the succession of grand ideas – even despite pronounced de-ideologization.

[3] S.A. Karaganov, D.V. Suslov, et al. *Protecting Peace, Earth, and Freedom of Choice for All Countries: New Ideas for Russia's Foreign Policy:* speech at XXI April International Academic Conference on Economic and Social Development, Moscow, 2020; Nat. Res. Un. "Higher School of Economics". Moscow: HSE Publishing House, 2020. P. 36.

[4] S.A. Karaganov, D.V. Suslov, et al. *Protecting Peace, Earth, and Freedom of Choice for All Countries: New Ideas for Russia's Foreign Policy*: speech at XXI April International Academic Conference on Economic and Social Development, Moscow, 2020; Nat. Res. Un. "Higher School of Economics". Moscow: HSE Publishing House, 2020. P. 33.

1. 1991–1999

During the "wild 90s", it was an idea of Russia's entrance in the coordinate system of global "Western project". This entrance should have been not just political and economic but mental and spiritual, manifesting itself in each citizen of our country. According to the plan of the "collective West" and the liberal elites who gained power after the final collapse of one of the greatest countries – the Soviet Union, Russia should have become a periphery territory, completely controlled by liberal values of the western world, implementing "the economy of services", the meaning of which is not the production of industrial products but the provision of services on its basis despite its place and manufacturer[5]. Perhaps, this would have happened if the greed of Russia's own elites did not lead the country to the economic catastrophe, which was a collapse of then in-demand liberal values of freedom, democracy, market, and it caused the emergence of a new grand idea in society – a strong centralized state power capable of restoring order in the country and stabilizing the rapidly declining economy

2. 2000–2007

In 2000, V. Putin "brought" this idea with him. He started his first speech as the President with addressing people and taking full responsibility for the situation in Russia. Later, thanks to his personal efforts, the President was able to settle the "Chechen conflict", fight back the oligarchs who continued to plunder the national wealth, and, most importantly, establish a direct personal contact with the society.

Coming back to the first program article of the future President of the RF (when he

> "Esteemed citizens of Russia, dear friends! **I am addressing you today, you specifically,** because you have entrusted me with the highest government post in the country. I understand that I have taken on a great responsibility, and I know that **in Russia the head of state has always been and will always be the person who is responsible for everything in the country...**
>
> We must guard what we have gained, we must protect and promote democracy, we must make sure that the authorities elected by the people serve the people's interests, protect Russian citizens everywhere – both inside and outside the country – and serve the public. **This is a principled, staunch position that I have defended and will continue to defend...**
>
> I can assure you that my work will be guided solely by **the interests of the state.** Perhaps it will not be possible to avoid mistakes, but what I can promise and what I do promise is that I will work openly and honestly.
>
> I consider it to be my sacred duty to unify the people of Russia, **to rally citizens around clear aims and tasks,** and to remember every day and every minute that we have one Motherland, one people and one future"[6].

> "I am convinced that ensuring the necessary growth dynamics is not only an economic problem. It is also a political and, in a certain sense, – I am not afraid to use this word – ideological problem. To be more precise, it is an ideological, spiritual and moral problem. It seems to me that the latter is of particular importance at the current stage from the standpoint of ensuring the unity of Russian society. Fruitful and creative work which our country needs so badly today is impossible in a split and internally disintegrated society, a society where the main social sections and political forces have different basic values and fundamental ideological orientations"[7].

[5] Betelin V.V. Russia needs to abandon the "service economy" and move to the economy of industrial production. *Ekonomist,* 2019, no. 2, p. 4.

[6] V.V. Putin's speech at the Inauguration Ceremony on May 7, 2000. *Official website of the President of Russia*. Available at: http://www.kremlin.ru/events/president/transcripts/21410

[7] Putin V.V. Russia at the Turn of the Millennium. Available at: https://www.ng.ru/politics/1999-12-30/4_millenium.html

pronounced his clear position on the impossibility of establishing an official state ideology in Russia), we would like to note that, in it, V. Putin noted a necessity of an ideological approach for solving economic problems, and at that time he called the "Russian idea" one of three columns of the new state system model, which he aimed to develop as the President and the role of national leader.

In the mid-2000s, when the middle class and civil society strengthened in Russia, a natural need for a new (more precisely, the next) grand idea emerged – Russia's positioning as an independent state in the international arena.

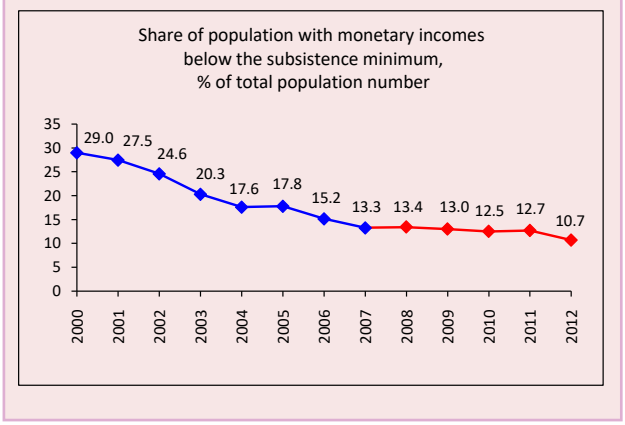
3. 2008–2012

V. Putin formulated this idea at the Munich Conference on Security Policy on Security Policy in 2007, when the Russian President was the first among the world leaders who started to talk about the threats of a unipolar world, the inevitability of its multipolar structure, and Russia's place in it as a rightful, sovereign partner.

After it, in 2008, constitutional obligations made V. Putin leave the position of the RF President. While this post was occupied by D.A. Medvedev, new grand ideas did not emerge in Russia, and there were no signs of them. On the contrary, this period was transitional and the most vulnerable for building the Russian statehood, and it was when the country fully faced the financial crisis and economic stagnation. "Collective West" powers had all the opportunities to take advantage of the historical moment and, possibly, completely stop the process of new Russia's rebirth from the wreckage of the USSR, started by V. Putin.

Russian society's experience with another (the third in the last 10 years) economic crisis caused a need to form a new grand idea. It would not be related to economic issues or the level and quality of life. It would be deeper, capable of uniting and consolidating Russian society, which started to feel disappointment with the efficiency of the state administration system, headed by D. Medvedev, and Russia's chances to have a bright future with the ongoing decline of population's income and key development indicators.

> "However, what is a unipolar world? However one might embellish this term, at the end of the day it refers to one type of situation, namely one center of authority, one center of force, one center of decision-making. It is world in which there is one master, one sovereign. And at the end of the day this is pernicious not only for all those within this system, but also for the sovereign itself because it destroys itself from within.
>
> I consider that **the unipolar model is not only unacceptable but also impossible in today's world… the model itself is flawed because at its basis there is and can be no moral foundations for modern civilization.** Along with this, what is happening in today's world – and we just started to discuss this – is a tentative to introduce precisely this concept into international affairs, the concept of a unipolar world [8].



[8] V. Putin's speech at the Munich Conference on Security Policy on February10, 2007. *Official website of the President of Russia*. Available at: http://www.kremlin.ru/events/president/transcripts/24034

4. 2013–2017

Such idea was the rebirth of spiritual and mental foundations of Russian identity. It was a beginning of V. Putin's third presidential term, and he addressed the whole world and Russians at the Valdai International Discussion Club in 2013.

> "For us (and I am talking about Russians and Russia), questions about who we are and who we want to be are increasingly prominent in our society. We have left behind Soviet ideology, and there will be no return. Proponents of fundamental conservatism who idealize pre-1917 Russia seem to be similarly far from reality, as are supporters of an extreme, western-style liberalism. It is evident that it is impossible to move forward without spiritual, cultural and national self-determination. Without this we will not be able to withstand internal and neither external challenges, nor we will succeed in global competitions"[9].

Without a doubt, a key "emotional point" in the implementation of this idea were events of the "Crimean Spring" which finally formed the borders of the currently existing socio-political (some experts call it "Putinskiy") consensus[10]. Simultaneously developing MIC, which has been controlled by V. Putin since the beginning, allowed "catching up" on an opportunity of implementing the grand idea of the previous stage ("Russia's positioning in the world"), which was missed in 2008–2012. Russia's participation in the "Syrian campaign" clearly showed it.

The feature of the studied period of the Russian history (2013–2017) is a certain temporary failure between the official declaration of a grand idea and its implementation. Before it, each grand idea gradually went through three development stages: maturation in the form of a wide necessity in Russian society, official wording in a public rhetoric of the President, and, finally, the implementation which is reflected in a gradual growth of a new necessity and grand idea in society.

However, in 2013–2017, V. Putin had to implement two grand ideas at once: to consolidate Russian society on the basis of traditional spiritual and moral values and to protect Russia's sovereignty in the international arena, which was not finished mostly due to "missed" presidential term in 2008–2012. Despite the fact that Russia managed to avoid the most pessimistic turn of events in 2008–2012 (run for office and possible second presidential term of D. Medvedev with the assistance of the "collective West" powers), **the interruption of a sequence** of V. Putin's presidential terms (who, let us remind, did not

[9] V. Putin's speech at the meeting of the Valdai International Discussion Club. September 19, 2013. *Official website of the President of Russia*. Available at: http://www.kremlin.ru/events/president/transcripts/19243

[10] Kulikov D.E.: "The President's foreign policy position, reunification with Crimea, attitude to the rebellious Donbass, and categorical rejection of any revolutionary scenarios for changing power within the country **formed a new social organism which today is called the "Crimean consensus" or "Putinsky consensus".** According to various sociological services, depending on the methods of research and emphasis in questionnaires, the social base of this consensus is from 85 to 95% of the country's citizens. The unity of this consensus is constantly being strengthened as a result of public reflection and increased understanding of the essence of the geopolitical and historical situation. This situation consists in the fact that Russia today is a part of the world that has rebelled against the global superpower. Russia refused to submit to the United States being the world hegemon and representative of the interests of the domination of the Western super-society. **This confrontation is a fundamental and historical one.** Either we will be crushed, Russia will not exist, and the world will be subordinated to the global superpower of Westernism for decades, or we will be able to defend our right to exist, to our civilizational essence, and thus to the fundamental possibility of a so-called multipolar world that preserves cultural and civilizational diversity as the most important resource for development for all mankind.

Within the "Crimean consensus", we have something to argue about and we should argue about it ... **But it is also quite obvious that only members of the "Crimean consensus" can become participants in the new policy.** Those few who do not agree with reunification with Crimea, do not support the Donbass, who are ready to surrender to global hegemon and apply to themselves the rule "Woe to the vanquished", who do not refuse riots and revolutions as means of seizing power – they cannot be participants of the new Russian policy. They do not have "a ticket" to the Russian political class".

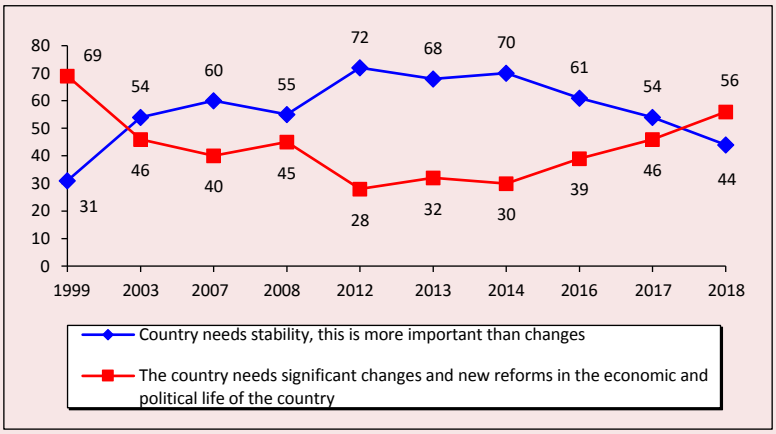
disappear from public policy in 2008–2012 and was a prime minister – the second most important person in the government) did not go unnoticed.

Let us note one more important factor: **the change of key political events in that period was not natural, and it was exactly natural unforced nature of grand idea's "life cycle" and its gradual transition from one stage to another which provided its efficient implementation and simultaneous development of the whole process of the Russian statehood formation**.

Events of 2013–2017 were primarily dictated by Russia's relationship with the "collective West" which became tense after the return of V. Putin's to the presidential position in 2012. It implied the continuation of the course announced by him at the Munich conference in 2007. It was not a plan of "collective West" who tried their best to keep D. Medvedev "at the wheel" of the Russian government as a person of more liberal views[11]. It caused rapid and chaotic monthly change of the public agenda: "the Valdai Forum", "Ukrainian crisis", "Crimean spring", economic crisis of 2014–2015, later – the US economic sanctions, "Syrian conflict", doping scandals...

It primarily caused the new necessity, which later became another grand idea, to form **unnaturally early** – in 2014, when sociologists recorded a steady growth of a number of Russians not satisfied with the public rhetoric of officials aimed at the preservation of stability[12], and they stated that "there is a growing understanding that the country may not be able to move forward without a major reassessment of strategies and priorities which were efficient in the previous relatively successful decade"[13].

Dynamics of orientations of Russians toward stability and changes, % of a number of respondents



Source: Petukhov V.V. Dynamics of social attitudes of Russians and the formation of a request for change. *Socis*, 2018, no. 11, p. 42.

[11] For reference: "The President D. Medvedev will meet the US vice-president Joseph Biden in Kremlin on March 9. Biden's visit demonstrates support of the West for D. Medvedev's potential second run for the office...It is also assumed that V. Putin – the head of government – if he does not go to the elections in 2012, may be offered the chair of the International Olympic Committee – one of the largest and most respected organizations in the world of sports" (Source: Konovalova E., Aleksandrov O. Will Joe Biden try to dissuade Vladimir Putin from running for presidency in 2012? *The Moscow Post*, dated March 4, 2011. Available at: http://www.moscow-post.su/politics/000129922924180/).

[12] Petukhov V.V. Dynamics of social attitudes of Russians and the formation of a request for change. *Socis*, 2018, no. 11, p. 43.

[13] *Russian Society after the 2018 Presidential Election: a Request for Changes: Information and Analytical Summary.* FNISTs RAN. Moscow, 2018. P. 7.

Thus, in Russian society, for the first time since V. Putin's presidential terms, a need for development and renewal of the economy, policy, new politicians, new living standards emerged and started to gain more power. It led to the necessity to formulate a new grand idea.

Therefore, the failure occurred exactly at the historical stage of 2013–2017 during the sequential implementation of a big way of constructing the new Russian statehood, which the President started in 1999 together with the country. It happened partially because V. Putin had to put double efforts due to "missed" presidential term, partially – due to strained relations with the collective West, partially – due to a very early, unnatural maturation of the necessity for changes in society, which was primarily caused by the euphoric nature of the "Crimean spring".

5. 2018 – now

The new grand idea was formulated by V. Putin during his Address to the Federal Assembly in March 1, 2018. It was an idea of a "decisive breakthrough" in areas of society's utmost concern. This development should have been exactly "decisive" as a respond of the government to the degree of the existing need for changes in society.

As always clear and aimed at the future, understandable for most population, and uniting supporters of any political views, the wording of the new grand idea was the reason why V. Putin received the highest support of voters (76.69%, or 56 mil. people) in the history of elections of the President of the Russian Federation during the latest presidential elections on March 18, 2018. A year later, V. Surkov's article about the deep state emerged in media. The author raised the relations between Russian society and V. Putin personally in the rank of the concept: the one where "confidential communication and interaction of the supreme ruler with citizens"[15] would be the main core of post-Soviet Russia; the instrument that would allow it to overcome all current and future historical challenges.

> "Therefore, everything hinges on efforts to preserve the people of Russia and to guarantee the prosperity of our citizens. We must achieve a decisive breakthrough in this area"[14].

Number and share of votes cast for V.V. Putin during the Presidential election in 2012 and 2018, total in Russia

Indicator	Presidential election		Change, 2018 to 2012
	March 4, 2012	March 18, 2018	
mil. people	45.6	56.4	+ 10.8
% of turnout	63.60	76.69	+ 13.09

However, the implementation of V. Putin's latest grand idea – the "decisive breakthrough" in people preservation and citizens' well-being – have not yet started. Its main reason is an unresolved dilemma of the liberal-patriotic way in the system of public administration, which has become a permanent attribute of post-Soviet Russia

Since the beginning of his presidential terms, V. Putin had to place stake not on the nationalization of the elites thoroughly imbued with liberal values, who gained power in the 1990s, but on their "manual operation". Nethertheless, the objective process of globalization blurred the borders between states, made the world a single one, and the historical process of Russia's recovery after the collapse of the USSR could not happen without attention and corresponding opposition from

[14] Presidential Address to the Federal Assembly. March 1, 2018. *Official website of the President of Russia*. Available at: http://www.kremlin.ru/events/president/news/56957

[15] Surkov V. Yu. Vladimir Putin's long state. *Nezavisimaya gazeta*, 2019, February 11. Available at: http://www.ng.ru/ideas/2019-02-11/5_7503_surkov.html

the "collective West". The President himself has always been surrounded by people (inside the country and in the international political arena) who supported liberal views opposed to the national development course he pursued, and these people also could not be ignored.

The focus on "manual operation" of the state system, where V. Putin created for himself the status of an arbiter who monitors the balance of interests of various groups, clans, and families, has been working for a long time – almost 18 years. He managed to complete nearly all set goals in this period. **However, when the Russian society's necessity, as well as another grand idea formed by it, touched upon the only thing that always attracted "collective West" in Russia – resources, capitals – then the process of the consistent implementation of grand ideas in our country has slowed down**.

The "life cycle" of the decisive breakthrough idea included the first stage (society's necessity, formed in 2014). There was the second stage – an official wording at the state level (Presidential Address to the Federal Assembly in 2018) after which the society's necessity becomes a priority in the national development course at this historical time interval. However, the third stage – practical implementation of the pronounced course – never happened.

Instead, many experts in 2018–2019 began to note signs that "the elites feel the beginning of the end and try to snatch as

"Every Western war for global hegemony since the Time of Troubles four centuries ago has always been directed against Russia. Subjectively, the US elite is focused on the usual logic of inciting war against Russia **as the largest country not under its control...** The ruling elite of the United States seeks to destroy the Russian identity and turn Russia **into a colonially controlled territory.**

Our offshore oligarchy is ready to capitulate in order to preserve the capital exported from Russia... It is not surprising that our economy has become a raw material economy – **the Western world needs nothing from us except natural resources.** This is because the ruble is essentially a surrogate mechanism for its creation – financing the growth of the Russian economy is allowed only to the extent of its increased contributions to the provision of raw materials and assets to the US and EU. Our monetary authorities continue to rely on the instructions of Washington financial organizations at the expense of the country's interests"[16]. "Over the last three years, the damage caused by the activities of the monetary authorities has reached nearly 20 trillion rubles of under-produced products and more than 10 trillion rubles of undelivered investments. Although population really feels it in the form of declining real incomes for the fourth year in a row and increasing poverty"[17].

"Domestic officials are less afraid of public scandals and more often show contempt for public opinion. People respond to this with distrust to almost all state institutions and even their own elected representatives"[18].

"People suddenly felt that everything was happening like in a banal well-known saying: "If you do not get into politics, it will get into you". This is a rather vulgar statement, but it accurately shows what is happening now. Politics came to literally every home and every family, because the authorities and government officials were mad with impunity. Over the past few years, any of their decisions and initiatives, even the most ridiculous ones, have passed – they have gotten away with everything[19].

[16] Glaz'ev S.Yu. We've been retreating for too long. *Literaturnaya gazeta*, 2018, no. 21. Available at: https://lgz.ru/article/-21-6645-30-05-2018/my-slishkom-dolgo-otstupali-/

[17] USA needs Russia's resources, and the war is inevitable (S.Yu. Glaz'ev's interview). *Gradator information resource*. May 16, 2018. Available at: https://gradator.ru/news/economy/2167.html

[18] The Russian bureaucracy goes unhinged, turning into "heaven-dwellers". Who needs it? *Russkoe agentstvo novostey.* 2018. December 27. Available at: http://ru-an.info/

[19] Trapeznikov P. The Russian government is stunned by impunity...(materials of an interview with the director of the Institute of globalization and social movements B. Kagarlitsky). *Literature portal "Izba-chital'na"*, July 11, 2018. Available at: https://www.chitalnya.ru/work/2314863/

much as possible while they still have time". At the regional level, cases of corruption scandals, boorish attitude and, to put it mildly, careless statements of public authorities in relation to people became more common. At he federal level, the implementation of national projects "froze" (they had to be postponed until 2030[20]), ideologists of the pension reform appeared from somewhere[21] (though many economists showed exact calculations proving that there was no need for changing the pension legislation and another mechanisms and instruments are necessary for the implementation of the President's idea of "the decisive breakthrough in preserving people of Russia and well-being of our citizens"[22].

V. Putin, who is the center of the system of state administration, created by him, for the elites and Russian society, had to explain the situation at the public level speaking directly to society (about the pension reform in particular) in order to keep population's trust he have always relied on while formulating and implementing grand ideas. **However, it did not cause a desired effect, due to the fact that, whatever the reasons, the main need of society and the grand idea of a "decisive breakthrough", formulated on its basis, remained unfulfilled – for the first time since Russia has embarked on the path that it currently follows.**

Here we should note two factors that largely determined (along with the outright sabotage of presidential instructions by the ruling elites) the specifics of the formulation of V. Putin's last grand idea and, at the same time, the specifics of the entire historical stage from 2018 to the present:

The first factor is a temporary failure in 2013–2017, after which the new need of society (need for change) was formed unnaturally early. "Life cycle" of each grand idea is 6–9 years. At

As shown by data of all-Russian surveys of VCIOM and regional studies of the VolRC RAS, in 2018, the steady trend of declining level of approval of the President's activities. emerged in public opinion surveys, and it has not been overcome until now.

In 2018–2019, support for the President decreased from 71 to 64% according to VCIOM data and from 66 to 57% according to the VolRC RAS data.

"Russian officials are completely out of touch with life and ignore it... They consider the demonstration of their contempt for citizens to be a norm and a matter of honor, valor, and heroism. It is difficult to explain their behavior in any other way. **It seems that they are absolutely not going to fulfill the promises of the state. Just remember the May 2012 presidential decrees, and how the government sabotaged them for six years"**[23].

[20] Executive Order on the National Development Goals of the Russian Federation through 2030. July 21, 2020. Available at: http://www.kremlin.ru/events/president/news/63728

[21] Ivanov A. Meet the author of the pension reform. *Zavtra*, 2018, June 24. Available at: http://zavtra.ru/events/avtor_pensionnoj_reformi_znakom_tes_

[22] See, for example: Byalyi Ju.V. Pension farce – 2018. *Information agency "Krasnaya vesna",* 2018, June 29. Available at: https://rossaprimavera.ru/article/365b3ffa?gazeta=/gazeta/284; Shirov A.A., Potapenko V.V. On a fair pension system. *Expert,* 2018, no. 24, June 11–17, pp. 53; Bashkatova A. "NG" calculated how much pensioners will receive as a result of the reform. *Nezavisimaya gazeta,* 2018, June 20. Available at: http://www.ng.ru/economics/2018-06-20/4_7248_minus.html; Obuhova E., Pahunov K., Ivanter A. This is a reform, baby! *Expert*, 2018, June 25, no. 26 (1080); Sergeev M. Initiators of the pension reform are backing out. *Nezavisimaya gazeta*, 2018, December 27. Available at: http://www.ng.ru/economics/2018-07-12/1_7264_pensia.html; Tsyplyaev S.A. Pension maneuver. *Interview at the radio "Ekho Moskvy"*, 2018, July 7. Available at: https://echo.msk.ru/blog/tsuplyaev_s/2235806-echo/; Mironov M. What is the injustice of the pension reform? Available at: https://echo.msk.ru/blog/mmironov/2224872-echo/

[23] "Showing contempt is normal": Delyagin explained why officials sabotage Putin's May decrees (interview with M.G. Delyagin). *Information portal Tsargrad TV*, 2019, July 3. Available at: https://yandex.ru/turbo/tsargrad.tv/s/news/demonstracija-prezrenija-norma-deljagin-objasnil-pochemu-chinovniki-sabotirujut-majskie-ukazy-putina_206739

the same time, as it was noted, the beginning of a "life cycle" of the decisive breakthrough idea was not 2018 (when this wording and new national projects emerged) but 2014 – when the euphoria of the Crimean spring disappeared, and a new round of 2014–2015 financial crisis began.

Thus, 4 years have passed between the maturation of the need for change in society (2014) and the official wording of the course for breakthrough development (2018). This is a period comparable to the previous historical stage of building Russian statehood (2013–2017), during which V. Putin managed to implement two grand ideas at once. Obviously, over such a long period of time, the need for dynamic development of the level and quality of life, social justice has become extreme. In many ways, this is why the policy of prioritizing the solution of key issues within the country, announced in 2018, should have been a breakthrough.

The second factor is a natural change of generations. Russian society has significantly changed over the last 20 years: numbers of Russian voters are "replenished" by young people who do not care about the results achieved by Russian authorities in comparison with the 1990s. They were born after 2000, and they are concerned about Russia's progress in comparison with other countries, most of which are significantly inferior to Russia in terms of initial competitive advantages.

> According to VCIOM exit poll, conducted on the day of the presidential election (March 13, 2018), "an average age of most voters (28.1%) was 60 years, 26.8 of respondents – 45 years. An average age of 21.4% of respondents is approximately 35 years, 15.6% – 25 years, 8.1% – 18 years"[24].
>
> Based on these data, **45% of Russians**, who participated in the presidential election, were born in 1983 and later: in 2000, they were still underage.
>
> **24% of respondents (nearly every fourth one)** were born in 1993 and later. I**n 2000, they were at least 7 years old** and, consequently, their nearly whole conscious life happened after the "wild 90s" – during V. Putin's presidency.

> "FOM's survey shows that pessimistic estimations on the future are more common than positive one in the group from 18 to 30. And they are difficult to mobilize using time-tested methods of the cold war, the images of the advancing enemy and a besieged fortress. They do not understand why it is necessary to tighten their belts and suffer for the sake of this authorities, what exactly has they given the country in the last 10 years"[25].

Thus, due to various reasons, the grand idea of the "decisive breakthrough" has not been implemented for six years (since 2014, when the social necessity arose). Coronavirus pandemic, which Russian and the whole world faced in 2019, only worsened the situation. However, the tense economic situation in relation to quarantine measures is only a "small brick" of

> "He [Putin] was the yoke of scales, on which two bowls of ways swung — patriotic and liberal. But, at a certain point, these scales were unbalanced: the patriotic way of life was out of Putin's control, as was the liberal way. The President failed to make the long-awaited breakthrough after the Crimea, a development that would connect these two ways. And everything went its own way. Within each, there was confusion, a complex system of decays. Therefore, Putin does not control these two huge areas of modern Russia. He probably controls the governors, the army, and the security forces, but to a lesser extent he monitors these huge social strata that have developed over the post-Soviet period, which are developing in their own way and quite chaotically[26].

[24] VCIOM named an average age of the majority of those who voted in the elections. *RIA Novosti*, 2018, March 18. Available at: https://ria.ru/20180318/1516645631.html

[25] On the new social pessimism (editorial article). *Nezavisimaya gazet*a, 2020, September 14. Available at: https://yandex.ru/turbo/ng.ru/s/editorial/2020-09-14/2_7963_editorial.html

[26] Prokhanov A. I see Putin's problems, his drama. *Zavtr*a, 2020, October 13. Available at: https://zavtra.ru/blogs/ya_vizhu_problemi_putina_ego_dramu

the process and not an explanation for the long-growing social pessimism.

As a result of such a long period of unimplementation, the idea of breakthrough development, which was hypothetically supposed to consolidate society, hit the President and the entire process of consistent construction of the post-Soviet statehood:

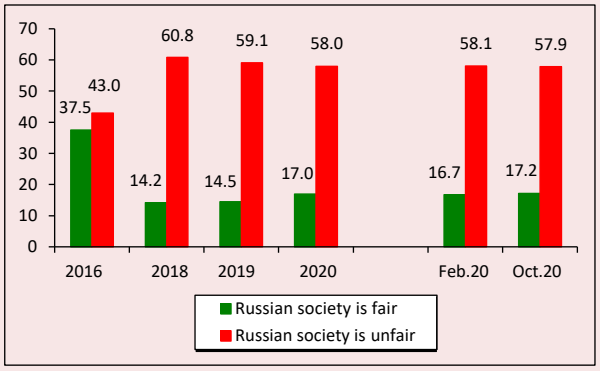
✓ The President began to lose control over the liberal and patriotic way.

✓ The level of approval of the President's activities started to decline.

✓ "Western partners", always following the events in Russia and, definitely, desiring to get rid of their geopolitical rival, became active and started to put Russia in a circle of extremely negative events (not just territorially but essentially): Belarus, Khabarovsk, "Navalny's case", Nagorno-Karabakh...

In January 2020, during his annual Address to the Federal Assembly[27], the President proposed specific amendments to the Constitution of the Russian Federation. **This V. Putin's initiative might be seen as an attempt to create a new grand idea, since amendments to the Fundamental Law of the Country is just an instrument, and a goal itself is its content. These amendments can be divided into three blocks corresponding to three components of the new big idea: strengthening of the state's social obligations, strengthening of the power vertical, and actualization of civil and patriotic sentiments in society** (we wrote more about this in one of our previous articles[28]).

Nevertheless, the principles, laid down in the amended Constitution of the Russian Federation, did not become the new big idea, even though



Source: data of public opinion monitoring of FSBIS VolRC RAS

As we see, entry into force of amendments to the RF Constitution after the all-Russian vote on July 1, 2020 did not affect population's assessment of the structure of modern society: since 2019, majority of people (58–59%) consider it unfair.

V. Putin's initiative to change the Fundamental Law was again formulated very precisely, in accordance with the growing public demand for social justice and the value of the social state; the public was widely involved in this process and the majority of Russians still supported the amendments at the all-Russian vote on July 1, 2020: almost 58 million people voted "for" it (or 78% of citizens who took part in the vote).

The new "socially oriented" Constitution of the Russian Federation did not acquire the features of a big idea, did not give society an ideological impulse. For example, in March 2018 (after V. Putin announced a "breakthrough" development), the President received a record number of votes in the presidential election, but according to the results of the all-Russian vote on amendments to the Constitution experts only noted: "It was not possible to consolidate society around amendments to the Constitution"[29]. According to the results of our

[27] Presidential Address to the Federal Assembly of the Russian Federation on January 15, 2020. *Official website of the President of Russia*. Available at: http://www.kremlin.ru/events/president/news/62582

[28] Ilyin V.A., Morev M.V. Another Step toward V. Putin's "Long State". *Economic and Social Changes: Facts, Trends, Forecast,* 2020, vol. 13, no. 1, pp. 9–33. DOI: 10.15838/esc.2020.1.67.1

[29] Constitutional prologue to the future. *Expert*, 2020, no. 28, July 6–12.

analysis[30], conducted according to data of the Central Election Commission of the Russian Federation, in 47 out of 86 RF entities, the share of votes cast against amendments to the Constitution was higher than average numbers in the country (21.27%). In some regions (for example, Murmansk, Omsk, Magadan oblasts, Khabarovsk Krai, Kamchatka Krai, Sakha Republic), this indicator reached 35–40%.

"Compared to "constitutional" vote on June 25, voter turnout significantly decreased on July 1, despite the introduction of a "three-day period", i.e. early expression of the will of voters during Friday and Saturday, September 11–12, in addition to the "main" Sunday, September 13. This can be partially explained by a "local" nature of the past elections, which traditionally caused much less interest among our fellow citizens. But the difference here is such that the following conclusion is obvious: **Russian society as a whole, and especially in certain regions of our country, shows increasing political passivity, and this is less true for "national" entities of the Federation. This situation indicates not only a fundamental difference in the management systems of "ordinary" regions and republics within the Russian Federation, but also the process of alienation, if not confrontation, and distancing our society from the current system of domestic political power"**[31].

Share and number of votes cast for V.V. Putin at the presidential election on March 18, 2020 and vote on amendments to the Constitution on July 1, 2020, average for Russia

Indicator	March 18, 2018	July 1, 2020	Change 2018 to 2012
mil. people	56.4	57.8	+ 1.4
in % of turnout	76.69	77.92	+ 1.23

In regions and large cities with system-forming enterprises for the domestic economy[32], the owners of which are not the last members of the Forbes list of the wealthiest businessmen[33], and these regions obviously have a more favorable position in comparison with other entities of the Russian Federation, 1.5 mil. less people voted for the amendments to the Fundamental Law, initiated by the President, in comparison with votes for V. Putin during the presidential election in 2018 (*Insert 1*).

As for regional and municipal elections, held on September 13, 2020, which became the first similar event after the adoption of the new Constitution, the picture is more clear: in comparison with the previous election day (September 15, 2015), turnout for elections increased only in the Arkhangelsk region (by 96 thousand people), the share of population who voted for members of the power party increased only in the Arkhangelsk and Irkutsk oblasts (by 100 and 99 thousand people, respectively; *insert 2*).

Number of votes cast for "United Russia" members at regional and municipal elections of 2015 and 2020 in certain entities of the RF

Indicator, thousand people	Single day of voting		Change, 2020 to 2015
	September 15, 2015	September 13, 2020	
Average for 6 regions*	1595,82	1512,21	-83,61
Average for 3 regions**	119,06	92,19	-26,87

* Belgorod Obl., Arkhangelsk Obl., Yamalo-Nenets AO, Chelyabinsk Obl., Irkutsk Obl., Magadan Obl.
** Lipetsk, Magnitogorsk, Magadan.

[30] Ilyin V.A., Morev M.V. Vote of confidence for the President is confirmed. Achievement of socio-economic development goals before 2024–2030 is uncertain. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 4, pp. 9–37. DOI: 10.15838/esc.2020.4.70.1

[31] Vinnikov V. Quiet backwater: on the results of a single political day. *Zavtra*, 2020, September 16.

[32] The study sample includes 14 regions and 17 towns (their regional capitals and some major cities), where large, system-forming companies for the Russian economy are located (such as Nornickel, NLMK, Novatek, Siverstal, Lukoil, Metalloinvest, MMK, Evraz, PhosAgro, Acron, Rusal, Severalmaz, Polymetal).

[33] Among them:

Potanin V.O. (welfare – 19.7 bil. dol.; 1st position in Forbes);

Lisin V.S. (welfare – 18.1 bil. dol.; 2nd position in Forbes);

Mikhelson L.V. (welfare – 17.1 bil. dol.; 3rd position in Forbes);

Mordashov A.A. (welfare – 16.8 bil. dol.; 4th position in Forbes);

Alekperov V.Yu. (welfare – 15.2 bil. dol.; 5th position in Forbes) et al.

Insert 1

Number of votes cast for V.V. Putin at the presidential elections of 2000–2018 and for constitutional amendments on July 1, 2020 (data in abs. val., mil. people)

Territory*	Presidential elections					All-Russian vote on amendments to the Constitution	Change (+/–)	
	March 26, 2000	March 14, 2004	March 2, 2008	March 4, 2012	March 18, 2018	July 1, 2020	2020 to 2000	2020 to 2018
Total for RF	***39,740***	***49,563***	***52,531***	***45,602***	***56,426***	***57,747***	***+18,007***	***+1,321***
Central FD	**9,928**	**11,780**	**13,084**	**10,354**	**14,034**	**14,409**	**+4,481**	**+0,375**
Belgorod Obl.	0,401	0,457	0,638	0,534	0,711	0,799	+0,398	+0,087
Lipetsk Obl.	0,268	0,399	0,482	0,382	0,542	0,480	+0,212	-0,062
Northwestern FD	**4,803**	**4,755**	**4,751**	**4,003**	**4,974**	**5,047**	**+0,244**	**+0,073**
Vologda Obl.	0,472	0,469	0,451	0,626	0,454	0,389	-0,083	-0,065
Arkhangelsk Obl.	0,428	0,483	0,417	0,333	0,407	0,297	-0,131	-0,110
Yamalo-Nenets AO	0,013	0,015	0,015	0,013	0,018	0,010	-0,003	-0,008
Novgorod Obl.	0,260	0,214	0,210	0,180	0,209	0,173	-0,087	-0,036
Ural FD	**3,334**	**4,348**	**4,440**	**4,133**	**4,714**	**4,100**	**+0,766**	**-0,614**
Sverdlovsk Obl.	1,352	1,506	1,432	1,338	1,556	1,132	-0,220	-0,423
Yamalo-Nenets AO	0,136	0,246	0,269	0,283	0,291	0,265	+0,129	-0,026
Khanty-Mansi AO	0,341	0,481	0,528	0,470	0,600	0,488	+0,147	-0,113
Chelyabinsk Obl.	0,893	1,237	1,214	1,125	1,276	1,190	+0,297	-0,086
Siberian FD	**3,729**	**5,361**	**5,772**	**5,232**	**6,171**	**5,451**	**+1,722**	**-0,721**
Irkutsk Obl.	0,586	0,622	0,739	0,595	0,764	0,530	-0,056	-0,234
Krasnoyarsk Krai**	0,669	0,694	0,815	0,784	0,941	0,849	+0,179	-0,093
Privolzhsky FD	**9,436**	**12,023**	**12,323**	**11,015**	**12,271**	**13,016**	**+3,580**	**+0,745**
Samara Obl.	0,710	0,921	0,934	0,912	1,235	1,346	+0,636	+0,111
Far Eastern FD	**2,003**	**2,706**	**2,817**	**2,438**	**2,633**	**2,517**	**+0,514**	**-0,116**
Magadan Obl.	0,062	0,057	0,054	0,039	0,053	0,034	-0,028	-0,019
TOTAL for 6 federal districts***	**33,232**	**40,973**	**43,187**	**37,175**	**44,797**	**44,540**	**+11,307**	**-0,258**
TOTAL for 14 regions	**6,591**	**7,802**	**8,198**	**7,614**	**9,058**	**7,981**	**+1,390**	**-1,077**

End of Insert 1

Number of votes cast for V.V. Putin at the presidential elections of 2000–2018 and for constitutional amendments on July 1, 2020 (data in abs. val., mil. people)

Territory*	Presidential elections					All-Russian vote on amendments to the Constitution	Change (+ / –)	
	March 26, 2000	March 14, 2004	March 2, 2008	March 4, 2012	March 18, 2018	July 1, 2020	2020 to 2000	2020 to 2018
Total for RF	***39,740***	***49,563***	***52,531***	***45,602***	***56,426***	***57,747***	***+18,007***	***+1,321***
Central FD	**9,928**	**11,780**	**13,084**	**10,354**	**14,034**	**14,409**	**+4,481**	**+0,375**
Belgorod	0,078	0,089	0,116	0,111	0,144	0,154	+0,075	+0,010
Lipetsk	0,120	0,159	0,179	0,138	0,189	0,097	-0,023	-0,092
Northwestern FD	**4,803**	**4,755**	**4,751**	**4,003**	**4,974**	**5,047**	**+0,244**	**+0,073**
Vologda	0,087	0,102	0,103	0,090	0,115	0,101	+0,014	-0,014
Cherepovets	0,118	0,119	0,111	0,090	0,127	0,078	-0,039	-0,049
Arkhangelsk	0,103	0,130	0,109	0,093	0,114	0,075	-0,028	-0,038
Naryan-Mar	0,013	0,006	0,004	0,081	0,007	0,004	-0,009	-0,004
Veliky Novgorod	0,064	0,057	0,061	0,105	0,072	0,048	-0,016	-0,024
Ural FD	**3,334**	**4,348**	**4,440**	**4,133**	**4,714**	**4,100**	**+0,766**	**-0,614**
Yekaterinburg	0,379	0,425	0,424	0,372	0,493	0,316	-0,063	-0,177
Salekhard	0,009	0,015	0,019	0,022	0,019	0,021	+0,012	+0,003
Khanty-Mansiysk	0,006	0,013	0,021	0,020	0,037	0,043	+0,037	+0,007
Chelyabinsk	0,250	0,349	0,359	0,336	0,408	0,403	+0,153	-0,005
Magnitogorsk	0,145	0,179	0,169	0,141	0,155	0,119	-0,026	-0,036
Siberian FD	**3,729**	**5,361**	**5,772**	**5,232**	**6,171**	**5,451**	**+1,722**	**-0,721**
Irkutsk	0,125	0,126	0,145	0,128	0,194	0,105	-0,020	-0,089
Krasnoyarsk	0,192	0,192	0,240	0,237	0,323	0,303	+0,110	-0,021
Norilsk	0,060	0,059	0,063	0,057	0,059	0,072	+0,013	+0,013
Privolzhsky FD	**9,436**	**12,023**	**12,323**	**11,015**	**12,271**	**13,016**	**+3,580**	**+0,745**
Samara	0,262	0,298	0,315	0,341	0,419	0,475	+0,212	+0,056
Far Eastern FD	**2,003**	**2,706**	**2,817**	**2,438**	**2,633**	**2,517**	**+0,514**	**-0,116**
Magadan	0,033	0,033	0,032	0,023	0,034	0,019	-0,014	-0,015
TOTAL for 6 federal districts ***	**33,232**	**40,973**	**43,187**	**37,175**	**44,797**	**44,540**	**+11,307**	**-0,258**
TOTAL for 17 towns	**2,045**	**2,350**	**2,472**	**2,385**	**2,910**	**2,433**	**+0,388**	**-0,477**

* Federal districts were formed on May 13, 2000, after the presidential election (held on March 26, 2000), so data for federal districts for 2000 are conditional.
** Data for 2000 and 2004 – without Evenk and Taymyr autonomous okrugs, which were separate entities of the RF.
***Without South and North Caucasian Federal District.

Insert 2

Results of regional and municipal elections of 2015–2020 (number of votes cast for "United Russia", thousand people)*

Region	September 15, 2015			September 13, 2020			Change (+ / –) of number of votes cast for
	Number		Number of votes cast for	Number		Number of votes cast for	
	population	voters		population	voters		
ELECTION RESULTS AT THE REGIONAL LEVEL IN 2015–2020							
Belgorod Obl.	1547,94	1201,22	403,99	1549,15	1229,20	428,08	+24,09
Arkhangelsk Obl.	1183,32	979,70	109,52	1136,54	924,17	210,06	+100,54
Yamalo-Nenets AO	539,99	341,38	165,98	544,44	365,16	111,11	-54,87
Chelyabinsk Obl.	3497,27	2693,23	624,86	3466,37	2600,38	374,29	-250,57
Irkutsk Obl.	2414,91	1869,45	270,53	2391,19	1864,89	369,76	+99,23
Magadan Obl.	148,07	108,14	20,94	140,15	97,81	18,90	-2,05
TOTAL for 6 regions	**9331,50**	**7193,11**	**1595,82**	**9227,84**	**7081,61**	**1512,21**	**-83,61**
ELECTION RESULTS AT THE MUNICIPAL LEVEL IN 2015–2020*							
Lipetsk	501,15	409,96	31,53	508,57	401,96	38,52	+6,99
Magnitogorsk	417,04	318,56	76,39	413,25	311,96	46,31	-30,08
Magadan	92,97	71,98	11,14	92,05	67,025	7,36	-3,78
TOTAL **for 3 towns**	**1011,17**	**800,50**	**119,06**	**1013,88**	**780,93**	**92,19**	**-26,87**

*The table shows the analyzed regions where regional elections were held on September 13, 2020 (elections of heads of entities of the Russian Federation, elections of deputies of the Legislative Assembly).

On September 13, 2020, elections of senior officials were held in 18 regions of the Russian Federation (Republic of Komi, Tatarstan, Chuvash Republic, Kamchatka, Krasnodar, Perm Krai, Arkhangelsk, Bryansk, Irkutsk, Kaluga, Ko-stroma, Leningrad, Penza, Rostov, Smolensk, Tambov oblasts, Sevastopol and the Jewish autonomous oblasts). **Elections of deputies of legislative (representative) bodies of state power in entities of the Russian Federation were held in 11 regions** (Republic of Komi, Belgorod, Voronezh, Kaluga, Kostroma, Kurgan, Magadan, Novosibirsk, Ryazan, Chelyabinsk oblasts, Yamalo-Nenets Autonomous Oblast). **Elections of deputies of representative bodies of municipalities and ad-ministrative centers were held in 22 regional capitals** (Syktyvkar, Kazan, Izhevsk, Cheboksary, Krasnodar, Astrakhan, Vladimir, Voronezh, Ivanovo, Kaluga, Kostroma, Lipetsk, Magadan, Nizhny Novgorod, Novosibirsk, Orenburg, Orel, Ros-tov-on-Don, Smolensk, Tambov, Tomsk, and Ulyanovsk).

In general, in all analyzed regions, the support for authorities decreased by 84 thousand people, in cities – by 27 thousand people.

Assessing the re sults of the single day of voting on September 13, 2020, VCIOM general director V.V. Fedorov noted that **the scenario of the upcoming federal campaign for the government and its party is extremely pessimistic, despite the fact that "the main deterioration in the socio-economic sphere is yet to come"**. The main risk of the United Russia is the geographical distribution of the masses of voters. They are mainly concentrated in large cities and have oppositional views, so that "the electorate of villages and small towns loyal to the government will not be enough in 2021... the UR is experiencing euphoria today due to the victory on a low turnout and administrative mobilization, but it will not be possible to repeat this success in 2021 – the conditions in the federal campaign will be completely different. The strategy of "drying up turnout" at the federal elections is fraught with their delegitimization and therefore cannot be used"[34].

It is difficult to disagree with the opinion of experts who link various indicators of electoral statistics (turnout dynamics, voting results) with the growing social pessimism in Russian society, which is a direct consequence and, at the same time, an indicative indicator of the effectiveness of public administration.

> «... socio-economic problems, aggravated in most regions, **widespread social pessimism**, numerous claims to "old" governors, and amorphous society's attitude to new ones: all of this does not allow us to predict the repetition of the same level of government support at the gubernatorial elections, as during the plebiscite or, for example, the presidential elections in 2018. **Therefore, the element of unpredictability in electoral behavior remains"**[35].

It is mostly shown by the results of sociological surveys that record the dynamics of public sentiment in "real time", in contrast to electoral statistics, which are largely influenced by the campaign period preceding elections at any level.

To analyze trends of public opinion we took two indicators which seem the most representative to us:

1. Assessment of the President's actions (as an indicator of society's attitude to the general course of the country's development, taking into account the historically high role of the presidency institution in Russia, as well as the attitude of Russian society personally to V. Putin).
2. Consumer Sentiment Index (CSI; as an indicator have not just economic but psychological meaning, because it simultaneously shows three aspects of social mood: the population's subjective assessment of the current economic situation in the country, characteristics of personal financial situation, and forecasts of its development in the near future, so in fact CSI shows people's ideas about life (their own and the country's) today and tomorrow).

Both selected indicators are measured in the monitoring regime across the whole country (VCIOM, Levada-Center) and at the regional level (VolRC RAS). At the same time, the impressive dynamics of data,

[34] Garmonenko D. During the Duma elections, United Russia will face seven risks. *Nezavisimaya gazeta*, 2020, October 6. Available at: https://www.ng.ru/politics/2020-10-06/1_7982_elections.html (based on the materials of the speech of V. V. Phedorov "Results of SED-2020 – prospects for the State Duma elections-2021" at the meeting of Scientific Expert Council "Russian Regional Elections 2020: Trends and Prospects », September 23, 2020.

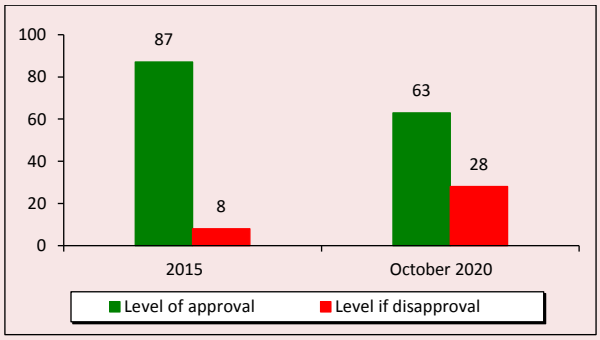
[35] Turovskiy P. Gubernatorial elections 2020: Between loyalty and protest. *Information website for political commentaries Politcom.ru*. August 17, 2020. Available at: http://politcom.ru/23927.html

covering basically the entire historical era of V. Putin's presidential terms (from 2000 until now), allows characterizing the process of transformation of Russian society and the efficiency of the public administration system during this period, including the provision of a clear answer to the question: "What is the reason for the growing social pessimism in society?".

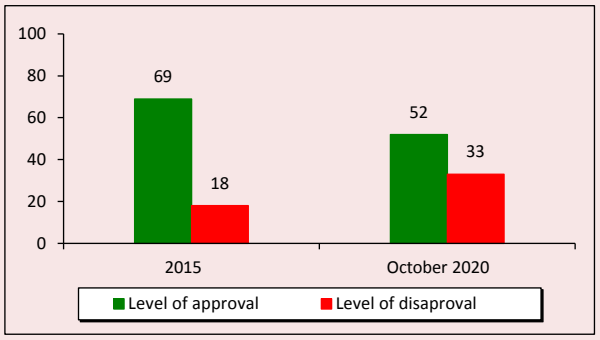
All-Russian and regional data (despite different data collection methods) show one thing in general: over the last 5 years (since 2015), there have been no significant improvements in the dynamics of assessments of the President's activities (*Insert 3*).

According to VCIOM, since 2015 to October 2020, the level of approval of the President's activities declined by 24 p.p. (from 87 to 63%), and the share of its negative assessments increased by 20 p.p. (from 8 to 28%). According to VolRC RAS data, the share of positive assessments of the President's activities deceased by 17 p. p (from 69 to 52%) over the same time period, and the negative ones – increased by 15 p.p. (from 18 to 33%).

It is necessary to mention that the increase of positive assessments of the President's activities in 2013–2015[36] was probably related to the events of the "Crimean spring", which were definitely important for psychological state of the Russian society and strengthening of national identity but quite insignificant in terms of relevant problems bothering people and related to the level and quality of life, achievement of social justice, etc. Therefore, the period of time when the level of approval of the President's activities showed steady growth dynamics was not long (only 2 years – from 2013 to 2015).



Assessment of the RF President's activities (VCIOM data) % of a number of respondents



Assessment of the RF President's activities (VolRC RAS data) % of a number of respondents

Over the whole period V. Putin's presidential terms (since 2000 until now), there were only three short periods when the President's ratings sharply increased: 2000 (when the complex process of the country's restoration after the "wild 90s" began), 2007 (when this restoration process reached its peak), and 2015 (related to the growth of patriotic moods due to the entry of Crimea and Sevastopol into Russia). Despite these three moments, in the Russian contemporary history, public assessments of the President's activities has not shown positive dynamics – especially over the last 5 years (2015–2020) – and this "stagnation" more often manifests itself as a factor of social pessimism contradicting really ambitious right

[36] In 2013–2015, the level of approval of the President's activities increased by 15 p. p. (from 63 to 87%) according to VCIOM data, and by 14 p.p. (from 55 to 69%) according to VolRC RAS data.

and specific goals, declared by authorities in their public rhetoric according to VCIOM. The level of the President's activities approval was 80% in 2000 (the first year of V. Putin's presidency), and it was 60–65% in 2019 and 2020 (20 p.p. less).

Consumer Sentiment Index is also quite indicative[37]. In general, in the period since 1999 until now (according to VolRC RAS data), population's assessments concerning the economic situation in the country, their financial situation, and forecasts for the future could be called positive only before the global financial crisis. This is indicated by the CSI value exceeding 100 points in 2005–2008 (*Insert 4*)[38].

Pessimistic sentiments prevail in all other periods of the past 22 years, and they sometimes fluctuate in one direction or another due to the impact of certain events in the domestic and foreign political arena. The last 12 years are included: the results of VolRC RAS regional studies correlate with data of Levada-Center's all-Russian surveys.

---

[37] For reference: **Consumer Sentiment Index** is a summary indicator of the state's economy; an indicator designed to measure consumer confidence, defined as a degree of optimism about the state of the economy expressed by population through their consumption and savings. The index shows how optimistic consumers are about the country's economy.

The method of CSI building is that it aggregates private opinions of individual people who do not depend on each other and do not affect each other. CSI is based on mass surveys of population, so it is an indicator that **reflects the mood and behavior of the majority of the country's residents – not certain privileged or deprived groups of population** (for example, very rich or very poor). Thus, the change of the index is related to the behavior of the mass consumer. This makes CSI **an independent generalized macroeconomic indicator calculated on the basis of microeconomic information but characterizing the dynamics of the country's economic development as a whole.**

After World War II, the business community and the US government were concerned about population's actions with huge savings accumulated during the war. Will it be spent? If so, how and for what? For the purpose of studying consumers' intentions, sentiments, and behavior, J. Caton from the University of Michigan suggested conducting consumer surveys in 1946, and they have become common not only in the USA but many European countries.

Later it turned out that the analysis of consumers' behavior through a special Consumer Sentiment Index (CSI) allows saying not only whether the population is going to spend savings but answering more common question **about the level of optimism in relation to economic and social development in general.**

In addition, time has shown that CSI has a huge predictive potential. A certain respondent, being a consumer, usually assesses the situation on the commodity market on the basis of own random information. He/she may be seriously mistaken, but the prevailing vector of the mass of individual consumer estimates, it turns out, almost always correctly anticipates the short-term perspective of the economic situation (source: https://economic-definition.com)

[38] Methodology of CSI building, applied at VolRC RAS:

Consumer Sentiment Index is calculated on the basis of responds to questions:

1. How do You assess the financial situation in Your family: is it worse or better than a year ago? (respond options: "better", "worse").

2. If we talk about major purchases for a house, speaking in general, what do You think: is this a good or bad time to buy such goods? (respond options: "good", "bad").

3. What do You think: in a year, your financial situation will be better, worse, or about the same as it is now? (respond options: "will be better", "will be worse").

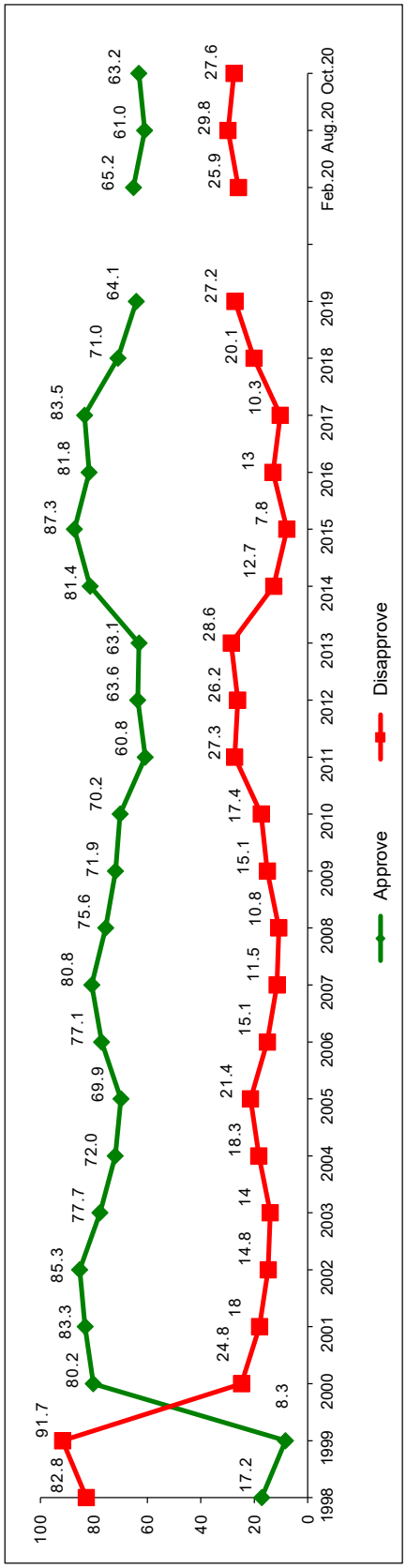
4. What do You think: the next 12 months will be a good time for the country's economy, a bad time, or something else? (respond options: "good", "bad").

5. If we speak about the following five years, will it be good or bad time for the country's economy (respond options: "good", "bad").

Private indices are calculated for each question. For this purpose, the share of negative responses is subtracted from the share of positive responses, and then 100 is added to the resulting value to avoid negative values. Thus, completely negative responses would give a general index of 0, positive – 200, the balance of the first and second expresses a value of the index of 100, which is, in fact, a neutral mark (- - -). The arithmetic mean of private indices gives the aggregate value - Consumer Sentiment Index.

Insert 3

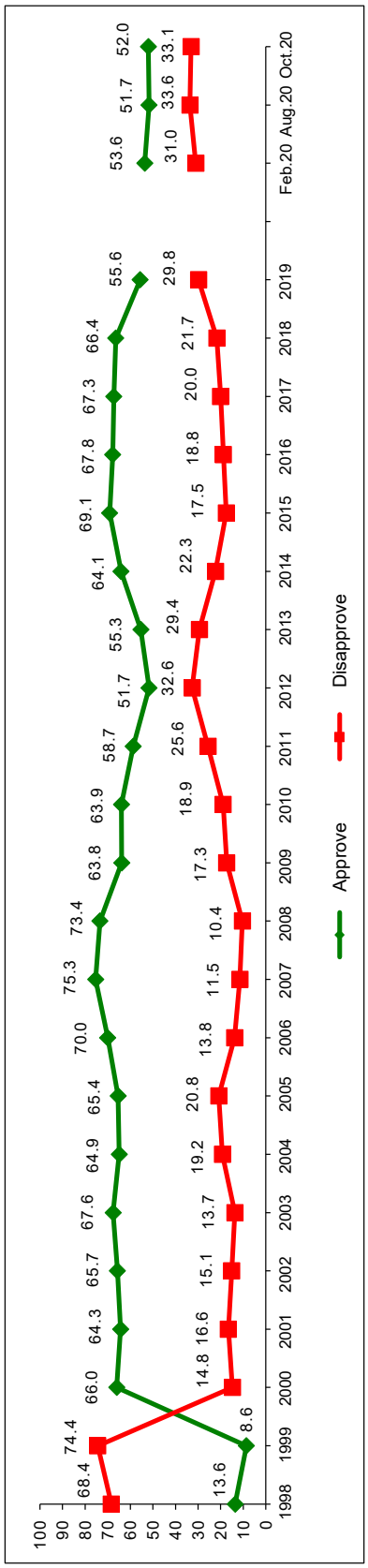
Assessment of the RF President's activities, % from a number of respondents



Data for Russia (VCIOM)*

** data for October 2020 – average for October 04–11, 2020*

According to VCIOM, during the first years of V.V. Putin's presidency (2000–2002), the level of approval of his activities as the President was 80–85%. Currently, this indicator is 60–65%, and there is a trend toward its decline in yearly dynamics (in 2017, the share of positive assessments of the President's activities was 84%, in 2018 – 71%, in 2019 – 64%, in October 2020 – 63%).

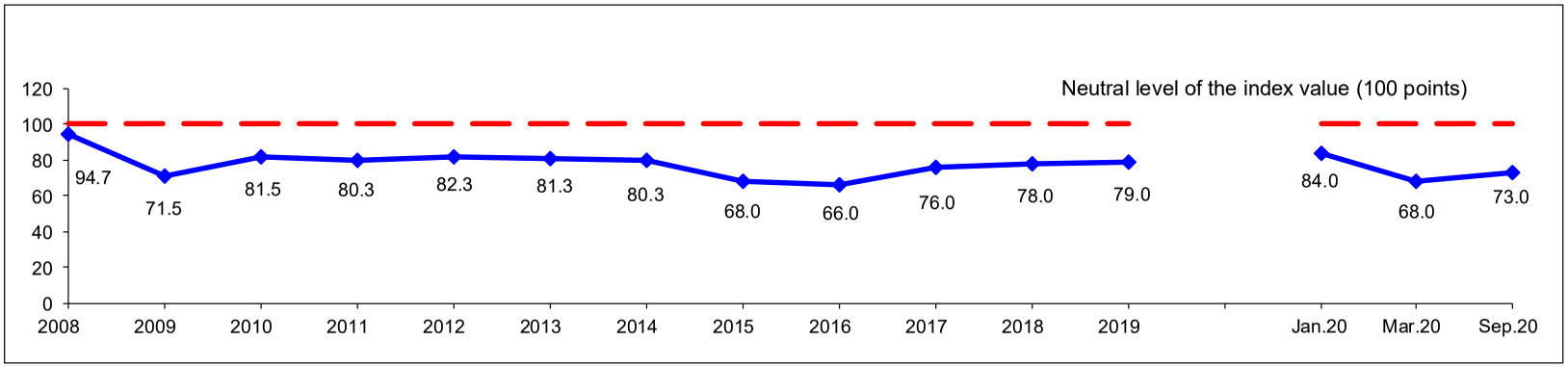


Data for the Vologda Oblast (VolRC RAS)

According to VolRC RAS, during the first years of V.V. Putin's presidency (2000–2005), the level of approval of his activities as the President was 64–68%. In 2019–2020, this indicator is 52–56%, which is significantly (by 10 p. p.) lower than in 2018.

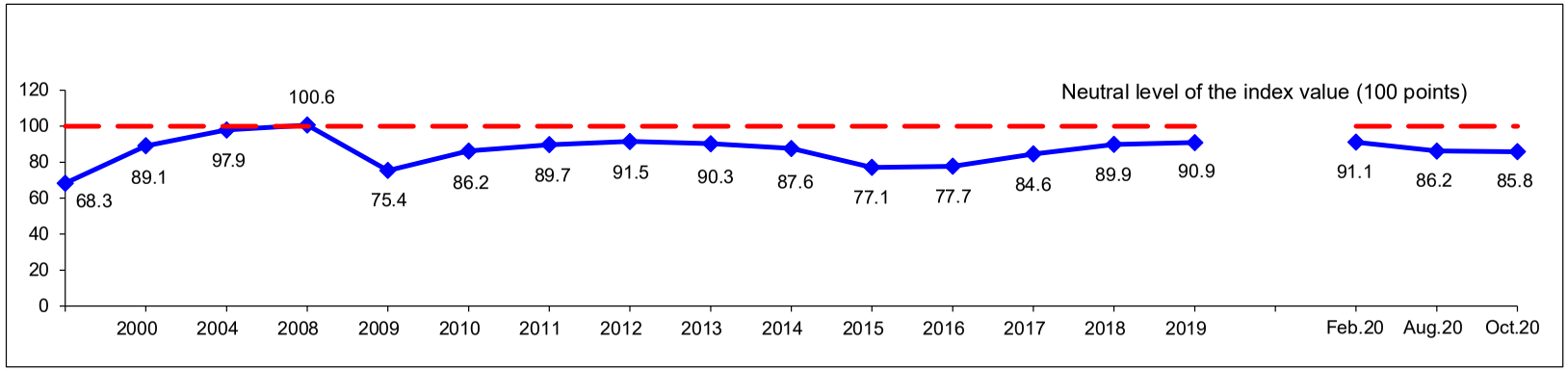
Insert 4

Consumer Sentiment Index (CSI), points



Data for Russia (Levada-Center)

According to Levada-Center, for the country in general, the Consumer Sentiment Index (CSI) has been below 100 points since the global financial crisis (2008). It means that negative assessments concerning economic situation in the country, own financial situation, and development prospects has been prevailing among Russian for the last 12 years. At the same time, CSI was 95 points in 2008, and it was 73 p. (22 p. less) in September 2020.



Data for the Vologda Oblast (VolRC RAS)

According to VolRC RAS data, the Consumer Sentiment Index exceeded 100 points (neutral level) only in 2005–2008, when the peak of recovery processes was reached after the crisis "wild 90s" stage for the Russian economy. Just like data of the all-Russian surveys of the Levada-Center, VolRC RAS regional studies has been showing the prevalence of pessimistic assessments of Russians in relation to the economy, their personal prosperity, and development prospects since 2008–2009.

Thus, the recent increase of social pessimism could not be explained by the uncertain situation caused by the coronavirus pandemic. First, Russian authorities manage to quite efficiently counter the spread of the infection[39]; second, we see that pessimistic moods, related to the development of the Russian economy and own financial situation, have been prevailing over many years, and population's assessments have barely changed since the global financial crisis (2008). In other words, this process had started long before the emergence of initial news from China about upcoming epidemiological threat.

The real reason for the increasing social pessimism in Russian society does not depend on any external force majeure circumstances, but it includes two aspects: a long-term population's dissatisfaction with the efficiency of the public administration system, which is primarily related to the solution of the most relevant problems of citizens, concerning the level and quality of life, and the inability of the ruling elites to find a "common language" with society, which has changed dramatically during the period of market transformations.

Official statistics data show that, after the period of 2000–2008, there were no changes in the dynamics of population's incomes (*Insert 5*) in the following 12 years (2009–2020). Despite many announced goals and responsibilities for this period, the poverty level remains stable. Similar dynamics of indicators is natural for vitally important and daily issues of population: availability of doctors and the quality of pre-school educational institutions (*Insert 6*).

In other words, after the last 12 years when D. Medvedev's Governments was mostly managing domestic policy issues[40], a very paradoxical situation emerged: more often authorities declare the utmost importance of people and the necessity to preserve nation's human capital (it certainly corresponds to objective requirements of our time), more apparent the difference between words and deeds becomes.

The conditions for maintaining health, getting education, and meeting the immediate financial needs of people do not improve, which is why the irritation among broad strata of

> "Unfortunately, the reforms of the 1990s a disastrously hit the Russian science, when many specialists were forced to leave the profession and, most importantly, two generations of young people did not join the profession. According to data, given at the RAS General Meeting on November 13, 2019, a number of scientists in 1991 was 1 mil. and 600 thousand people, and currently this number is nearly 600 thousand people"[41].

[39] As the President noted on September 15, 2020, "Russia ranks 40th worldwide in terms of the number of cases per 100,000 people and 100th in terms of mortality associated with this dangerous infection. Also, our country is the world's leader in the number of tests per 100,000" (source: Transcript of V. V. Putin's speech during an opening ceremony for two new multi-purpose medical centres in Pskov on September 15, 2020. *Official website of the President of Russia*. Available at: http://www.kremlin.ru/events/president/transcripts/64035). The same data was announced by the head of Rospotrebnadzor A. Popova during the meeting of the RAS Presidium (Source: Belyaeva S. Using the approximation method. RAS prepares a springboard for the development. *Poisk*, 2020, no. 38, September 18. Available at: https://poisknews.ru/magazine/metodom-priblizhenij/)

[40] After his presidential term (2008–2012), D. A. Medvedev headed the RF Government from May 8, 2012 to January 15, 2020. It is 9 years out of 12 when, in Russia, there was the stagnation of population income, poverty level, and people's subjective assessments. In particular, Consumer Sentiment Index trends, which shows society's views on the current economic situation in the country, their personal financial situation, and prospects.

[41] Volkonskiy V.A., Gavrilets Yu.N., Kudrov A.V. Liberalism and the state: economic growth and inequality. *Economics of Contemporary Russia*, 2020, no. 2, p. 156.

Russian society grows, forming an appropriate (as yet constructive) agenda for relations between society and authorities. However, if there are no tools to influence authorities, or they exist but do not work, then constructive irritation develops into social pessimism and apathy, as a result of which the turnout for elections decreases, assessments of government bodies at all levels worsen, and a gap of misunderstanding and distrust between society and authorities emerges. In the end, it can lead to irreparable consequences for the entire statehood (there are many cases of this in Russian and global history).

The problem is that the changes in society and the ruling elites have been occurring, to put it mildly, unequally over the last 20 years. The elite groups (families, clans) are mostly from the 90s: their system of liberal values, views, priorities do not change. The system of public administration is the same politburo[42] (*Inserts 7–8*) about which the experts of the "Minchenko Consulting" holding wrote in 2012[43]. No matter how many parties or civil platforms there are in Russia, none of them can or really want to influence the government.

> "Russian ruling class and "the power vertical", built by it, as a multi-year experience shows, are quite inert and lack efficient feedback systems with society in domestic policy. Let alone a lack of ideological unity. **It is not clear when and how this situation will change. But it definitely cannot go on forever.** Moreover, there are more than enough of those who are interested in destroying it in their own interests – safely and profitably. In our country and abroad. Modern Russian Federation, as the USSR during the "perestroika", is practically invulnerable to external military aggression, but it may be destroyed by a growing burden of internal contradictions, which, moreover, will be supported in every possible way from the outside"[44].

As experts note, "today, no opposition or alternative political structures – parliamentary, extra-parliamentary, "old", "new", "Pro-Russian", "Pro-Western" – have a strong trust of Russian voters and cannot show off a significant increase of such trust, "missing" current objective political agenda"[45].

---

[42] Experts of Minchenko Consulting understand "Politburo 2.0" as an "**informal network structure of the coordination of interests of the main elite clans, in which the arbiter and most influential figure is Vladimir Putin**" (Source: "Politburo 2.0" and post-Crimean Russia": Report. *Official website of Minchenko Consulting.* October 23, 2014. Available at: https://minchenko.ru/analitika/analitika_42.html).

An analogy is drawn with the closed Politburo system that existed in the USSR: "**The apparatus of the Central Committee of the CPSU as the Central administrative structure of the formally ruling Communist party in the USSR was an organization with strictly regulated methods of work and a strict hierarchy.** Any paper in it passed at least five floors of the administrative vertical, was repeatedly agreed with various (but not all) interested persons. Within the apparatus, this formal order was maintained by the general department responsible for document management and the center for making internal party management decisions – the Secretariat of the Central Committee. There was also the institute of heads of secretariat departments of the apparatus, who were personally responsible for compliance with all the rules of office work. As a result, the preparation of any decision by the Central Committee staff was, first, a very long process, second, **closed to external control**, and, third, paradoxically leading to the increase in the impact of various lobbyists on the process.

A side effect of this formalization, which was called "bureaucratization" in the political jargon of the period, was the emergence of **informal methods of solving issues**. They did not fit into the bureaucratic framework, but they accelerated decision-making or forced to take into account certain interests that could have been bypassed in a formal approach to a case. Opportunities to solve a particular issue informally, especially using the system of already established informal contacts, were called, according to the Soviet lexicon, "personal connections"" (Source: Mitrokhin N. "Personal connections" in the apparatus of the Central Committee of the CPSU. *Neprikosnovennyi zapas*, 2012, no. 3. Available at: http://www.intelros.ru/readroom/nz/n3-2012/14963-lichnye-svyazi-v-apparate-ck-kpss.html)

[43] Vladimir Putin's big government and "Politburo 2.0": report. *Minchenko Consalting*. August 21, 2012. Available at: https://minchenko.ru/analitika/analitika_27.html

[44] Vinnikov V. Quiet backwater: on the results of a single political day. Zavtra. September 16, 2020.

[45] *Ibidem*.

Insert 5

Poverty level (number of people with monetary incomes below subsistence minimum), % of total population number

Region	1995	2000	2010	2018	2000 to 1995, %	2010 to 2000 , %	2018 to 2010, %	2018 to 2000, %	2018 to 1995, %
Total for RF	*24.7*	*29.0*	12.5	*12.6*	117.4	43.1	100.8	43.4	51.0
Irkutsk Oblast	32.3	35.5	18.1	17.7	109.9	51.0	97.8	49.9	54.8
Kranoyarsk Krai	24.2	24.4	17.9	17.1	100.8	73.4	95.5	70.1	70.7
Novgorod Oblast	22.8	34.2	14.9	13.8	150.0	43.6	92.6	40.4	60.5
Vologda Oblast	20.1	25.5	16.8	13.6	126.9	65.9	81.0	53.3	67.7
Arkhangelsk Oblast	26.9	33.5	14.0	13.5	124.5	41.8	96.4	40.3	50.2
Chelyabinsk Oblast	27.9	30.7	10.2	12.8	110.0	33.2	125.5	41.7	45.9
Samara Oblast	21.2	31.2	15.1	12.7	147.2	48.4	84.1	40.7	59.9
Magadan Oblast	24.6	30.9	13.6	9.5	125.6	44.0	69.9	30.7	38.6
Sverdlovsk Oblast	29.5	28.8	10.0	9.5	97.6	34.7	95.0	33.0	32.2
Khanty-Mansi AO	n.d.	11.8	10.3	9.0	n.d.	87.3	87.4	76.3	n.d.
Lipetsk Oblast	18.6	30.9	9.9	8.7	166.1	32.0	87.9	28.2	46.8
Belgorod Oblast	19.9	33.6	8.2	7.5	168.8	24.4	91.5	22.3	37.7
Yamalo-Nenets AO	n.d.	11.1	7.3	5.8	n.d.	65.8	79.5	52.3	n.d.
Source: Rosstat. Ranked according to data for 2018.									

In all studied regions, as well as in the country in general, the poverty level significantly decreased in 2000–2010 (In Russia, the share of population with incomes below subsistence minimum in 2010 was 43% of this level recorded in 2000).

However, in the following years, there were no significant changes in the dynamics of the poverty level: in 2018, the poverty level across Russia was 100.8% of indicators recorded in 2010.

Mortality rate, per 1000 population

Region	1990	2000	2010	2018	2000 to 1990, %	2010 to 2000, %	2018 to 2010, %	2018 to 2000, %	2018 to 1990, %
Total for RF	*11.2*	*15.4*	14.2	*12.5*	137.5	92.2	88.0	81.2	111.6
Novgorod Oblast	14.1	19.8	20.0	16.7	140.4	101.0	83.5	84.3	118.4
Lipetsk Oblast	12.8	16.4	16.7	14.5	128.1	101.8	86.8	88.4	113.3
Vologda Oblast	11.9	15.7	16.7	14.4	131.9	106.4	86.2	91.7	121.0
Samara Oblast	11.0	16.4	15.2	13.5	149.1	92.7	88.8	82.3	122.7
Sverdlovsk Oblast	11.2	16.4	14.3	13.5	146.4	87.2	94.4	82.3	120.5
Belgorod Oblast	12.8	15.5	14.4	13.5	121.1	92.9	93.8	87.1	105.5
Chelyabinsk Oblast	10.5	15.4	14.4	13.2	146.7	93.5	91.7	85.7	125.7
Arkhangelsk Oblast	9.8	15.5	14.6	13.1	158.2	94.2	89.7	84.5	133.7
Irkutsk Oblast	9.8	14.9	14.4	13.1	152.0	96.6	91.0	87.9	133.7
Kranoyarsk Krai	9.6	14.7	13.5	12.4	153.1	91.8	91.9	84.4	129.2
Magadan Oblast	5.7	10.2	13.0	11.4	178.9	127.5	87.7	111.8	200.0
Khanty-Mansi AO	4.1	6.8	6.8	6.3	165.9	100.0	92.6	92.6	153.7
Yamalo-Nenets AO	3.3	5.6	5.5	4.7	169.7	98.2	85.5	83.9	142.4
Source: Rosstat. Ranked according to data for 2018.									

Mortality rate among Russian population in all studied RF entities did not change much in 2000–2018 (according to official statistics), and it was higher than in 1990.

Insert 6

Number of doctors, per 10000 population

Region	1990	2000	2010	2018	2000 to 1990, %	2010 to 2000, %	2018 to 2010, %	2018 to 2000, %	2018 to 1990, %
Total for RF	*45.0*	*47.2*	*50.1*	*47.9*	*104.9*	*106.1*	*95.6*	*101.5*	*106.4*
Magadan Oblast	48.6	44.7	55.6	63.8	92.0	124.4	114.7	142.7	131.3
Khanty-Mansi AO	31.4	41.1	55.2	56.5	130.9	134.3	102.4	137.5	179.9
Arkhangelsk Oblast	43.2	47.8	56.6	56.0	110.6	118.4	98.9	117.2	129.6
Yamalo-Nenets AO	36.6	43.6	51.2	55.1	119.1	117.4	107.6	126.4	150.5
Kranoyarsk Krai	41.7	46.2	53.7	49.8	110.8	116.2	92.7	107.8	119.4
Irkutsk Oblast	41.2	44.7	49.9	48.7	108.5	111.6	97.6	108.9	118.2
Samara Oblast	45.0	47.7	47.7	47.7	106.0	100.0	100.0	100.0	106.0
Novgorod Oblast	36.5	36.6	41.3	43.3	100.3	112.8	104.8	118.3	118.6
Sverdlovsk Oblast	36.5	41.6	45.7	43.2	114.0	109.9	94.5	103.8	118.4
Chelyabinsk Oblast	36.4	39.2	43.0	42.0	107.7	109.7	97.7	107.1	115.4
Lipetsk Oblast	35.0	39.2	40.4	41.4	112.0	103.1	102.5	105.6	118.3
Belgorod Oblast	34.2	38.2	40.4	40.5	111.7	105.8	100.2	106.0	118.4
Vologda Oblast	31.0	34.1	34.6	35.3	110.0	101.5	102.0	103.5	113.9
Source: Rosstat. Ranked according to data for 2018.									

Availability of doctors for population increased in nearly all studied regions in 2000–2010 (average for the country – by 6 p. p.). However, in 2010–2018, the growth of this indicator was recorder only in Magadan Oblast (by 15 p.p.). A number of doctors barely changed in 7 RF entities and decreased in 5 (by 5 p.p – like in the country in general).

Number of pre-school educational institutions, un.

Region	1990	2000	2010	2018	2000 to 1990, %	2010 to 2000, %	2018 to 2010, %	2018 to 2000, %	2018 to 1990, %
Total for RF	*87944*	*51329*	*45111*	*36581*	*58.4*	*87.9*	*81.1*	*71.3*	*41.6*
Chelyabinsk Oblast	2285	1560	1542	1243	68.3	98.8	80.6	79.7	54.4
Sverdlovsk Oblast	3241	1651	1421	1212	50.9	86.1	85.3	73.4	37.4
Kranoyarsk Krai	1968	1100	985	937	55.9	89.5	95.1	85.2	47.6
Irkutsk Oblast	1798	1022	943	863	56.8	92.3	91.5	84.4	48.0
Belgorod Oblast	814	530	514	473	65.1	97.0	92.0	89.2	58.1
Vologda Oblast	1195	683	600	363	57.2	87.8	60.5	53.1	30.4
Samara Oblast	1571	941	641	339	59.9	68.1	52.9	36.0	21.6
Lipetsk Oblast	665	383	360	326	57.6	94.0	90.6	85.1	49.0
Khanty-Mansi AO	698	428	404	304	61.3	94.4	75.2	71.0	43.6
Arkhangelsk Oblast	1364	584	319	190	42.8	54.6	59.6	32.5	13.9
Yamalo-Nenets AO	299	209	188	167	69.9	90.0	88.8	79.9	55.9
Novgorod Oblast	555	277	281	160	49.9	101.4	56.9	57.8	28.8
Magadan Oblast	250	58	60	49	23.2	103.4	81.7	84.5	19.6
Source: Rosstat. Ranked according to data for 2018.									

In all analyzed RF entities, as well as in the country in general, over the last 28 years (1990–2018), there has been a steady decline of the dynamics of a number of pre-school educational institutions. In general, its number decreased by 2.5 times in this period in Russia (from 88 thousand in 1990 to 36.5 thousand in 2018), for 2000–2018 – by 1.4 times (from 51 to 36.5 thousand).

Insert 7

"Politburo 2.0 and the anti-establishment wave" (June 5, 2019)
Source: https://minchenko.ru/analitika/analitika_80.html

Politburo 2.0 as an informal decision-making structure, formed around V. Putin, stayed even after the presidential election in 2018… The top league of the Russian elite only keeps people who are curators of significant industries and projects.

State-owned and near-state companies are being promoted to new sectors of the economy – up to the formation of certain markets from scratch (for example, a new waste recycling industry), and resources and markets are being redistributed from private companies and regional elites to members and candidates of Politburo 2.0.

Even modernization projects are supposed to be implemented within the framework of state programs or corporate procedures. The corporatist approach is also being extended to the political sphere. In political management, the emphasis is not on encouraging political competition but on selecting and cultivating new technocratic personnel.

The anti-establishment wave that has reached Russia becomes a serious challenge for the elites around the world. Authorities have faced a number of high-profile defeats in regional elections and protests according to the federal and regional agenda. **Society has formed a steady demand for a new type of politicians, which at the moment is not fully satisfied by the government or the opposition. Anti-establishment sentiments will likely be a key challenge for the Russian elites, because methods of its disposal, usual for the government (anti-nomenclature rhetoric of the President and his appointed governors, high-profile resignations, and recruitment of new personnel, the anti-corruption campaign), are close to exhausting its efficiency at this point.**

In 2018–2019, Putin's Politburo 2.0 continued to function **as the most influential informal political institution in Russia**. **Politburo 2.0 includes people from Putin's inner circle who have an ability to accumulate significant resources, manage it, and create their own networks of influence. As before, formal positions within the state system are important, but they are not decisive in assessing the political influence of leaders of the elite groups within Putin's Politburo 2.0.**

An important factor in maintaining the balance of the elite groups is the division of zones of informal supervision by members of the Politburo 2.0. The highest concentration of interests is in the area of state capitalism, where the heads of the largest Russian state corporations S. Chemezov and I. Sechin remain beyond competition in terms of influence. At the same time, business models of formally private companies of G. Timchenko and the Rotenberg family are more often seen as the continuation of state policy.

In the government of the Russian Federation, updated after the presidential election, the influence of full fledged members of the Politburo 2.0 on ministers remains decisive. It is rather difficult to name a minister who is not somehow affiliated with one of Politburo 2.0 members.

A high pressure exerted on the government by members of the Politburo 2.0 is related to the chosen tactics of the elite groups until the next transition of power. **Observers are not happy with the variety of tactics used by the ruling elites.** Each Politburo 2.0 member claims to be in charge of a very large structure that manages a large amount of resources. **In theory, the heaviness of such structure should exclude the possibility of its painless disbandment (too big to fall) and, sometimes, simple reformation – transfer to another influential member of the ruling coalition.** At the same time, Politburo 2.0 members constantly expand in their own and related areas, absorbing smaller players.

Despite growing competition within Politburo 2.0, **arguments between groups are still artificially kept out of the public political process.** Main competition methods between groups are personnel lobbying, information wars (moved to anonymous Telegram channels), and the usage of power tools. Moreover, a number of players who are immune to force persecution rapidly decreases.

Insert 8

MINCHENKO CONSULTING

Scheme 5. Russian elite. The model of the "Politburo 2.0"

COMMUNICATION HOLDING "MINCHENKO CONSULTING"
22, Moscow, Zoologicheskaya Street, Moscow, 123252
Phone. Fax: +7 (495) 899-00-69
www.minchenko.ru office@minchenko.ru

"It seems obvious to me that **if the government does not depend on the parliament and not accountable to it, it may negatively impact its efficiency. This is not good when there is no competitiveness in the party-political system...** Often, the electoral process seems to exist in form, but in fact it does not. And now we are moving on to the constitutional reform, which involves putting the government under tighter control and responsibility not only to the President but also to the Parliament. **But as long as there is no normal system competition in the party-political system, the conditions under which the party system operates are not organic, they do not provide a normal representation of people in the parliament, and this requires serious work by both the government and society.** We need a bridge between citizens, elected parliamentarians, and the executive branch. And it is destroyed. **There is a government report, but it does not affect anything: even personnel policy in general.** It is possible to have an impact only by not approving the prime minister, but this is a crisis. And there is no working mechanism. **Therefore, the government is in irresponsible conditions"**[46].

Thus, we see that despite a firm official position of government authorities on de-ideologization of construction frame of post-Soviet Russia, its history can be seen in the form of sequential change of grand ideas that was marked by V. Putin as one of the necessary conditions of the course implemented by him.

The idea of liberalizing everything was welcomed in Russian society tired of outdated Communist ideology and the "Iron Curtain".

The idea of power state, which replaced it, was necessary for the country and society to decisively overcome crisis consequences of failed democratic reforms of the 90s.

The idea of external positioning of Russia as a sovereign state and an equal partner in international relations became a logical continuation of overcoming the most acute domestic problems (primarily related to the population's level and quality of life, as well as strengthening of the power vertical).

The idea of national identity and consolidation on the basis of traditional spiritual and moral values emerged at the time when the restoration of Russia from the ruins of the Soviet Union started to seriously bother "collective West" powers – when this process became obvious and "seen" in the international arena.

Finally, *the grand idea of the "decisive breakthrough"* became necessary exactly when the understanding of the development vector formed in Russia (first of all, in Russian society and political discourse); it should be sovereign, independent of any other forces; the main obstacle for it is inside the country, not outside – in the value orientation and, as a result, in the efficiency of work among our own ruling elites.

In the context of the formation of Russian statehood through a chain of grand ideas, it should be noted that the new Constitution did not become a grand idea, since the idea of the *"decisive breakthrough"* for the first time disrupted the process of their historical continuity, which was ensuring the efficient construction of the new, post-Soviet statehood for nearly 20 years.

This is perhaps the main conclusion that we can draw looking at relatively recent Russian history: **no other grand idea will replace the previous one if it did not properly pass all three stages of its "life cycle".**

All aforementioned ideas are united by the following provisions:

1. Each one (even in the early 1990s) corresponded to public sentiments. **This was, in fact, a dialogue between society and**

[46] Skorobogatyi P. Striving for the right-wing conservative flank (interview with NRU HSE Professor, Can. of Sci. (Law) V. Senin). *Expert*, no. 37, September 7, 2020. Available at: https://expert.ru/expert/2020/37/stremlenie-k-pravokonservativnomu-flangu/

authorities (which is natural if authorities are unwilling to allow any revolutionary events, and they want to maintain their dominant status in any elections of any level).

2. Each grand idea formed a **socio-political consensus**, under which a certain period of time had passed until this idea ideologically and psychologically exhausted itself.

3. Each idea had a logical conclusion and led to the emergence of a new one. **It was a historically successive and consistent process,** comparable to the process of a creative (constructive) destruction, the point of which is that something completely new appears very rarely. Usually, there is some rearrangement in the development process, recombination of factors within the existing paradigm[47].

4. **Every grand idea has been formulated by V. Putin personally since 2000. It was the basis of public trust in him (so-called "deep state"), but it also imposed personal responsibility for the implementation of the idea on him.**

5. Recent experience shows that **a new grand idea cannot be implemented until the exhaustion of a previous one – the completion of the whole "life cycle": from the maturation of social needs to implementation in state policy.**

Based on these conclusions, we can discuss what needs to be done today to preserve Russian statehood and overcome the impasse that the long-term historical process, launched by V. Putin in 1999, has reached.

Today, the solution of the most important domestic tasks is complicated by international events which are related to Russia, its geopolitical prospects, opportunities and capabilities for preserving the statehood: these include protests in Belarus, escalation of Nagorno-Karabakh and Kyrgyzstan conflicts. Events in Russia are no less frightening: poisoning of A. Navalny, tensions in Khabarovsk. **Some experts see in these domestic and foreign events a united and consistent goal of adepts of "western" global project "on the background of chaos, created by them (including our territory, if it is allowed), to keep their own network administration system … all actions, ones against Russia included, are strictly aimed at this"[48].**

> "By the way, did anyone think about why Klishas and Krashennikov put forward their juvenile law again, which even the Patriarch opposed? Because if they manage to get it through, a large lobby will emerge that will build its income on sales of our children. Because fast and secret courts are necessary for one purpose – to take children away from families, and then sell them. The liberals' dream, by the way"[49].

Manifestations of how the western global project is trying to slow down the development of a nationally and socially oriented "red" project (Russia in particular) have always been, and they have always been different. However, the root causes of the President's unfulfilled promises to society and his direct instructions to the ruling elites are the problems of the public administration inefficiency, and they do not change.

Experts have been talking about this for a long time, but it is equally important that it becomes more and more obvious to society. Trust in the President and disbelief in the implementation of his policies by the ruling

[47] Schumpeter J. *The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle* [Transl. from German by Avtonomova V.S. et al.]. Moscow: Progress, 1982. 455 p.

[48] Khazin M. Liberalism is incompatible with democracy. *Zavtra*. October 7, 2020.

[49] *Ibidem*.

"So far, it is obvious that liberals, whether they are Western policy makers who use symbols of Freedom and Equality only as weapons for the destruction of states or part of the Russian elite acting in the name of personal enrichment, have earned a negative, contemptuous attitude from the majority of the Russian people… **It cannot be natural for our country to follow the path prescribed by the Western liberal-capitalist ideology.**

One of the main tasks of the state is to develop the economy in the context of high technologies and the requirements of scientific and technological progress. This task cannot be solved by primarily developing small and medium-sized businesses, although this area is undoubtedly important for the economy… The function of the state should be the support of a free and fair society through special institutions that can resist the anti-social actions of corporations and clan groups"[50].

elites increases the gap between society and the government and already affects the results of municipal, regional, and federal elections. Society (the electoral majority) is a resource that the President has always relied on, therefore, the growing apolitical nature of society "unties the hands" of liberal-minded elites, which ultimately boomerangs the implementation of population's urgent needs and the main aspects of national security.

In these circumstances, many experts more often pay attention to the fact that "the time has come to publicly declare the ideology. V. Putin must do it, because residents of Russia will not trust anyone else"[51]. "The combination of the scientific theory of long-term socio-economic development as a process of successive changes in technological and global economic patterns and traditional spiritual values can become a reliable support for the formation of a modern ideology that consolidates Russian society. Without it, it is extremely problematic to make a leap into the technological future"[52].

It is difficult to disagree with this opinion, because the efficiency of public administration depends primarily on the interests that are pursued by people who carry it out.

We have repeatedly[53] agreed with experts who, in various formulations, said that Russia needs a new grand idea that would consolidate the most diverse segments of population and reduce the severity of accumulated contradictions. And we still share this opinion conceptually because, as it was shown at the beginning of our article, **grand ideas are means to build post-Soviet statehood (no matter how anyone feels about it).**

However, we see that new ideas do not work without historical continuity of this path. They definitely may succeed and to occupy a public agenda for several months (as it happened with constitutional amendments discussions in 2020), but they cannot become a driving force of a new historical stage. In this regard, in the current situation, it seems more appropriate to take steps aimed not at creating a new big idea but at **reviving the only historical process that Russia has been following since the beginning of**

[50] Volkonskiy V.A., Gavrilets Yu.N., Kudrov A.V. Liberalism and the state: economic growth and inequality. *Economics of Contemporary Russia*, 2020, no. 2, p. 157.

[51] Kazakov A. Fox of The North. *Vladimir Putin's Grand Strategy.* Saint-Petersburg: Piter, 2020. P. 202.

[52] Glaziev S. Yu. Integrated system. *Zavtra*, 2020, no. 38.

[53] See, for example: Ilyin V.A., Morev M.V. "Intellectual feebleness" of the ruling elites and the "deep people" of the "long state". *Economic and Social Changes: Facts, Trends, Forecast*, 2019, vol. 12, no. 2, pp. 9–35; Ilyin V.A., Morev M.V. The problem of civilizational choice and its reflection in the key documents defining the present and future of Russia. *Economic and Social Changes: Facts, Trends, Forecast*, 2019, vol. 12, no. 3, pp. 9–23; Ilyin V.A., Morev M.V. "Russian Federation – a welfare state?": assessing the results of 25 years of implementation of Article 7 of the Russian Constitution. Economic and Social Changes: Facts, Trends, Forecast, 2018, vol. 11, no. 6, pp. 9–25.

V. Putin's presidential terms. Future generations will judge this path later, but Russia has no other choice today.

To "restart" this process, we should refer to more specific (practical, not ideological) measures which may impact the liberal-oligarchic stratum of the ruling elites that has become a "stumbling block" in the implementation of the goals of the "breakthrough" development. In particular, such measures are proposed by Doctor of Sciences (Economics), Professor, RAS Academician, Former Adviser to the President of the Russian Federation on Regional Economic Integration (2012–2019), Minister for Integration and Macroeconomics of the Eurasian Economic Commission S.Yu. Glaziev. We share his fundamental opinion and regularly refer to it in our articles in "Editorial" section[54].

In the article "Integrated system", S.Yu. Glaziev lists 12 "bearing pillars of the image of the future Russian socio-economic structure"[55]. As the author himself emphasizes, this is "not an exhaustive list of components of the image of the future for the Russian socio-economic system", **but it is difficult not to agree with him that each of these "pillars" is a necessary and integral element of the future of the Russian state, without which this future simply will not exist.**

1. Introduction of a mechanism of the government's automatic responsibility for improving people's welfare, level and quality of life by introducing a norm on their resignation in case of unjustified deterioration of a corresponding system of indicators. Creation of a system for objective assessment and promotion of personnel in state bodies and the public sector.
2. Introduction of a system of strategic and indicative planning implemented through contractual mechanisms of public-private partnership.
3. Stopping the export of capital, de-offshorization of the economy, restoration of mandatory sale of foreign currency earnings and export duties on the export of raw materials, introduction of a tax on currency speculation.
4. The reorientation of monetary policy and the banking system to refinance the growth of the production and investment activity.
5. Implementation of a comprehensive program of advanced economic development based on a new technological structure, deepening the processing of natural resources, and full activation of scientific and technical potential.
6. Withdrawal of natural rent to the state revenue, restoration of the system of environmental funds and payments for environmental pollution.
7. Double spending on health care with the elimination of private intermediaries in the system of public financing, on education and culture with the restoration of guarantees for the free provision of their services to population. The provision of universal social security, the introduction of a basic social income.
8. Triple increase of R&D expenditures, restoration of the leading role of the Russian Academy of Sciences, exemption from taxation of all expenses of enterprises for innovative activities.
9. Introduction of a progressive scale of income and inherited property taxation with exemption from them for the population with incomes below the subsistence minimum.
10. Restoration of the Unified energy system and nationalization of energy, transport, telecommunications, and social infrastructure.
11. Introduction of the Institute of participation of representatives of labor collectives in the management of enterprises, expansion of the network of national enterprises.
12. Restoration of the Soviet system of higher and secondary education, its orientation to the upbringing of a creatively active, patriotic person.

[54] For example: Ilyin V.A., Morev M.V. Nationally oriented rotation of the elites – the most important condition for the im-plementation of national projects. *Economic and Social Changes: Facts, Trends, Forecast*, 2019, vol. 12, no. 4, pp. 9–25; Ilyin V.A., Morev M.V. Revisiting the issue concerning the future of Russian statehood. *Economic and Social Changes: Facts, Trends, Forecast,* 2018, vol. 11, no. 5, pp. 9–29.

[55] Glaziev S. Yu. Integrated system. *Zavtra*, 2020, no. 38.

In conclusion, we would like to note that Russia needs a program of concrete actions at the federal level that is transparent, clear, and deeply understandable for nationally oriented elites and broad segments of population. This program should be developed on the basis of a large-scale discussion organized according to the rationalization proposals of the expert community members, who understand the essence and causes of key problems in the country and have repeatedly proved in their biography and professional activities commitment to the national-patriotic development course, implemented by V. Putin.

Society needs such action program, and many experts propose a specific solution and expect that it will be acknowledged and accepted for implementation.

The leading role and initiative on the transition from declaring the grand idea of the "decisive breakthrough" to its implementation was and still remains in the hands of the President. Especially after Russian society supported changes in the RF Constitution, and V. Putin received an opportunity to extend the presidential term until 2030[56] and to maintain his development course for another 10 years at least.

New Russian grand idea should start with the implementation of the "decisive breakthrough". Otherwise, the whole historical path, our country has been following for the last 20 years, will continue to be "stuck", weakening the foundation of the Russian statehood every month and every year and negating many truly important historical results achieved by the President.

References

1. Karaganov S.A., Suslov D.V. et al. Protecting peace, earth, and freedom of choice for all countries. New ideas for Russia's foreign policy. In: *XXI Apr. mezhdunar. nauch. konf. po problemam razvitiya ekonomiki i obshchestva, Moskva, 2020 g.* [XXI April International Academic Conference on Economic and Social Development, Moscow, 2020]. National Research Institute "Higher School of Economics". Moscow: Izd. dom Vysshei shkoly ekonomiki, 2020. 92 p. (in Russian).
2. Betelin V.V. Russia needs to abandon the "service economy" and shift to the economy of industrial production. *Ekonomist=Economist*, 2019, no.2 (in Russian).
3. Petukhov V.V. Dynamics of social moods of Russians and the formation of a request for change. *Sotsis=Sociological Studies*, 2018, no. 11, pp. 40–53 (in Russian).
4. *Rossiiskoe obshchestvo posle prezidentskikh vyborov – 2018: zapros na peremeny: informatsionno-analiticheskoe rezyume* [Russian society after the presidential elections – 2018: A request for change: Information and analytical summary]. FNISTs RAN. Moscow, 2018. 55 p.
5. Ilyin V.A., Morev M.V. Another Step toward V. Putin's "Long State". *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 1, pp. 9–33 (in Russian).
6. Ilyin V.A., Morev M.V. Vote of confidence for the President is confirmed. Achievement of socio-economic development goals before 2024–2030 is uncertain. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 4, pp. 9–37 (in Russian).

[56] "The provision of Part 3 of Article 81 of the Constitution of the Russian Federation, limiting a number of terms when one and the same person may hold the office of President of the Russian Federation, applies to the person who held and (or) holds the office of the President of the Russian Federation **without regard to a number of terms during which he held and (or) holds this position at the time of entry into force of the amendment to the Constitution of the Russian Federation**, which introduces a matching constraint and does not exclude for him the possibility to hold the office of President of the Russian Federation within the period allowed by the specified provision (RF Constitution, Art.81, p. 3.1).

7. Volkonsky V.A., Gavrilets Yu.N., Kudrov A.V. Liberalism and the state: Economic growth and the inequality. *Ekonomicheskaya nauka sovremennoi Rossii=Economics of Contemporary Russia*, 2020, no. 2, pp. 147–159 (in Russian).
8. Schumpeter J.A. *Teoriya ekonomicheskogo razvitiya* [The Theory of Economic Development]. Moscow: Progress, 1982. 455 p.
9. Kazakov A. Lis Severa. Bol'shaya strategiya Vladimira Putina [The Fox of the North. Vladimir Putin's Big Strategy]. OOO Izdatel'stvo «Piter», 2020. 380 p.
10. Ilyin V.A., Morev M.V. "Intellectual feebleness" of the ruling elites and the "deep people" of the "long state". *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2019 vol. 12, no. 2, pp. 9–35 (in Russian).
11. Ilyin V.A., Morev M.V. The problem of civilizational choice and its reflection in the key documents defining the present and future of Russia. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2019, vol. 12, no. 3, pp. 9–23 (in Russian).
12. Ilyin V.A., Morev M.V. "Russian Federation – a welfare state?": Assessing the results of 25 years of implementation of Article 7 of the Russian Constitution. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2018 vol. 11, no. 6, pp. 9–25 (in Russian).
13. Ilyin V.A., Morev M.V. Nationally oriented rotation of the elites – the most important condition for the implementation of national projects. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2019 vol. 12, no. 4, pp. 9–25 (in Russian).
14. 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, vol. 11, no. 5, pp. 9–29 (in Russian).

Information about the Authors

Vladimir A. Ilyin – RAS Corresponding Member, Doctor of Sciences (Economics), Professor, Honored Scientist of the Russian Federation, Scientific Director, Vologda Research Center of the Russian Academy of Sciences (56A, Gorky Street, Vologda, 160014, Russian Federation; e-mail: ilin@vscc.ac.ru)

Mikhail V. Morev – Candidate of Sciences (Economics), Leading Researcher, Deputy Head of Department, Vologda Research Center of the Russian Academy of Sciences (56A, Gorky Street, Vologda, 160014, Russian Federation; e-mail: 379post@mail.ru)

DOI: 10.15838/esc.2020.5.71.3
UDC 338.32; LBC 30.6

Scientific and Technological Development of Russia: State Assessment and Financing Problems *

Evgenii A.
MAZILOV
Vologda Research Center of RAS
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: eamazilov@mail.ru
ORCID: 0000-0001-5792-3883; ResearcherID: J-1686-2016

Arina A.
DAVYDOVA
Vologda Research Center of RAS
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: arina.davydova.1992@mail.ru
ORCID: 0000-0001-7689-0589; ResearcherID: I-9080-2016

Abstract. Given the current conditions of rapid cyclical economic processes, the urgency of tasks related to ensuring sustainable economic growth is increasing. The available experience clearly indicates that sustainability can only be achieved by ensuring the proper level and pace of scientific and technological development. At the same time, the implementation of spatial development concept is entering into the foreground due to globalization, integration and digital technologies development. The purpose of the work is to assess the scientific and technological development of Russia in the context of international comparisons and to study the system of R&D financing in the country. Based on this purpose, the article considers the evolution of approaches to the scientific and technological development of territories, identifies the need to form a single scientific and technological space in Russia, which will reduce the existing imbalances and ensure the uniformity of regional development; substantiates the significance of the financial subsystem in the formation of a single space; analyzes its state. The conducted analysis has

* The research was supported by the grant of the President of the Russian Federation (MK-2164.2020.6).
For citation: Mazilov E.A., Davydova A.A. Scientific and technological development of Russia: state assessment and financing problems. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 55–73. DOI: 10.15838/esc.2020.5.71.3

shown that the current system of research and development financing in Russia is contrary to the global trends. The research has revealed that a crucial role in the process of funding is still played by the state; it has demonstrated the low efficiency of the system of R&D financing and offered recommendations for its improving and optimizing, i.e. the formation of regional funds for scientific, scientific-technical and innovation activities; increasing the availability of federal funding sources of scientific and technological development in the regions and the efficiency of venture activity in Russia. Further stages of the research will involve studying other basic subsystems of the scientific and technological space (organizational, managerial, informational, educational, etc.), as well as working out practical recommendations for their development, efficiency and harmonious interaction and functioning.

Key words: unified scientific and technological space, factors, differentiation of territories, financing of scientific, scientific-technical and innovative activities; support funds, incentive tools.

Introduction

The implementation of national aims and issues related to improving competitiveness in external markets, increasing the human well-being level, as well as ensuring national security, is impossible without relying on a scientific and technological basis. The available foreign experience [1] shows that only the states that have determined the growth of science, technologies, and innovation as a strategic imperative, have been able to achieve sustainable socio-economic development.

This issue is also crucial for Russia. It has been impossible to ensure the increasing efficiency of the scientific and technical activities, and achieve the required level of its competitiveness after the transition to the market economy 30 years before [2]. This problem is worsened by the steady acceleration of the scientific and technological progress. Its importance and relevance are mentioned in the speeches of the President of the Russian Federation. Thus, V.V. Putin mentioned in the Address to the Federal Assembly on February, 2020: "Today the speed of technological change in the world is increasing manifold, and we must create our own technologies and standards in areas that define our future"[1].

The relevance of the scientific and technological development for the state is emphasized in the adopted for implementation the "Science" national project[2] where one of the crucial challenges stated "ensuring the presence of the Russian Federation among the five world leading countries conducting research and development in the areas determined by the scientific and technological priorities".

At the same time, globalization and deepening integration, constant new technologies evolution lead to the fact that the distance and location of the subjects of scientific, scientific-technical and innovative activities are becoming less important factors. Furthermore, the differentiation level of Russian regions in terms of the key indicators of science and technology development continues growing. The difference between the leading and outsider regions is more than 140 times by the indicator of "the share of research and development expenditures in GRP"; in terms of the indicator of "the number of personnel engaged in research and development, people per 10 thousand people", it is more than 160 times (according to Rosstat data in 2018).

[1] Presidential Address to the Federal Assembly. *Official website of the President of Russia*. Available at: http://kremlin.ru/events/president/news/62582

[2] Passport of the "Science" national project. *Official Website of the Russian Government*. Available at: http://static.government.ru/media/files/UraNEEbOnbjocoMLPOnnJZx4OT20Siei.pdf

The provision of science and technology development in the country is impossible in the conditions, where the regions so significantly differ in their development level which leads to increased concentration of all resources in particular territories and the flow of the few resources from other territories to them. From the authors' point of view, the current situation can be leveled if a unified scientific and technological space is formed within the borders of the entire state.

The concept of the spatial evolution is one of the imperatives in Russia. The RF Spatial Development Strategy for the period up to 2025 was approved in 2019[3]. It is intended to ensure the competitive growth of the economy of the RF entities by the implementation of competitive advantages through the development of their promising economic specializations which include both effective existing and potentially effective branches of economic specialization. According to the Strategy, "professional, scientific and technical activities" is marked as promising for more than 50% of the entities of the Russian Federation (48 units) which indicates that there is a significant reserve of scientific, scientific-technical and innovative activities in many regions.

Thus, the provision of scientific and technological development through the formation of the unified scientific and technological space (STSp) of the country is the best variant for ensuring the competitiveness of the state as a whole and increasing the interregional imbalances of the progress. It is important to understand that this approach allows concentrating the possibilities of each RF entity on those subsystems of the scientific and technological space and activity areas which have a certain groundwork or development potential.

[3] On the Approval of the Spatial Development Strategy until 2025: Executive Order of the RF Government no. 207-p, dated February 13. *Official website of the Russian Government. Available at: http://government.ru/docs/35733/*

In this regard, the purpose of the research is to assess scientific and technological development of Russia in the context of international comparisons, and study a system of R&D financing in the country. The following issues should be solved to achieve this aim: to consider theoretical and methodological approaches to the scientific and technological development and understanding the essence of the scientific and technological space; to analyze the key trends and problems of the scientific and technological development of Russia; to study the system of R&D financing at the federal level; to substantiate the priority directions and tools for improving the system of R&D financing in Russia, in order to achieve the issues set in the national projects.

The scientific novelty of the work is in the developing of the theoretical and methodological aspects of the STSp formation, substantiating the role of the financial subsystem in creating the unified space, and analyzing its state; working out the recommendations to improve and optimize the system of R&D financing both at the federal and regional levels.

Theoretical aspects of the research

The issues of the spatial economy development and its separate subsystems have been the subjects of the scientific studies since the begging of the 19th century. At the same time, in recent years, due to the globalization, digitalization of all the aspects of social life, the interstate and interregional borders have been erased, the unified space has been formed where the subjects receive the bigger effect from interaction with each other and from the synergy of these relationships than if they were outside of it [3].

The theory of the scientific and technological development originating in the works of J. Schumpeter (the theory of innovation) [4], has being undergone significant fundamental changes within the 20th and 21st centuries. The theory of innovation of J. Schumpeter fits into the concept of long waves by N.D. Kondratyev

[5] who proves the cyclical nature of economic and technological development processes. In many aspects, Kondratiev's ideas formed the basis of the theory of innovation diffusion by T. Hägerstrand which is interesting, as it takes into account the location theory, i.e. spatial aspects of the development of technology and diffusion processes.

The basis of the theory of scientific, technological and innovative development was laid by F. Perroux's concept of growth poles [7]. In his studies he points out that the inequality of economic actors arising for natural reasons allows generating the development points in space which accumulate economic agents around themselves, playing the role of locomotives, thereby forming agglomerations. Later, this theory was reflected in the emergence of technopolises and other forms of organization of scientific, technological and innovative activities.

The theory of the technological paradigm (D.S. Lvov, S.Yu. Glaziev) [8] should be referred to as the conceptual approaches to describing the processes of organizing innovative activities. The latter is understood as groups of related industries connected with each other by the same type of technological chains [9]. In parallel with the theory of technological paradigm, the theory of clusters was dynamically developing in the studies of M. Porter [10]. One of the main theses is that the most competitive companies are concentrated in the same territory which is associated with the wave nature of innovative development and the peculiarities of the innovation diffusion.

The next stage in the evolution of the theory of management of scientific, technological and innovative development was the formation of the concept of National System of Innovation (C. Freeman, B. Lundvall, R. Nelson) [11; 12; 13].

The National System of Innovation (NSI) is understood as a set of various institutions which contribute to the new technological creation and expansion together and individually, making an organizational and legal basis that serves governments for the policy formation and implementation, affecting the innovation process [14]. This concept has a positive experience of realization in the USA, Japan, and a number of economically developed countries.

The current global changes and the technological development, associated with the forth industry revolution, determine the necessity to use other approaches of management of scientific, technological and innovative development. The existing patterns of innovative development need adjustment, as far as the basic principles of interaction, and the organization of management processes in scientific, scientific and technological, and innovative activities are changing in modern conditions. Moreover, the existing approaches do not allow solving one the most crucial problems, reducing the differentiation level in the arrangement of the territories. From the authors' point of view, it is necessary to talk not about the creation of growth poles (for example, clusters), national systems of innovation, etc. but focus on the space integral development as a unified system of subjects' interaction with equal opportunities and access to the resource base of relationship.

Literature review showed that the subject of STSp has not been properly reflected in research. At the same time, practical steps to solve the problems of creating a unified space have already been realized. Most CIS countries intend "making the transition to the innovative pattern of development which requires shift of cooperation emphasis to the joint elaboration and implementation of innovative projects and programs, and creating solid grounds for the formation of a unified scientific and technological space" [15]. The Agreement on the creation of a common scientific and technological space of CIS countries (as amended on November 11, 2009) came into

effect in 1997. The monograph [16] concludes that the well-timed formation of scientific and technological and innovative policy at the supranational level, as well as organizational and legal forms and mechanisms have become the main respond to the challenge of the scientific and technological progress and, in particular, the forth industry revolution.

The researchers present the experience of forming a unified STSp of the Union State of Russia and Belarus and draw attention to the problematic aspects of this project [17]. The schematization of the directions of formation and functioning of the unified scientific and technological space of the Union State is of particular interest. The authors noted that "the most relevant for theoretical understanding is the creation of mechanisms and tools for building and realization of a unified strategy for innovative development of the Union State, which ensures the effectiveness of integration of innovative systems in Russia and Belarus" [17]. This problem is certainly crucial for organizing a unified STSp in Russia.

The scientists consider the basic principles of creating a unified scientific and technological space: concentration of joint efforts on the most priority areas of innovative development; complementarity of innovative development (elimination of duplication and optimization of resources through the joint research on agreed topics); equal availability of R&D results for participants in common projects [18]. Despite the fact that this research is about the formation of an intercountry scientific and technical space, the basic principles are characteristic and applicable for one state (regions as separate territories within a unified space).

Thus, the issue of developing a unified scientific and technological space capable of responding to global challenges is an urgent practical task.

The term "space" came in economy from geography where it is understood as the "existence form of the geographical objects and phenomena within a geographical environment; a set of relations between geographical objects, located on the specific territories and developing over time"[4]. In economic theory, in general, space means a saturated territory that contains many objects and connections between them; settlements, industrial enterprises, economically developed and recreational areas, transport and engineering networks, etc. [19]. However, depending on the goals of the research, the term can be slightly modified. For example, in the socio-economic approach, space is considered "a system of relations between subjects that realize private economic interests and subjects of the aggregate economic process to form the expected results of their activities" [20]. There are works with emphasis on business entities that exchange signals in the process of economic activity through information flows [21].

The review of the management theories of scientific and technological, and innovative development demonstrated that the category of the "scientific and technological space" ought to generalize and include a number of aspects. First, we should speak about a certain system of interaction that lies within the framework of regulatory and legal area, created by the state through the regulatory legal acts, including the formation of the research agenda. At the same time, the interaction of subjects and their access to the existing resources should be formed on a parity basis, but this principle is not maintained in the current situation.

Based on the aforementioned criteria, we understand the scientific and technological space as a system of entities functioning and interacting within the existing regulatory and legal area in the field of scientific and technological development, geographically limited by the state boundaries whose activity are aimed at the increasing the corresponding

[4] *Geographic Encyclopedic Dictionary. Concepts and terms.* Ed. by A.F. Treshknikov. Moscow: 1988. P. 56.

Table 1. The structure of the scientific and technological space as a system

No.	Subsystem	Contents	Subjects of the subsystem	Indicators assessing the state of subsystem
1.	Knowledge generation	Set of entities, reproducing and generating knowledge and technology	Research establishments; universities	Number of scientific and research organizations; number of patents received, etc.
2.	Personnel	System of training ("growing") personnel for scientific, scientific-technical and innovative activities	State; infrastructure; universities; research establishments	Share of people engaged in research and development in total of the employed population; share of young researchers in total; number of graduates of engineering specialties, etc.
3.	Financial	Set of financial organizations and resources for R&D (private, public)	Producer; infrastructure; state	Share of R&D expenditures in GDP; share of enterprises, received government support; financial structure by sources, etc.
4.	Material and technological	Set of entities, participated in the production of innovative products and commercialization of R&D results	Producer; infrastructure; universities; research establishments	Share of organizations implementing technological innovations; level of innovative activities, etc.

Source: own compilation.

potential, achieving state priorities and leveling out the imbalances in the development of space subsystems.

Previous studies in the field of scientific and technological development [3; 22] allow concluding that STSp should be considered from a systematic approach. STSp consists of the following structural elements (subsystems): material and technological, financial, personnel, and knowledge generation *(Tab. 1)*. In addition, from the authors' point of view, it is the financial subsystem that plays the key role in the structure, as it forms payroll fund for the personnel subsystem, ensure knowledge generation with the necessary resources, and provides opportunities for the commercialization of R&D results.

Research Methods

The methodological basis of the work is the concept of the systematic approach, providing the necessary comprehensiveness of assessing the current level of scientific and technological development, as well as allowing its study from the point of view of the spatial aspect.

We used a set of methodological approaches, ensuring the necessary comprehensiveness of assessing the strengthening of the role of the new industry revolution in the development of production, increasing the efficiency and competitiveness of the Russian economy in the context of the transition to a new technological paradigm.

The research data base was the program documents of Russia's socio-economic development, analytical materials of government and management authorities, official documents of the government of the Russian Federation, and other federal authorities. Rosstat statistical materials, analytical materials on the stated problem, works of leading domestic and foreign scientists in the field of spatial, scientific, technological and innovative development of territories are used as information sources.

The research is based on the systematical approach to studying the problem of forming a unified scientific and technological space. A number of general scientific methods have been applied (for example, analysis and synthesis, comparison, etc.) which allows providing the necessary depth and comprehensive elaboration. When studying the theoretical and methodological foundations of the formation of scientific and technical space, determining its role in the economic development of Russia, the authors used such methods as a literature review, a systematic approach, etc., when processing factual material – tabular and

graphical methods, as well as statistical and comparative analysis, building trends which together will provide the necessary depth, reliability of results and validity of conclusions. Project approach, logical and generalization methods were taken as a basis, when developing measures and tools.

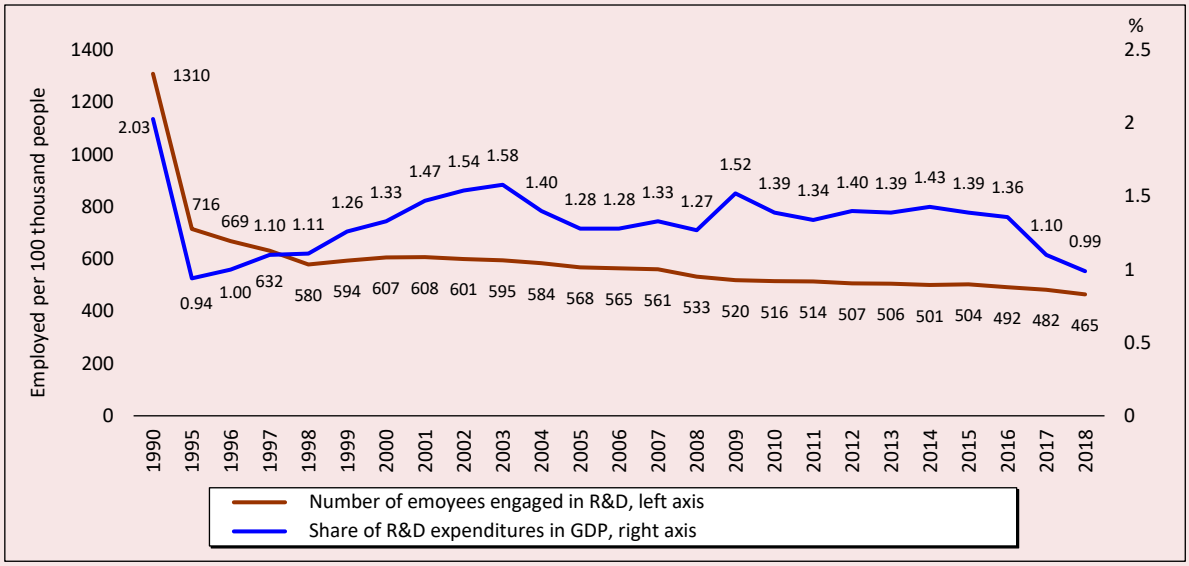
The research of the financial subsystem is based on the usage of various methods of statistical accounting. As noted above, the financial subsystem is a set of financial organizations and resources for conducting research and development, i.e. the institutional environment and the resource (in this case, financial) base. Therefore, the share of domestic R&D expenditures in GDP, gross domestic R&D expenditures by funding sources, the share of enterprises that received state support for innovation, and the budgets of programs of support institutions operating in Russia should be singled out as key indicators for assessing the state of this subsystem.

Research Results

Russia's transition to a market economy system was accompanied by serious shocks in all areas of social life. The research and development (R&D) sector also experienced negative trends. At the same time, the changes that were outlined 30 years ago, by and large, could not be overcome. Internal R&D expenditures fell from 2% to 1% of GDP, and a number of R&D personnel decreased threefold *(Fig. 1)*. If the expenditures on R&D exceeded 1.5% of GDP in 2003 and in 2009, in 2018 this indicator turned out to be at the level of 1995 – 0.99% against the background of the launching the "Science" national project (one of the aims of which is to outstrip the growth of domestic expenditures on research and development in comparison with GDP growth).

Multidirectional vectors in the main processes are revealed when comparing Russia with other countries. Thus, the share of domestic R&D expenditures in the GDP of the leading countries showed moderate growth. For example, in 30 years, China was able to move from zero to the position of one of the world leaders in this indicator *(Tab. 2)*. On the contrary, the opposite situation is observed in Russia.

Figure 1. Share of R&D expenditures and number of employees engaged in R&D in 1990–2018



Source: Rosstat data.

Table 2. Share of domestic R&D expenditures in the GDP, %

Country	1990	1995	2000	2005	2010	2015	2018	2018–1990
Japan	2.96	2.92	3.00	3.31	3.36	3.59	3.26	0.3
Germany	2.75	2.19	2.47	2.51	2.82	2.90	3.13	0.38
USA	2.65	2.51	2.71	2.51	2.82	2.74	2.83	0.18
China	–	0.57	0.90	1.32	1.70	2.05	2.19	1.62
Russia	2.03	0.85	1.05	1.07	1.25	1.13	0.99	-1.04

Source: *Science Indicators 2020: Stat. Coll*. L.M. Gokhberg, K.A. Ditkovskiy, E.I. Evnevich and others. National Research University "Higher School of Economics". Moscow: NRU HSE, 2020. P. 336.

Table 3. Number of employees engaged in R&D*, person per 10 thousand people

Country	1990	1995	2000	2005	2010	2015	2018	2018/1990, %
Germany	54	56	59	58	67	74	85	157.81
Japan	73	76	71	70	69	70	71	97.17
Canada	42	49	55	68	68	63	60	143.37
Russia	131	82	69	64	59	57	52	40.07
China	-	6	7	10	19	27	31	5.2 times**
South Korea	-	34	30	94	125	84	97	2.9 times**

* Here and later, the indicator "employees engaged in R&D" means all specialists, involved in scientific and scientific-technical processes: researchers, engineers, and support staff.
** 2018 to 1995.
Source: *Science Indicators 2020: Stat. Coll*. L.M. Gokhberg, K.A. Ditkovskiy, E.I. Evnevich and others. National Research University "Higher School of Economics". Moscow: NRU HSE, 2020. P. 336.

Russia is practically the only country among developed and developing countries that has demonstrated the decrease in a number of people employed in R&D by 79 people per 10 thousand people in the previous 28 years *(Tab. 3)*. Thus, the share of those employed in R&D has more than halved.

The resulting indicator of scientific and technological activity is a number of publications in leading international data base. Thus, in Russia, on average, there are only 2 articles in journals published in WoS and Scopus per 100 people employed in R&D *(Tab. 4)*. At the same time, the situation has not fundamentally changed since 2010. China is one of the global leaders according to this indicator (on average, one article per person employed in R&D).

In terms of a number of patent applications for inventions, Russia lags behind Germany almost twice *(Tab. 5)*. China has increased a number of applications by 30 times since 2000, while Russia has only increased by 30%. At the same time, this indicator is declared one of the key ones in the "Science" national project, according to which Russia should take the 5th place in the world in terms of a number of patent applications by 2024. This issue can only be achieved if the relevant programs and management decisions are effectively implemented in the country. The available data shows that getting into the top five is problematic. The fifth place is occupied by the EU (excluding Germany), the sixth – by Germany.

According to the Organization for Economic Cooperation and Development (OECD) data, only 7% of big companies and 2% of small and medium businesses from the total amount of companies applied for a patent in Russia in 2016–2017[5]. For example, it is 38 and 12% in Germany, in Japan – 36 and 8%. First, this indicates that the greatest activity in the field of intellectual property in Russia occurs in the academic community and scientific, and educational sphere, rather than in the real sector of the economy.

[5] Business Innovation Statistics and Indicators 2019. Available at: https://www.oecd.org/innovation/inno/inno-stats.htm

Table 4. Number of publications in scientific journals indexed in the Web of Science and Scopus, per one employed in R&D, units

Country	2010–2014	2011–2015	2012–2016	2013–2017	2014–2018
Web of Science					
China	2.7	0.0	0.4	4.4	4.6
Germany	0.9	0.2	1.1	1.1	1.1
Japan	0.4	0.0	0.6	0.6	0.6
South Korea	0.3	0.0	0.4	0.4	0.5
Russia	0.1	0.1	0.1	0.1	0.1
Scopus					
China	1.9	5.6	5.6	5.6	5.7
Germany	3.6	1.2	1.2	1.2	1.2
Japan	2.3	0.7	0.7	0.7	0.7
South Korea	0.9	0.4	0.5	0.5	0.5
Russia	1.6	0.1	0.1	0.1	0.1

Source: *Science Indicators 2020: Stat. Coll.* L.M. Gokhberg, K.A. Ditkovskiy, E.I. Evnevich and others. National Research University "Higher School of Economics". Moscow: NRU HSE, 2020. P. 336.

Table 5. Patent applications for inventions filed by national and foreign applicants to the country's patent authorities including triad applications, units

Country	2000	2005	2010	2015	2018	2018/2000
China	51906	173327	391177	1101864	1542002	30 times
incl. triad	87	523	1425	3167	4215**	48 times
USA	295895	390733	490226	589410	597141	201.8
incl. triad	15626	17374	12743	13280	12021**	76.9
Japan	419543	427078	344598	318721	313567	74.7
incl. triad	18263	18932	19295	17340	17591**	96.3
Germany	62142	60222	592445	66893	67898	109.3
incl. triad	7639	7141	5058	4434	4531**	59.3
Russia	28688	32254	42500	45517	37957	132.3
incl. triad	85	91	88	97	98**	115.3

* Patent applications filed simultaneously with EU, USA, and Japan.
** Data on triad application for 2018 are not provided in the statistics. The table shows the values for 2017.
Source: *Science Indicators 2020: Stat. Coll.* L.M. Gokhberg, K.A. Ditkovskiy, E.I. Evnevich and others. National Research University "Higher School of Economics". Moscow: NRU HSE, 2020. P. 336.

Summary comparison of the indicators clearly demonstrates differently vectored development of Russia and the world. Despite some progress in a number of indicators, the problem of reaching the global average growth rate has not been solved, and the achievements of the aims set within the framework of the "Science" national project is unlikely to be reached.

Russia's lag of the developed and developing countries in the scientific and technological development is worsened by the state of domestic STSp. The most obvious and critical problem is a significant level of the regional differentiation in most indicators that characterize subsystems of space *(Tab. 6)*. For example, the difference in a number of people engaged in research and development is 90 times. Compared with 2010, this indicator rather decreased which is largely due to the reduction of researchers in the leading regions. An enormous difference is also observed in the share of internal research and development expenditures in GDP, both in percentage and in ruble terms (it reached 629 times in 2018).

The number of organizations engaged in R&D is more stable in Russia, and, at the same time, despite the reduction of the gap between

Table 6. Some indicators of the state of the scientific and technological space in 2005–2018

Indicator	2005			2010			2015			2018		
	max	min	**Gap, times**	max	min	**Gap, times**	max	min	**Gap, times**	max	min	**Gap, times**
Number of R&D employees, per 10 thousand people	-	-	**-**	209.0	0.3	**686**	194.2	2.0	**98**	162.4	1.8	**90**
Share of R&D expenditures, % GRP	5.02	0.01	**815**	4.80	0.01	**616**	5.94	0.01	**781**	5.64	0.01	**629**
Number of advanced production technologies used, per 10 thousand people	55.1	0.2	**216**	69.1	0.1	**532**	80.4	0.4	**204**	78.4	0.4	**176**
Number of organizations engaged in R&D, per 10 thousand people	0.8	0.0	**34**	0.9	0.0	**25**	0.9	0.1	**16**	0.9	0.1	**17**
Level of innovation activity of enterprises, %	-	-	**-**	34.3	0.8	**43**	24.0	1.6	**15**	33.7	0.2	**189**

Note: the table for each indicator presents maximum and minimum among all entities of the Russian Federation, and the gap between these values.
Source: Rosstat data.

the leading regions and outsiders by half (from 34 to 17 times), the imbalance remains more than serious.

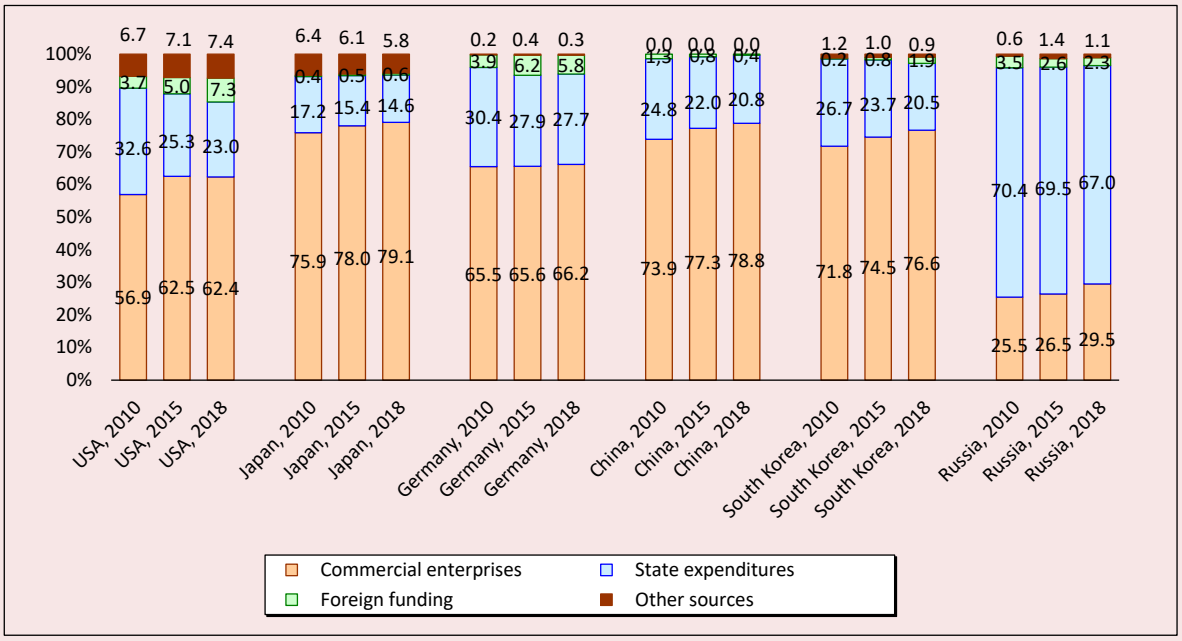
There is also a significant gap in the indicator "a number of used advanced production technologies" (it reached 200 times in 2018). On the one hand, it is logical and understandable, as not all the entities of the Russian Federation are industrially developed. At the same time, the growth rate of the leading regions in this indicator is significantly higher than in other territories which only increase differentiation. Moreover, there are still entities in Russia where the level of companies innovation activity is below 3% (in 2019 – 5 regions), i.e., in fact, modernization processes do not happen there.

Thus, Russia's main internal problem is the significant imbalances in all subsystems of the scientific and technological space. This circumstance turned into logical mistakes in scientific and technological, and innovative development of the territories. The current situation only accelerates negative trends; the regions with richer resources "taking" them from the other territories which increase the imbalance.

Studies of particular scientists [23–26] (including foreign ones [27; 28]) and research teams [29; 30] show that financing of scientific, scientific-technical and innovative activities are the key factor in ensuring an intensive path of economic development. In this regard, as part of our work, we will focus on the financial subsystem of the Russian STSp.

The system of R&D financing in Russia that developed during the period of the planned economy could not but affect its current state. First, we are talking about the financing structure. The main player in the Russian R&D market is the state, which provides two thirds of all expenditures *(Fig. 2)*. This situation is fundamentally different from the situation in the world, where more than 60% of costs are accounted for by the commercial sector. A global trend is increasing the volume of R&D funding by the commercial sector. To a certain extent, this is typical for Russia as well, but the share of private capital in 9 years has grown by only 3 percentage points. Of course, such rates are not enough, but it is possible to change the situation. An example is the experience of China, which switched to a market economy nearly at the same time as Russia: in 2018, the

Figure 2. Gross domestic expenditures on R&D by funding source, %



Source: OECD data. Available at: https://stats.oecd.org/

Table 7. Distribution of the countries by quantity of companies in the world's top 1,000 and their expenditures in 2018

Country	Quantity of companies in rating, unit	Companies R&D expenditures, USD billion	Share of companies' expenditures in total R&D expenditures, %
Japan	160	116.8	68.2
USA	320	328.84	56.5
Germany	44	66.5	49.5
South Korea	33	33.3	33.9
China	133	57.35	10.6
Russia	1	0.28	0.7
Source: The Global Innovation 1000 study. Available at: https://www.strategyand.pwc.com/gx/en/insights/innovation1000.html			

share of government spending on it accounted for only 20% of all spending on research and development.

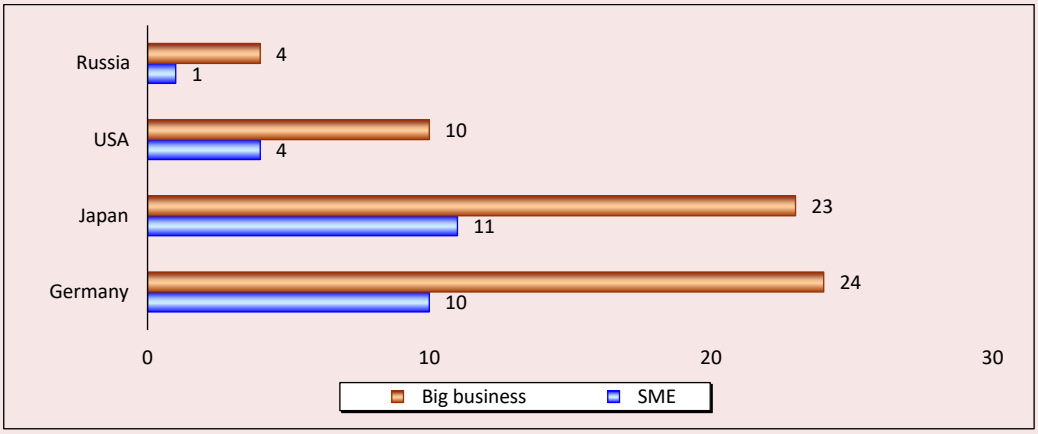
The existing financial structure is also characterized by the fact that only one Russian company (PJSC Gazprom) is in the top 1,000 companies in the world in terms of R&D expenditures, and its share is 0.7% *(Tab. 7)* in the total expenditures of the state. The global picture proves that the most of the R&D expenditures are carried out by the biggest national companies.

Despite the fact that about two thirds of R&D expenditures are budgetary in Russia, the biggest share of the funds remains in the state structures. For example, only about 1% of small and medium business and 4% of big companies received state support for innovation in 2017 *(Fig. 3)*.

As a result, companies lack resources to develop technologies and launch innovative projects which are reflected in a low level of innovation activity in Russia. According to OECD data[6], only 5% of SMEs and 25% of

[6] Business innovation statistics and indicators 2019. Available at: https://www.oecd.org/innovation/inno/inno-stats.htm

Figure 3. Share of companies that received state support for innovation, %



Source: OECD data. Available at: https://stats.oecd.org/

big companies in the country are innovatively active (in the USA – 64 and 73%, respectively, in Germany – 62 and 91%, and in Japan – 41 and 66%).

As already mentioned, the financing problem at the regional level is worsening by significant imbalances in the financial provision of R&D. The difference between leading and outsider regions is 140–150 times. The share of internal expenditures on research and development is less that 1%GRP in 76% (62 of 81) of Russian regions (in some regions, it is less than 0.1%, for example, in the Vologda Oblast – 0.07%). Only 7% of regions spend more than 2% of GRP for this purpose. This situation significantly differs from the foreign experience. For example, in Germany, the share of R&D expenditure exceeds 1.5%[7] in the GRP of 15 out of 16 federal states (in Saxony-Anhalt, it is 1.49%). The difference between the maximum and minimum was 6.2 times.

The main funding share for science and technology falls on the federal budget due to the limited budgetary resources in the constituent entities of the Russian Federation. The Russian Science Foundation, the Russian Fundamental Research Fund, and Grants Council of the President of the Russian Federation carry out grand financing of projects of researchers and science teams by competition. The Foundation for Assistance to Small Innovative Enterprises in Science and Technology and the Skolkovo Foundation provide funding for start-ups and developments of small innovative companies. Innovative and scientific-technical elaborations of medium and big companies can be partially financed through the relevant ministries or organizations operating their support measures (for example, RVC JSC, Skolkovo Foundation, Russian Fund for the Development of Information Technologies).

The Industrial Development Fund (IDF) and VEB RF provide concessional loans as co-financing of projects, aimed at introducing advanced technologies, creating new products or organizing import-substituting. The Ministry of Industry and Trade of the Russian Federation and the Ministry of Economic Development of the Russian Federation pursue subsidizing interest rates under credit and leasing agreements.

In common, the reviewed infrastructure organizations demonstrate positive dynamics of budgets for programs to support scientific and technological development. In particular,

[7] According to Federal Statistical Service of Germany.

Table 8. Support Program Budgets in 2015–2019 at constant prices in 2019, billion rubles

Support Program Budget	2015	2016	2017	2018	2019	Growth rate, 2019 to 2015, %
Russian Science Foundation	8.82	16.3	20.2	22.36	20.8	235.81
Russian Foundation for Basic Research	12.2	10.9	10.82	19.7	22.2	182.17
Innovation Promotion Fund	9.86	6.61	6.45	8.24	12.8	129.75
Skolkovo Foundation	н/д	9.14	7.3	6.6	n/d	72.15
JSC Rusnano	н/д	29.38	9.55	12.87	n/d	43.8
Ministry of Industry and Trade of RF	153.06	166.41	163.15	315.64	360.31	235.4
Industrial Development Fund	22.17	17.73	23.31	28.44	34.5	155.63

Sources: Annual reports of the RSF. Available at: http://www.rscf.ru/ru/documents/; http://www.rscf.ru/ru/archive/ ; Annual reports of the RFBR. Available at: https://www.rfbr.ru/rffi/ru/documents; https://www.rfbr.ru/rffi/ru/documents/n_770; Official website of Innovation Promotion Fund. Available at: www.fasie.ru; Annual reports of JSC "Rusnano". Available at: https://www.rusnano.com/about/highlights/annual-report; Annual reports of the Skolkovo Foundation. Available at: http://sk.ru/foundation/results/annual_reports_ru/p/annual_report_2018.aspx; Official website of Industrial Development Fund. Available at: www.frprf.ru; Annual reports of JSC "Rusnano". Available at: https://www.rusnano.com/about/highlights/annual-report.

for 2015–2019, the budget of the Russian Science Foundation and the Ministry of Industry and Trade of the Russian Federation increased by more than 2.3 times *(Tab. 8)*, the Russian Foundation for Basic Research – by 80%, the IPF – by 29.4%. At the same time, the budget of JSC Rusnano decreased by more than 55% in 2015 – 2018, and the Skolkovo Foundation – by 25%. The total volume of loans issued under the programs of the Industrial Development Fund amounted to 34.5 billion rubles in 2019 which is 55.6% higher than in 2015.

The Innovation Promotion Fund acts in accordance with the approved state assignment[8] which establishes that annually the share of constituent entities of the Russian Federation, legal entities and individuals from which participate in the Fund's tenders, should be 80%, and the share of funding for regional projects (from constituent entities of the Russian Federation, except Moscow) – 60%.

The Skolkovo Foundation finances only their residents' projects (persons, registered in the territory of Skolkovvo, Moscow). 80% of the entities of RF annually receives financial support from the Ministry of Industry and Trade of the Russian Federation, and the budget share, allocated to the business entities registered in Moscow, is on average 20–25% (in 2019% it was 20.9%). Moreover, the authors revealed that the same enterprises annually receive the support in various fields in 2016–2019 by analyzing the results of selections for the programs of the Ministry of industry and trade of the Russian Federation. This is due to the complexity and closeness of competitive selection procedures.

This financial distributions in the entities of RF additionally confirm the significant differentiation of the country's territories in terms of opportunities for scientific and technological development, as well as the existence of a pronounced "growth pole".

The causes lie in a number of factors. First, about 20%[9] of manufacturing and IT companies are redistricted in Moscow which is largely due to more comfortable business conditions, availability of technological infrastructure and personnel. As a result, Moscow is one of the leaders in creating innovative companies. Second, the State regulates fund distributions between the entities, but allowed relation does not contribute to the scientific and

[8] Source: *Official website of Innovation Promotion Fund.* Available at: http://fasie.ru/fund/normativnye-dokumenty/ (accessed: September 9, 2020).

[9] Authors' calculations are based on: *Regions of Russia. Social and Economic Indicators, 2019: Stat. Coll.* Available at: https://rosstat.gov.ru/folder/210/document/13204 (accessed: August 18, 2020).

technological development of the territories, as 60% of the resources is for 84 entities of RF and 40% – for 1 entity. Third, there is still a lack of awareness in the regions about existing federal support measures and possibilities to receive them.

For example, according to the survey in the Vologda Oblast [10], the share of enterprises using various support forms does not exceed 11%, despite a plenty of support measures and state funding. One of the main reasons entrepreneurs noted lack of relevant projects (42.5%), lack of confident in the possibility of receiving funds (28.8%), lack of awareness about support measures (16.4%), and lack of qualifies specialists in preparing documentation (15.1%).

In these circumstances, the main issue is to step up efforts to attract additional funding, including federal funding, as the main source for R&D. Expanding the presence of enterprises in various selections increases competition for preferential funds and, as a result, the efficiency of their distribution by selecting the objectively best projects that contribute to the economy development of the regions and the country as a whole.

Scientific, technological, and innovative projects are characterized by a high level of risks associated with non-achievements of the indicators which, in return, determines possible commercial success of the studies. The state financing system in Russia does not imply a project's failure; having only an idea or preliminary research, the project executor should commit to improving technical parameters, selling an innovative product, and expanding the company's personnel. In this regard, the tool for venture financing of innovative projects at the pre-seed and seed stage has been seriously spread in developed countries. There is a number of venture funds operating in the Russian Federation, but most of the financing of scientific and technological projects is carried out by funds with state participation, namely those managed by RVC JSC.

The company's revenue from its core business amounted 933.8 million rubles in 2018, which is 63.6% lower than in 2015 *(Tab. 9)*. At the same time, 942.2 million rubles was allocated for investment purposes, which is 8% lower than in 2017. Other income of RVC JSC from exchange rate differences, interest receivable, targeted subsidies, etc. exceeded revenue from its core business by 3.4 times, reaching 3194.5 million rubles in 2018 (3.4 times more than in 2015). In addition, other expenses are comparable to other income (2514.8 million rubles in 2018), which is 32.4 times higher than in 2015.

Thus, financial results of activity of RVC JSC are unstable. For example, in 2015 and 2017, net profit was received and dividends were paid in the amount of 752.4 and 138.3 million rubles, respectively. As a result, there was a loss, and no dividends were paid in 2016 and 2018.

The revenue sources of RVC JSC are mainly interest on deposits, accumulated coupon income on Federal loan bonds, and payments on shares (CSIF). At the same time, 5.9 billion rubles were placed on deposits in 2018, which is 2.6 times lower than in 2016[11]. The amount of subsidies allocated from the Federal budget increased 20 times in 2017, and the trend toward growth continued in 2018.

The RVC JSC payroll fund increased by 55% by 2018 compared to 2015, and a number of employees increased by 32% to 181 people *(Tab. 10)*. As a result, the average monthly salary of an employee of RVC JSC in 2018 amounted to 274,2 thousand rubles, which is 17.5% higher than in 2015.

[10] According to the survey "Monitoring of scientific and technological activities in the Vologda Oblast", conducted by FSBIS VolRC RAS in 2018 among heads of enterprises in the Vologda Oblast. A number of respondents is 100 people.

[11] According to the annual reports of RVC JSC in 2016–2018. Available at: https://www.rvc.ru/about/disclosure/(accessed: August 15, 2020).

Table 9. Results of financial activity RVC JSC, million rubles

No.	Indicator	Year				Changes, 2018 to 2015,%
		2015	2016	2017	2018*	
1	Revenue, incl.:	2 543.5	2 132.8	2 072.0	933.8	- 63.6
1.1	Interest from deposit	no data	no data	1 300.4	86.7	–
2	Cost Price	1 047.7	1 252.2	1 023.6	955.1	- 8.8
3	Income from participation in other organizations	–	–	–	95.0	–
4	Interest receivable	27.4	62.0	468.0	725.8	+ 26.5 times
5	Other income	908.0	591.9	182.0	2 373.7	+ 2.6 times
6	Other expenses	77.7	1 279.7	748.2	2 514.8	+ 32.4 times
7	Net profit	1 504.8	- 243.3	276.6	- 140.8	- 109.4
8	Viability of activities, %*	143.6	–	27.0	–	–
9	Dividends	752.4	0	138.3	0	–

* Calculated as the ratio of net profit (item 7) to cost price (item 2).
Source: data of the annual accounting statements of RVC JSC in 2016–2018. Available at: https://www.rvc.ru/about/disclosure/ (accessed: August 15, 2020).

Table 10. RVC JSC payroll fund

No.	Indicator	Year				Changes, 2018 to 2015, %
		2015	2016	2017	2018	
1	Personnel number, people	137	168	193	181	+ 32.1
2	Payroll fund, million rubles	383.7	537.1	712.7	595.6	+ 55.2
2.1	Labor costs for the main type of activity, million rubles	298.0	400.0	572.2	473.2	+ 58.8
2.2	Remuneration for executives (executive expenses), million rubles	85.7	137.1	140.5	122.4	+ 42.8
3	Average monthly salary, thousand rubles/ person	233.4	266.4	307.7	274.2	+ 17.5

Source: data of RVC JSC annual reports in 2016–2018. Available at: https://www.rvc.ru/about/disclosure/ (accessed: August 15, 2020).

Analysis of the results of RVC activities showed significant underfunding of the scientific and technological sphere due to the "freezing" of funds on deposits, including foreign currency (more than 9.7 billion rubles at the end of 2018). The formation of such reserves hinders the pace of scientific and technological development and does not help to overcome the accumulated gaps in this area.

The importance of progress in mechanisms for direct and venture capital financing of scientific and technological development was outlined by the President of the Russian Federation in his Address to the Federal Assembly on January 15, 2020. In particular, the need to consolidate the entrepreneur's right to risk is emphasized; an unsuccessful implementation of the idea does not automatically mean misuse of funds with subsequent possible criminal prosecution.

Suggestions

Formation of the regional funds for scientific, scientific-technical, and innovative activities

In our opinion, a network of specialized institutes of resource support for applied research and development should be formed in the regions. As one of the examples, the experience of Germany can be used, where regions (federal states) act as full and active participants in the management of scientific, technological and innovative activities. Thus, "the ability of the lands includes financing of vocational education and fundamental research in universities, as well as regional innovation programs. The federal government is responsible for the strategic course in the

development of R&D, and the system of measures to support at the required level the innovative activity of enterprises, carried out through state banks"[12].

One of the effective and legitimate methods for activating science funding in Russian regions can be the creation of the regional funds to support scientific, scientific-technical, and innovative activities. There are necessary regulatory and legal conditions for the formation of funds in Russia. For example, the article no. 262 of the Internal Revenue Code of the Russian Federation regulates the issues, related to expenditure records of enterprises for R&D. According to the paragraph 2 of the article no. 262, such expenses include deductions for the formation of funds to support scientific, scientific-technical and innovative activities, created in accordance with the Federal Law no. 127-FZ "On science and state scientific-technical policy", dated August 23, 1996, in the amount of no more than 1.5% of income from sales of products.

The article 15.1 of the Federal Law "On science and state scientific-technical policy" states that "... funds may be created by the Russian Federation, entities of the Russian Federation, physical persons and (or) legal persons in the organizational and legal form of the Fund...".

The calculations show that the formation of regional funds to support scientific, scientific-technical and innovative activities at the expense of deductions from the revenue of industrial enterprises will grow the internal volume of expenditures on research and development per person on average in the subjects of the Russian Federation in the amount of up to 6.8 times. The share of corresponding expenditures in the GDP structure can be increased from 0.99 to 2.42% (if 1% of revenue is deducted). The relative volume of research and development expenditures in the structure of GDP will begin to approach the values of the leading countries of the world. Increasing the volume of internal research and development expenditures will help to sharply reduce the level of regional differentiation in this indicator. The gap between territories with the maximum and minimum per capita expenditures can be reduced from 140–150 to 16 times, and between the maximum and average from 16.0 to 5.1 times.

This solution certainly requires additional elaboration. It does not take into account the specific of the territorial development in the processes of creating regional funds in its current form, as not every region can provide a significant level of expertise, etc. to organize the R&D support institute. Moreover, not every entity of the Russian Federation has the necessity for similar structures and funds. This, as well as a number of other aspects, is planning to be investigated and provided at the next research stages.

Increasing the availability of federal funding sources of STSp in the regions

Given the limited resources of the region, targeted support for developers and enterprises requires organizing a system to ensure the availability of federal budget funds for the scientific and technological development of territories. On the one hand, this system should ensure active interaction between regional and federal authorities in order to inform about current and prospective forms of support, terms and conditions for their provision. On the other hand, it is necessary to work directly with the subjects of innovative activity in order to identify promising projects that contribute to the socio-economic development of the regions.

[12] National system of innovation of Germany. *Official website of almanac "Production Management"*. Available at: http://www.up-pro.ru/library/innovations/national_innovative_organizations/nacyonalnaja-inn.html

For effective organization of activities in this direction, an operating algorithm was created for working with manufacturing enterprises which includes five steps:

1) technological audit of enterprises and developers, analysis of their financial condition;

2) selection of support measures that are appropriate for a particular innovation entity, explanation of conditions, possibilities and obligations;

3) formation of the project concept and its "packaging" to the requirements of the financing organization;

4) coordination of the project participations' work during its implementation;

5) support of project implementation at all stages.

The implementation of these directions will allow manufacturing enterprises to attract the necessary resources under the optimal conditions, reduce the project operation time and, as a result, increase the efficiency of their activities and contribute to the economy, and support to the achievement of national goals of scientific and technological development. However, the realization of this initiative requires a separate study which should begin with an examination of the institutional framework and normative and legal regulation which is planned in future work.

Improving the efficiency of venture capital activities in RF

The most important issue should be a strategy approval for the development of the Russian venture market up to 2030 which was started in December 2018. Moreover, it is necessary to legislate the permissible norms of non-return of budgetary funds when financing innovative projects (or proportion of the entire budget of the venture fund to the profit received from the implementation of startups), as well as to define responsibility areas (including criminal) both for developers and infrastructure organizations (funds). The uncertainty of market and technological prospects is taken into account in the implementation of innovative projects that may result in the loss of financial and other resources. It is worth dividing the permissible norms depending on the financing stage of innovative projects; the research and development stage has been carried out, R&D is planned; risks and the non-return rate are higher; laboratory research (R&D) has been carried out; we plan to create an industrial design and test it; the risks are lower, respectively, and the rate of no-return, too, etc. Thus, the norms are not subject to spatial differentiation and should be the same in all entities of the Russian Federation.

Another element of changing the regulatory framework should be the standard establishment for the amount of funds for replacing on the deposits (for example, no more than 0.5–1% of the budget), including securing responsibility for not attracting targeted funds into economic circulation for public and public-private organizations that provide financing (relevant primarily for joint-stock companies with state participation). Determination of the types of responsibility and the mechanism of attracting to it requires additional study of the regulatory legal acts regulating the activities of venture organizations which will be carried out at the next stages of the study.

It is also important to increase the transparency of the activities and financing conditions offered by venture enterprises. Acceleration programs have been actively elaborated in Russia in recent years in which educational intensive is organized for teams for their projects realization, as well as project presentations are held to potential investors. The program conditions are set before the beginning of the project selections and are available to all potential participants. At the same time, financing programs of particular venture funds remain unpublished in open sources, and fund specialists close information

about them. Thus, this market works on the basis of developing financial proposals for a particular project. However, in the authors' opinion, the unavailability of specific and correct information about venture financing programs hinders the venture market evolution (lack of demand).

Conclusion

Summing up, it is worth emphasizing once again that Russia's scientific and technological development which is based on the unified space concept can be the main driver and catalyst for changes in scientific, scientific and technological, and innovative activities in Russian regions that will contribute to improving the competitiveness of the Russian economy in world market and, consequently, sustainable economic growth.

The presented research is complex. Its results contribute to the expansion and systematization of the theoretical foundations of scientific and technological development, and, firstly, in the application of the spatial approach. In addition, applied solutions have been developed to optimize work of financial subsystem of scientific and technological space which can be used both in the authority and administration activities, and while adjusting the "Science" national project and other strategic documents.

References

1. Mazilov E.A., Sheng F. Scientific and technological potential of the territories of Russia and China: Assessment and development prospects. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast,* 2018, no. 1, pp. 70–83 (in Russian).
2. Uskova T.V., Lukin E.V., Vorontsova T.V., Smirnova T.G. *Problemy ekonomicheskogo rosta territorii: monografiya* [Issues of Economic Growth of the Territory: Monograph]. Under editorship of T.V. Uskova. Vologda: In-t sotsial'no-ekonomicheskogo razvitiya territorii RAN, 2013. 170 p.
3. Gulin K.A., Mazilov E.A., Alfer'ev D.A., Kvitko K.B. *Nauchno-tekhnologicheskoe prostranstvo i prognozirovanie ego razvitiya v usloviyakh global'noi konkurentsii : monografiya* [Scientific and Technological Space and Forecasting its Development in the Context of Global Competition: Monograph]. Vologda: VolNTs RAN, 2018. 203 p.
4. Schumpeter J.A. The theory of economic development: An inquiry into profits, capital, credit, interest and the business cycle. *Harvard Economic Studies*, 1934, vol. 46.
5. Kondratieff N.D. *Bol'shie tsikly kon"yunktury i teoriya predvideniya: izbrannye Trudy* [Long Cycles of Business Activity and the Theory of Foresight: Selected Works]. Moscow: Ekonomika, 2002. 767 p.
6. Hägerstrand T. Innovation diffusion as a spatial process. Postscript and translation by A. Pred. Chicago and London: University of Chicago Press, 1967. 334 p.
7. Perry F. Diffusion of innovation and regional economic growth. *The Annals of Regional Science*, 1998, vol. 5.
8. Glaz'ev S.Yu., L'vov D.S., Fetisov G.G. *Evolyutsiya tekhniko-ekonomicheskikh sistem: vozmozhnosti i granitsy tsentralizovannogo regulirovaniya* [Evolution of Technical-Economic Systems: Possibilities and Boundaries of Centralized Regulation]. Moscow: Nauka, 1992.
9. Glaz'ev S.Yu. *Strategiya operezhayushchego razvitiya Rossii v usloviyakh global'nogo krizisa* [The Strategy of Accelerated Development of Russia in Conditions of the Global Crisis]. Moscow: Ekonomika, 2010. 255 p.
10. Porter M.E. Clusters and the new economics of competition. *Harvard Business Review*, 1998, vol. 76, no. 6, pp. 77–90.
11. Freeman C., Clark J., Soete L. *Unemployment and Technical Innovation: A Study of Law.* London, 1982. 214 p.
12. Lundvall B-Å. (ed.) *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning.* London: Pinter Publishers, 1992. 317 p.
13. Nelson R.R. (ed.) *National Systems of Innovation: A comparative Study.* Oxford: Oxford University Press, 1993. 541 p.
14. Mil'kina I.V. Theoretical foundations of the formation of a strategy for innovative development of the territory. *Innovatsii=Innovations,* 2007, no. 10(108), pp. 81–87 (in Russian).

15. Lenchuk E.B. Problems of transition to an innovative development model in post-soviet states. *Problemy prognozirovaniya=Studies on Russian Economic Development,* 2006, no. 4, pp. 126–145 (in Russian).
16. Ignatushenko E.I. *Obshchee evropeiskoe nauchno-tekhnicheskoe prostranstvo i rol' Rossii* [Common European Scientific and Technological Space and the Role of Russia]. Moscow: MAKS Press, 2014. 180 p.
17. Sokolov M.S., Surilov M.N. The problems of forming of united scientific and technological space of the Union State of Russia and Belarus. *ANI: ekonomika i upravlenie=ASR: Economics and Management*, 2018, no. 3 (24), pp. 263–266 (in Russian).
18. Ivanov V., Markov A. Ways of forming a common scientific and technological space of Belarus and Russia. *Nauka i innovatsii=The Science and Innovations*, 2011, no. 6 (100), p. 46 (in Russian).
19. Granberg A.G. Economic space of Russia: Eternal problems, transformation processes, search for a strategy. *Ekonomicheskoe vozrozhdenie Rossii: periodicheskoe nauchnoe izdanie=Economic Revival of Russia,* 2004, no. 1, pp. 16–22 (in Russian).
20. Biyakov O.A. *Teoriya ekonomicheskogo prostranstva: metodologicheskii i regional'nye aspekty* [The Theory of Economic Space: Methodological and Regional Aspects]. Tomsk: Tomskii universitet, 2004. 152 p.
21. Parinov S.I. *K teorii setevoi ekonomiki* [On the Theory of Network Economy]. Novosibirsk: IEOPP SO. RAN, 2002. 168 p..
22. Mazilov E.A., Sakhanevich D.Yu. The structure and elements of the scientific and technological space. *Korporativnaya ekonomika=Corporate economy*, 2020, no. 2(22), pp. 4–13 (in Russian).
23. Eriashvili N.D., Mailjan S.S. Investments and innovations in system of economic safety. *Vestnik Moskovskogo universiteta MVD Rossii=Vestnik of Moscow University of the Ministry of Internal Affairs of Russia*, 2011, no. 12, pp. 71–77 (in Russian).
24. Asmolova M.S., Dedov S.V. Theoretical approach to the institutionalization of forms of governance resource provision of innovative activity. *Vestnik VGUIT=Proceedings of the Voronezh State University of Engineering Technologies,* 2016, no. 4, pp. 422–426 (in Russian).
25. Vikhoreva, O.M., Karlovskaya, S.B. Innovation-Based economic development financing in modern world. *Vestnik Moskovskogo universiteta. Seriya. 6. Ekonomika=Moscow University Economics Bulletin*, 2011, no. 4, pp. 98–110 (in Russian).
26. Aganbegyan A.G. Six steps needed to recover social and economic growth and overcome stagnation, recession and stagflation. *Den'gi i kredit=Russian Journal of Money and Finance,* 2015, no. 2, pp. 7–13 (in Russian).
27. *Fostering Innovative Entrepreneurship. Challenges and Policy Options.* United Nations. Geneva, 2012. 68 p.
28. Takalo T., Tanayama T. Adverse selection and financing of innovation: Is there a need for R&D subsidies? *The Journal of Technology Transfer*, 2010, vol. 35, no. 1, pp. 16–41.
29. *Finansovoe obespechenie razvitiya nauchno-tekhnologicheskoi sfery* [Financial Support for the Development of the R&D Sphere]. Under editorship of RAS corresponding member L.E. Mindeli. Moscow: In-t problem razvitiya nauki RAN, 2018. 216 p.
30. Grachev S.A., Fraimovich D.S., Donichev O.A. Areas of resource provision for innovative activity of socio-economic systems. *Ekonomicheskii analiz: teoriya i praktika=Economic Analysis: Theory and Practice*, 2016, no. 8, pp. 108–119 (in Russian).

Information about the Authors

Evgenii A. Mazilov – Candidate of Sciences (Economics), Deputy Director, Head of Department, Leading Researcher, Vologda Research Center of the Russian Academy of Sciences (56A Gorky Street, Vologda, 160014, Russian Federation; e-mail: eamazilov@mail.ru)

Arina A. Davydova – Head of the Center for Technology Transfer and Commercialization, Junior Researcher, Vologda Research Center of the Russian Academy of Sciences (56A Gorky Street, Vologda, 160014, Russian Federation; e-mail: arina.davydova.1992@mail.ru)

Received September 14, 2020.

DOI: 10.15838/esc.2020.5.71.4
UDC 338.264; LBC 65.050

Management Tools for the Region's Socio-Economic Development

Georgy A.
BORSHCHEVSKIY
Russian Presidential Academy of National Economy and Public Administration
Moscow, Russian Federation, 82, Vernadsky Avenue, 119571
E-mail: ga.borshchevskiy@igsu.ru
ORCID: 0000-0001-9099-9847; ResearcherID: J-6974-2014

Abstract. The purpose of the research is to assess the focusing of existing management tools on socio-economic development (SED) of the Russian Federation constituent entity. The practical rationale of the research is caused by general problems of regional development and the need to develop methodological approaches to their solution. The author used qualitative methods of cross-sectoral analysis, document analysis, and quantitative methods (those of principal components, variance calculation, correlations, regressions, and index construction). The novelty of the research is related to comparing management tools at the federal and regional levels, as well as to designing a number of administrative staff based on these tools. As a result of the study, the author proposes a method of management tools evaluation (SED strategy, priority projects, state programs), approves the methods of SED indices calculation and public services development, as well as the methods of rationing the number of managerial staff in line with SED priorities. The main conclusion is that the assessment of stated goals' achievement is complicated by a low level of program documents' compliance with official statistics indicators. Since the sectoral distribution of a number of state apparatus employees is not optimal, the author proposes its adjustment, focusing management personnel on achieving region's development priorities. The results obtained are correlated with the labor market trends. The applied forecasting of the employees number is limited by the correctness level of SED and labor productivity target indicators. When developing management tools, the regions are recommended to take into account statistical indicators that are relatively objective and to focus the performers on achieving final socially significant results. The proposed method has the potential to be replicated in the constituent entities of the Russian Federation addressing similar problems in the field of SED.

Key words: constituent entity of the Russian Federation, socio-economic development, strategy, national project, state program, public service.

For citation: Borshchevskiy G.A. Management tools for the region's socio-economic development. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 74–89. DOI: 10.15838/esc.2020.5.71.4

Introduction

The increasing trends of regionalization and decomposition of management decision-making centers [1; 2] make the quantitative assessment of the tools of socio-economic development (hereinafter – SED) at the regional level relevant. A number of provisions of the theory of results-based management [3] and data-based management [4] are applied in the article. The basic hypothesis is based on the assumption that the vertical of power formed in the Russian Federation [5] requires a unity of management tools for its implementation. The study was conducted on the materials of one of the constituent entities of the Russian Federation. The results were discussed with the leaders of the region. The relevance of the research is due to the conceptual changes in the organization of the planning system in the Russian Federation that have occurred in recent years, including the adoption and subsequent improvement of the law on strategic planning (2014)[1], as well as the "May" Decree of the President of the Russian Federation and national projects (2018)[2].

In this article, we do not assess the level of SED indicators achievement and the regional authorities' efficiency. Our goal is to assess the focus of the existing management tools on the region's SED. The mentioned goal may be achieved by means of the following research tasks:

1) evaluating the interrelationships of management tools at the federal and regional levels;

2) checking up the consistency of the region's administrative apparatus structure and its current strategic documents;

3) conducting a statistical assessment of the targets of strategic documents;

4) checking up the degree of relationship between management tools and development of public administration employees.

The results of this analysis are of interest to all constituent entities of the Russian Federation, since they have a comparable set of management tools, and each region now faces the task of improving government efficiency.

Literature review

We should formulate a number of working hypotheses to solve research problems and test the basic hypothesis.

H.1 hypothesis assumes that there is a clear link between SED management tools at the federal and regional levels. Russia is a state with high centralization, which is manifested in the synchronization of management practices [5], so the economies of most regions are dependent on federal budget transfers, and management tools are universal [3]. The model of "soft" federalism, which leaves the solution of many issues at the sub-federal level, does not negate the need for vertical planning [6]. Evaluating management tools is not an easy task [7; 8; 9]. The difficulty is to select a limited set of indicators for the analysis from the array of variables that affect the region's development. For this purpose, generalizing indicators such as gross regional product and human capital are used. In Russia, the priorities of long-term development are fixed in the SED strategy [10].

H.2 hypothesis suggests that there is a link between strategic documents and the structure of the regional management apparatus. Mike Danson and colleagues connect regional development with institutional changes in the system of state power [11]. Vladimir Leksin and Alexander Shvetsov revealed the difference in the concepts of "assessing the level of regional development" and "assessing the efficiency of

[1] On strategic planning in the Russian Federation: Federal Law no. 172-FZ, dated June 28, 2014 (amended on July 18, 2019). *Collection of legislation*. June 30, 2014. No. 26 (part I), art. 3378.

[2] On national goals and strategic objectives of the Russian Federation through to 2024: Order of the President of the Russian Federation no. 204, dated May 7, 2018. *Collection of legislation*.. May 14, 2018. No. 20, art. 2817.

regional management" [12]. Alexey Barabashev [4] notes that results-based management requires clear adherence to socially significant priorities, personal responsibility and reporting in relation to target indicators. Of particular importance is the ability of regional administrations to efficiently implement strategies, programs, and projects [13].

H.3 hypothesis is based on the idea that statistical observation indicators correspond to the targets of strategic documents. This approach is based on the concept of data-driven management, in which panel data is used to analyze and forecast regional development [14; 15; 16]. Accordingly, the usage of quantitative methods is acceptable to the extent that development priorities are recorded in measurable indicators [17; 18]. The unreliability of departmental statistics, along with the incompleteness of data on SED, requires operational and objective supra-departmental statistical data [19].

H.4 hypothesis assumes that management tools are related to development of state and municipal management personnel. The distribution of state employees' number should probably correspond to development priorities. Despite the fact that much attention is paid to the issues of state personnel policy [8; 20], the studies relating the distribution of human resources to SED priorities [21] have not yet gained traction. Experts usually normalize a number of employees on the basis of labor costs [22; 23]. However, in order to implement the results-based management concept, a number of public employees should be clearly related to SED priorities. Not only organizational and personnel changes, but also the level of trust of society and citizens in public servants are characteristic of management staff. In the article, we used the conclusions of some studies devoted to assessing the level of public confidence in the government [24].

Data and methods

To test H.1 hypothesis as a tool of public administration at the federal and regional levels, the following documents were overviewed:

Executive Order of the President of the Russian Federation no. 204 "On national goals and strategic objectives of the Russian Federation through to 2024" (hereinafter – Order no. 204), dated May 7, 2018, prioritizing 13 national projects implemented in most national economic areas in all regions of the country.

Decree of the President of the Russian Federation no. 193 "On evaluating the performance of senior officials (heads of higher executive bodies of the government) of constituent entities of the Russian Federation and activities of executive bodies (hereinafter – EBs) of constituent entities of the Russian Federation" (hereinafter – Decree no. 193), dated April 25, 2019, which contains 15 indicators corresponding to various industries for evaluating senior officials' activities.

SED strategy of the Russian Federation constituent entity until 2030 (hereinafter – the Strategy), approved in 2016, is currently valid in 2018 edition, and it contains 29 SED priority directions. State programs and priority projects of the Russian Federation constituent entity are developed in accordance with the Strategy, and they are management tools for its implementation. State programs for the constituent entity (23) are calculated until the period of 2020–2025, priority regional projects (23) are developed in accordance with national projects and within the framework of the strategy.

Each of these documents highlights the targets that are compared with the targets of other documents. This method is similar to correlation analysis, but it is based on qualitative (target indicator formulations) rather than quantitative indicators. A high degree of compliance indicates that there is consistency.

Employees of the regional apparatus are more focused on the implementation of legal acts of the relevant constituent entity of the Russian Federation than on documents of the federal level. The gap in priorities makes it difficult to implement them effectively.

When testing hypothesis H.2, the priority directions of the Strategy, state programs, and regional projects are compared with the EBs structure, i.e., the region's administrative apparatus. Most areas of public administration involve interdepartmental implementation with the participation of several EB. However, each priority should be assigned to one responsible government agency that organizes the interaction of all involved structures. If a government agency is not responsible for any of the priority areas, then its activities are characterized as supporting and poorly related to achieving SED final results.

Test of the hypothesis H.3 involved comparing the Strategy targets with statistical observation indicators. Official statistics is a tool for planning and ensuring the quality of public administration. Departmental statistics, in addition to the possibility of manipulation, is first, less open and accessible for study, and, second, it is subjected to frequent changes in methodology compared to state statistics. Individual indicators of state statistics are provided by relevant agencies, but such indicators are subjected to external evaluation in Rosstat and can be compared with previous data. For these reasons, the usage of state statistics is preferable to departmental statistics. The source of data on statistical indicators is the federal plan of statistical works, and the values of indicators are taken from Russian Federal State Statistics Service (Rosstat) collections. We analyzed data for more than 10 year period (2005–2018), since it is difficult to judge development trends in a smaller horizon. The low level of compliance between the targets and statistical indicators meant that the implementation of the Strategy, state programs, and priority regional projects is evaluated on the basis of departmental statistics, or that the targets are not subjected to statistical evaluation. Both have a negative impact on efficiency.

While testing hypothesis N.4, we compared the dynamics of priority areas of regional development with development of managerial personnel. It is assumed that the main human resources should be concentrated on SED priority areas.

First of all, *SED index* of the RF constituent entity (I_a) has been calculated using the formula (1):

$$\mathrm{I_a} = \frac{\sum_{i=1}^{\mathrm{N}} \left(\frac{\mathrm{X}_{r,i}}{\mathrm{X}_{b,i}} - 1 \right) \times 100}{\mathrm{N}}, \qquad (1)$$

where: $X_{b,i}$ is the value of i indicator in the base (first analyzed) year, $X_{r,i}$ is the value of i indicator in the reporting (last) year, N is the number of indicators.

The index (1) is based on a set of macroeconomic indicators directly specified in the Strategy. It has been obtained by aggregating statistics indicators that are equivalent to the Strategy targets. Before the aggregation, the indicators have been normalized, i.e. converted to common units of measurement (percentages). The dynamics of most indicators was evaluated positively in the case of growth, but for some of them (mortality, crime, etc.), the decline was considered positive. The index is based on more than 70 indicators covering all priority areas.

The *index of managerial personnel development* has also been calculated (2):

$$\mathrm{I_{pa}} = \frac{1}{T}\sum_t \frac{1}{I}\sum_i \frac{\sum_{i \in a} X_{t,i}}{\sum_i X_{t,i}}, \qquad (2)$$

where: a is a region; i is the number of indicators; $X_{t,i}$ is the value of i indicator for t year; T is the number of years.

State civil and municipal employees (hereinafter employees) of the constituent entity of the Russian Federation are considered as managerial personnel. The possibility of index building is limited to a set of indicators that meet the criteria of objectivity, measurability, comparability, relevance, and statistical independence. The indicators available in the official statistics relate to the employees' number, level of remuneration, and socio-demographic characteristics (gender, age, length of service, and level of education). They are not informative enough in their original form, so they have been transformed into specific indicators for building the index.

Comparison of indices (1) and (2) allowed determining the degree of compliance of the processes described by them in the analyzed years. The growth of both indices with a high degree of statistical correspondence is considered optimal, and the reverse situation is considered negative. The significance of the indicators that make up the indices is estimated by the principal component method.

The relationship in the indices dynamics was evaluated by constructing a pair regression on panel data, where index (1) is the dependent variable, and index (2) is the explanatory one. The model was tested for homoscedasticity by the Durbin–Watson statistic (formula 3), where ε_i is the residuals of the regression model:

$$dw = \frac{\sum_{i=2}^{n}(\varepsilon_i - \varepsilon_{i-1})^2}{\sum_{i=1}^{n}\varepsilon_i^2} \qquad (3)$$

The first-order autocorrelation coefficient is calculated using the formula (4):

$$r(1) = \frac{\sum_{i=2}^{n}(\varepsilon_i \varepsilon_{i-1})^2}{\sum_{i=1}^{n}\varepsilon_i^2} \qquad (4)$$

Having correlated the priority areas of the Strategy with the EBs functions, we found out whether the staff distribution of their employees corresponds to the dynamics of the corresponding areas development. The discrepancy indicated that there were reserves for reallocating employees from overstaffed bodies to those with deficits. In this situation, it is proposed to predict a number of employees using the formula (5):

$$X_i = \left(\frac{1}{|v_{\in i}|}\sum_{v_{\in i}}\left(\frac{1+w_v}{1+\pi_v}\right)^{t/\alpha}\right)^{1/t} - 1, \qquad (5)$$

where: X_i is the forecast of a staff number of the i EBs; $v \in i$ are the fields of regulation branches of the i authority; w_v is the v SED priority directions development index; π_v is labor productivity growth in the v industry; t is the forecasting time-frame; α is labor elasticity coefficient.

The source of data on the forecast values for the priority areas development was the target values of the Strategy indicators by 2030. The forecast of labor productivity dynamics contains a Forecast of the long-term SED of the Russian Federation for the period up to 2030. We understand labor productivity in the meaning used by the Ministry of Economic Development of Russia[3].

The scatter diagrams are based on two parameters: the dynamics of the priority areas development (indicator x) and the share of the employees' number (indicator y). The interpretation is carried out by visual analysis of obtained scatter diagrams.

Results

When testing H.1 hypothesis and studying the strategic documents content in detail, the following trends were revealed.

First, there is a lack of priorities coordination at the federal level: four indicators of Decree no. 193 do not correspond to the national projects, and five national projects do not correspond to the indicators of the Decree.

[3] On amendments to the Methodology for calculating labor productivity indicators of an enterprise, industry, or entity of the Russian Federation: Order of the Ministry of Economic Development of the Russian Federation no. 659, dated October 15, 2019.

Second, the level of compliance of the Strategy with the federal priorities is low: 12 (out of 29) priority areas of the Strategy, do not meet the indicators of Decree no. 193, five indicators of the Decree do not have similar Strategy directions, and seven Strategy directions do not correspond to the national projects.

Third, management tools are partially created. Thus, eight priority regional projects do not meet the indicators of Decree no. 193. It is surprising that there are no priority projects that meet the indicators of attracting investment, labor productivity, fighting poverty, raising wages, population growth, improving housing conditions and the quality of the environment. Regional projects do not correspond to such national projects as "Ecology", "Digital economy", "Demography", "Science", "Comprehensive plan for modernization and expansion of the main infrastructure".

Fourth, nine regional state programs do not meet the indicators of Decree no. 193. There are no programs that correspond to the indicator of "Natural population growth", which is strange for a region where saving people is declared a strategic goal. Seven programs were developed out of touch with the national projects.

Fifth, the high level of correspondence between the Strategy directions and regional projects and state programs is noteworthy.

H.2 hypothesis concerned checking the level of EBs' involvement in the region's SED. There are 39 EBs in the constituent entity of the Russian Federation. Their correlation with the Strategy directions, priority regional projects and state programs is carried out according to their functions (for example: priority direction "Public Health Protection" – national project "Health Care" – regional project "E–Health" – program "Health Development" – Department of Health).

Data indicate that:

1) from one to three departments are responsible for each indicator of Decree no. 193 and the national project, but only about half of them are responsible for implementing the provisions of this decree and the national projects;

2) in some areas of the Strategy, there is more than one government agencies, but in some cases one agency manages two priority areas;

3) a smaller proportion (36%) of government agencies are involved in the implementation of regional projects, although up to three implementing agencies are assigned to each project;

4) each state program has a responsible executor; more than one agency is responsible for the implementation of five programs, but a number of bodies are not involved in the implementation of state programs.

Departments of economic development, health, education, agriculture and food resources are actively involved in the implementation; each department is responsible for several priority areas and projects. The Department of Construction implements two priority projects, while the Department of Labor and Employment is responsible for two regional programs. There are no EBs for several priority areas (such as industry, science, trade); in this case, the Department of Economic Development is in charge. Five government agencies are not involved in SED. There is more than one responsible body in nine priority areas, which may be explained by the unclear division of the departments' functions.

H.3 hypothesis assumed assessing the availability of management tools with the relevant statistical observation tools. It was

revealed that only in two priority areas of the Strategy, all the targets were fully provided with statistical indicators, and two areas do not have statistical correspondences at all. Each area is described by an average of three statistical indicators. The percentage of targets that fully or partially meet statistical indicators was 48.6% (73 indicators). The formation of target indicators is mainly based on departmental, rather than state statistics.

H.4 hypothesis testing required calculating the region's GDP index using the formula (1). The index value increased by 13 p.p. in 2005–2018, and the dynamics coincided with all-Russian trends: a decline in 2008–2009, a slowdown in 2014–2015, and a moderate growth over the entire period. The development indices of 18 priority sectors increased during this period. Accelerated growth was observed in the areas of ICT (118%), tourism (98%) and demography (89%). The index declined in nine areas: primarily in professional education (-134%), finance (-59%) and foreign trade (-42%). Positive SED trends during the period of 2005–2018 can be seen as a consequence of the low base effect after the global recession of the 1990s–early 2000s During the period from 2011 (when the current head of the region took position) prior to 2019, SED growth index was 6.9%, the negative trend was observed for 11 priority areas.

Since 2016 (Strategy approval), the SED index has increased by 7.6%, and the decline is recorded in seven priority areas. In other words, the situation of the region's economy has improved, and this can be interpreted as a recovery process after the 2014–2015 crisis.

The index of managerial personnel development in the region (2) is considered in the context of the state civil and municipal services (*Tab. 1*).

One way to select the main components for further analysis is to select those where the eigenvalues are greater than one. The first principal component ("Share of employees' number...") and second one ("Share of employees' salary...") correspond to this criterion. In total, they explain 89% of data variations. At the same time, if you build the index of public service development only for these two most informative principal components, excluding all the others, the resulting set of indices is less correlated with the dynamics of the SED index compared to the index built for all seven principal components. This indicates that, even at a low level of significance, the remaining principal components have a positive effect on the model.

Let us estimate the relationship in the indices' dynamics by constructing a pair regression (*Tab. 2*).

Table 1. Application of the principal component analysis for macro-variables related to the development of the state civil service of the Russian Federation constituent entity

Indicator	Share of employees' number in the population PC1	Share of employees' salaries from the average in the region PC2	Share of employees with higher education PC3	Share of employees under 40 years old PC4	Share of employees completed training during the year PC5	Share of employees with more than 5 years of service PC6	Level of trust in state employees in the society PC7
Standard deviation	3.583	0.781	0.439	0.031	0.055	0.012	0.000
Share of variance explained	0.701	0.189	0.078	0.015	0.011	0.003	0.0003
Eigenvalue	4.912	1.328	0.548	0.108	0.077	0.022	0.002
Explained variance	0.701	0.892	0.969	0.985	0.996	0.999	1.000
Source: own compilation.							

Table 2. Results of regression on the SED index and the index of development of the state civil service of the constituent entity of the Russian Federation

Regression statistics			Variance analysis					
Multiple R	0.729			Df	SS	MS	F	Significance F
R-square	0.532		Regression	1	101.401	101.401	13.676	0.003
Normalized R-square	0.493		Residue	12	88.968	7.414		
Standard error	2.722		Total	13	190.369			
Observations	14							

	Coefficient	Standard error	t-statistics	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Y-intersection	58.704	11.157	5.261	0.000	34.393	83.019	34.3938	83.015
Civil service development index	0.415	0.112	3.698	0.003	0.17	0.66	0.17	0.66

Source: own compilation.

Regression equation: y = 58.7 + 0.41x. Model interpretation: is as follows if the civil service development index increases by 1%, the value of the SED index increases by 0.41%. The coefficient of determination (R^2) is 0.53, meaning that the model explains more than half of the variations in the dependent variable (the SED index). The multiple correlation coefficient (0.73) means that the observed tightness of the statistical relationship between the factors is at a high level. Approximation error of 2.7% means that the model is highly accurate.

The significance of the model was evaluated using Fischer's F-statistics. The coefficient calculated value (13.676) is greater than the table value (0.004 for a given 95% significance level and 12 degrees of freedom); in other words, the regression equation should be considered significant and it can be used for analysis and forecasting. The significance of the regression equation coefficient was estimated using Student's t-statistics. The calculated coefficient value (3.994) is greater than the table value (2.178); therefore, the coefficient values are significant. The P-value of Student's t-statistic for this coefficient (0.003) is less than the significance level $\alpha = 0.05$, which also indicates the significance of the model. The confidence interval for the coefficient calculated with a 95% confidence probability does not contain zero inside it, since the lower and upper 95% bounds of the confidence interval have the same signs.

Testing the model for homoscedasticity, we should check that the condition for the independence of residues is met using the Durbin–Watson statistic using formula 3. The value of the statistic is in the interval between the table values: $1.045 < 1.082 < 1.350$. There is a criterion for uncertainty, and the hypothesis that there is no autocorrelation in the series can be either accepted or rejected. In such cases, the first-order autocorrelation coefficient is calculated using formula 4. The value of the coefficient (0.313) indicates a moderate close relationship between the neighboring levels of a number of residues, that is, the property of residues independence is fulfilled.

The index of the region's civil service development, calculated using the formula (2), increased by 15 p.p. during the analyzed period. The largest contribution to the index dynamics was made by the indicators of the share of employees who completed training (index increase by 70% in 2005–2018), and the share of employees in population (ratio decrease by 42%). The level of trust is the only indicator showing a negative trend: if 63% of citizens trusted the regional authorities in 2005, then

the figure made up only 58% in 2018. This indicates the direction of further transformation of the power system – increasing openness to society and accountability.

The revealed correspondence of SED trends of the constituent entity of the Russian Federation and civil service development confirms H.4 hypothesis about the relationship between development of the region and its management system. At the same time, the distribution of the EBs civil servants' number of staff in priority areas does not show a statistically significant dependence on the SED dynamics.

As mentioned above, the values of SED index have decreased in seven priority areas during the last period (2016–2018). While, 16% of a total number of employees is concentrated in the management bodies in these areas, and approximately the same share of employees is employed in the seven industries that showed the greatest growth. In addition, more than 16% of employees are employed in bodies that are not involved in the implementation of priority areas (*Tab. 3*).

Let us make a forecast of public servants' number needed for the implementation of SED

Table 3. Actual and projected number of civil servants in priority development areas of the Russian Federation constituent entity

Priority SED area	Economic growth (2016–2018), %	Number of staff (2019), units	Share in a number of staff (2019), %	Economic growth forecast (2019–2030), %	Projected number of staff (2030), units			Projected share in a number of staff (2030), %		
					Conservative	Innovative	Forced	Conservative	Innovative	Forced
Providing the economy and social sector with efficient labor resources	2.1	8	0.3	131.3	4	2	1	0.2	0.2	0.1
Entrepreneurship and competition development	17.5	7	0.3	142.4	2	1	0	0.1	0.1	0.1
Ensuring the population's quality of life	2.8	138	6.1	129	24	12	5	0.9	0.9	0.8
Investment strategy	21.9	33	1.4	179.1	4	2	1	0.2	0.1	0.1
Public health protection	-9.7	74	3.3	120.8	31	15	7	1.1	1.2	1.0
Development of physical culture and sports	9.1	13	0.6	185.3	30	15	7	1.1	1.2	1.0
Family and sustainable population saving	32.1	162	7.2	163.9	167	81	37	6.1	6.5	5.3
Housing and creating favorable living conditions	22.8	96	4.3	152.4	13	8	3	0.5	0.7	0.5
Integrated spatial development of territories	0.7	5	0.2	145.5	1	1	0	0.1	0.1	0.0
Natural resources and mineral and raw materials base	8.3	106	4.7	168.5	169	66	53	6.2	5.3	7.8
Ensuring environmental well-being and creating the basis of a "green" region	15.7	423	18.8	141.3	333	129	105	12.1	10.4	15.3
Development of comprehensive and additional education	3.2	28	1.2	140.7	22	10	5	0.8	0.8	0.7
Development of professional education and training	-10.5	28	1.2	143.2	23	11	5	0.8	0.9	0.7
Transport and road network	14.1	65	2.9	163.1	70	29	24	2.6	2.3	3.4
Development of scientific and technological potential and innovation sphere	2.2	7	0.3	202	24	12	5	0.9	0.9	0.8
Information technology	-5.7	9	0.4	333.3	160	66	54	5.8	5.3	7.9

End of Table 3

Priority SED area	Economic growth (2016–2018), %	Number of staff (2019), units	Share in a number of staff (2019), %	Economic growth forecast (2019–2030), %	Projected number of staff (2030), units			Projected share in a number of staff (2030), %		
					Conservative	Innovative	Forced	Conservative	Innovative	Forced
Tourism and creative industry	39.0	26	1.2	213.3	84	34	12	3.1	2.8	1.7
Culture, historical, and cultural heritage	-0.9	45	2.0	225.2	226	109	49	8.2	8.8	7.1
Development of export competitiveness and import saving	27.0	7	0.3	100	0	0	0	0.0	0.0	0.0
Development of population's political consciousness, civic activity, and self-realization	21.1	50	2.2	160.8	21	10	5	0.8	0.8	0.7
Population's residence security, and self-preservation	-5.9	71	3.2	142.3	18	9	4	0.7	0.7	0.6
Agricultural and fisheries complexes	5.9	31	1.4	158.2	38	15	12	1.4	1.2	1.8
Trade and consumer market	-2.3	31	1.4	129.1	3	1	1	0.1	0.1	0.1
Development of fuel and energy infrastructure	9.5	71	3.2	119.6	0	0	0	0.0	0.0	0.0
Effective management of land and property complex	-38.2	108	4.8	332.6	829	400	188	30.2	32.2	27.3
Public administration	3.0	78	3.5	165.6	37	18	8	1.3	1.4	1.2
Ensuring the region's financial stability	14.6	113	5.0	338.4	183	79	43	6.7	6.4	6.3
Industry	2.1	8	0.3	154.6	0	0	0	0.0	0.0	0.0
Communications and telecommunications	17.5	34	1.5	129.9	15	6	5	0.5	0.5	0.7
Not participating in the Strategy	7.6	376	16.7	173.2	211	102	48	7.7	8.2	6.9
Total	*7.6*	*2251*	*100*	*173.2*	*2744*	*1241*	*687*	*100*	*100*	*100*

Source: own compilation.

priorities after calculating the increment of the target values in the Strategy priority areas and put them together with the estimates of productivity growth by industry in the formula (5). The result is shown in *table 3*. A number of the EBs' employees corresponds to the forecast of relevant industries development, which was the main goal of building the model. The correlation coefficient between these parameters varies, depending on the scenario, from 0.77 to 0.82 if $p < 0.001$.

Under the conservative scenario of labor productivity growth, a number of employees will have to be increased by 22% in order to meet the planned growth rates of SED in 2019–2030. Implementing such an extensive scenario is not optimal, as it will lead to the increase of management costs and reputational risks caused by a low level of public trust in the regional authorities, with a downward trend.

Under the innovative scenario, a number of employees will be reduced by 45% by 2030. The planned SED results for the region will be achieved by increasing labor productivity. This scenario will provide maximum level of correspondence between a number of civil servants and the economy growth rate; that is why we consider the innovative scenario optimal.

The forced scenario will reduce the management apparatus by 70%, and employees will be redistributed between the authorities. Thus, the field of land and property relations will concentrate up to a third of a total number of

employees; the apparatus share in the field of information technology will increase from 0.4 to 6%, and in the field of culture – from 2 to 8%. On the contrary, there will be the reduction in such sectors as fuel and energy management, trade, life support, and housing policy. The share of EBs' personnel, not involved in the Strategy implementation, will decrease to 7%. At the same time, it should be noted that the results of reduction depend on the correctness of determining the level of labor productivity and its growth.

Conclusion and discussion

Addressing the first research task, we evaluated the content, rather than textual compliance of federal and regional documents, and the reflection of national projects in the Strategy, projects, and programs of the region. A common reason for a lack of funds application allocated to the regions for the implementation of the national projects is a lack of such links, which is shown by the experience of these documents implementation in 2018–2019. The results are summarized in *table 4*.

The Strategy and other management tools are highly consistent (maximum compliance is provided in the areas of health, education, and housing policy, and the minimum one is in the areas of innovation and demographic policy). At the same time, regional priorities do not always correspond to the federal ones, creating risks for the region to lag behind in the management quality ratings. Thus, H.1 hypothesis has been partially confirmed.

Addressing the second task of the study, we revealed that only half of the EBs of the analyzed region participates in the implementation of the national projects and the indicators of Decree no. 193. Involvement in the implementation of the regional Strategy is already much higher (85%). About a third of government agencies implement priority regional projects. This means that H.2 hypothesis is also only partially supported by data. The unclear division of agencies' functional is evident.

At the same time, we cannot say that there is no relationship between the region's development and the processes in the management apparatus. The calculation of the corresponding indices revealed a strong statistical link between SED and public service development. *Figure 1* shows the relationships of these indices against the background of similar processes occurring at the federal level.

When addressing the third problem, the statistical correspondence of the analyzed indices was evaluated (*Tab. 5*). It is indicative of interconnections between them (the significance of connection is in parentheses).

Table 4. The level of SED management tools compliance, %

Comparison category	Indicators of Decree no. 193	National projects (Order no. 204)	Targets of the Strategy of the Russian Federation constituent entity	Priority regional projects	State programs of the RF constituent entity	Executive bodies of the RF constituent entity
Indicators of Decree no. 193	1					
National projects (Order no. 204)	0.62	1				
Target indicators of the Strategy of the RF constituent entity	0.52	0.72	1			
Priority regional projects	0.65	0.83	0.96	1		
State programs of the RF constituent entity	0.61	0.70	1	0.57	1	
EBs of the RF constituent entity	0.51	0.54	0.85	0.36	1	1
Source: compiled by the author.						

Figure 1. Dynamics of civil (municipal) service development indices, SED RF indices and the RF constituent entity (2005–2018), %

Source: own compilation.

Table 5. Correlation matrix of indices

	SED of a RF constituent entity	Civil service development in a RF constituent entity	Municipal service development in a RF constituent entity	RF SED	Federal civil service development
SED of a RF constituent entity	1				
Civil service development in a RF constituent entity	0.73 (0.003)	1			
Municipal service development in a RF constituent entity	0.84 (0.0001)	0.95 (0.0000)	1		
RF SED	0.85 (0.0001)	0.88 (0.0000)	0.97 (0.0000)	1	
Federal civil service development	0.78 (0.001)	0.76 (0.002)	0.83 (0.0002)	0.76 (0.002)	1
Source: own compilation.					

These interconnections may be interpreted as follows:

1. The interconnection of the region's SED with the municipal service development is stronger (0.84) than with the civil service development (0.73). This is confirmed by the dual regressions calculation. If the civil service development index increased by 15% during the analyzed period, q value of the municipal service development index increased by 30%. The negative trend is marked in the level of public trust: if 63% of citizens trusted the regional authorities in 2005, this indicator made up only 58% in 2018. This indicates the direction of further transformation of the power system – increasing openness to society and accountability. Without this, all internal improvements in the bureaucratic environment do not lead to the desired result. The level of trust in municipal authorities has been and

remains low (no more than a third of citizens trust them), which means that quantitative improvements do not yet lead to a qualitative increase of local authorities' social efficiency.

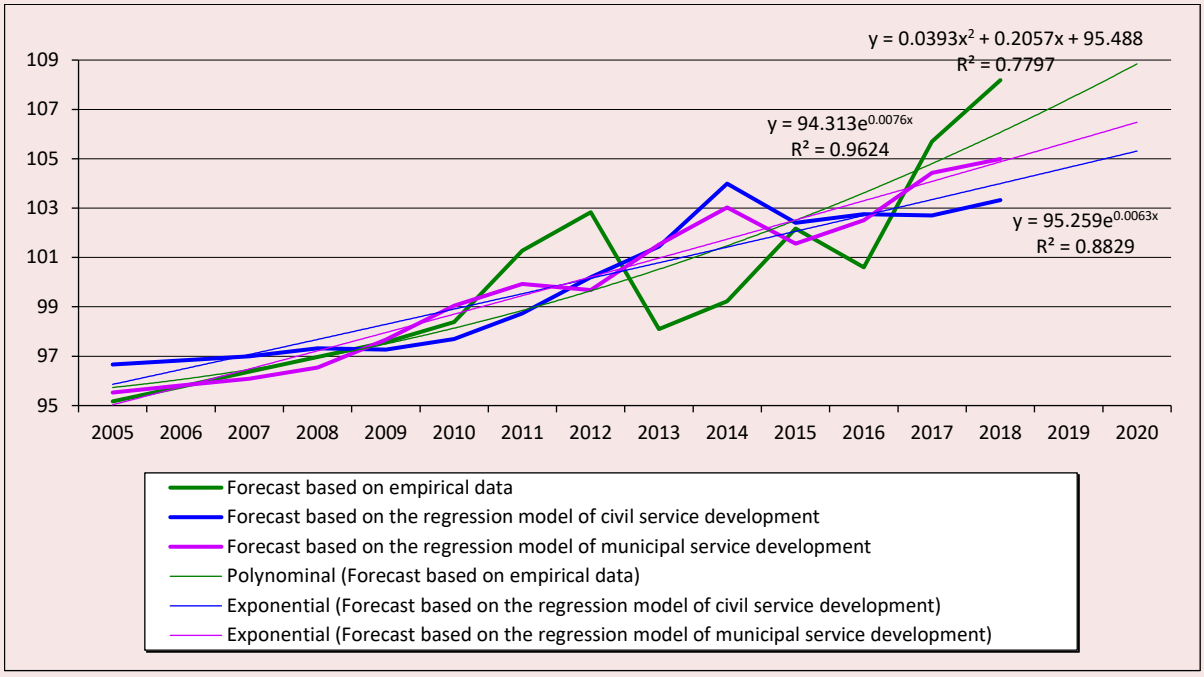
2. There is a significant correlation in the dynamics of the region's SED indices and the country's indices as a whole (0.85). Changes at the regional level can be considered primary, since, while considering the index for the Russian Federation as a dependent variable, the correlation coefficient takes the value of 0.91 with a time lag per year in relation to the dynamics of SED of the constituent entity of the Russian Federation.

3. The interconnection between development processes of the federal and regional civil service is great (0.76). These processes occur in conjunction. Linear regression models, based on the indices of civil and municipal service development, make it possible to predict the dynamics of SED index of the constituent entity of the Russian Federation (*Fig. 2*).

The interval forecast for two years ahead, based on the regression model of civil service development, is constructed with an approximation confidence value (R^2) of 0.88, and it is 0.96 on the regression model of municipal service development (that is, the model for the municipal service development index is more accurate). For comparison, the same trend is based directly on empirical data of SED index of the Russian Federation's constituent entity. The maximum accuracy of 0.78 was obtained using a polynomial trend line by trial and error. Regression analysis tools provide for higher accuracy as they take into account the influence of hidden regressors. The confidence forecast version of SED index value for 2020 varies from 105.1 to 109 with the most likely value of 106.5.

Thus, the test of H.3 hypothesis showed that the share of the Strategy targets that fully or partially correspond to the program of statistical observations is 48.6% (only 22.8% of indicators are fully equivalent). When forming targets

Fig. 2. Dynamics and forecast of SED index of the constituent entity of the Russian Federal



Source: own compilation.

for strategic planning, departmental data is often used, which is easy to manipulate. Consequently, the hypothesis about the correspondence of management tools and statistical indicators was not confirmed.

When developing management tools, the regions are recommended to focus on statistical indicators that are relatively objective and orient the performers to achieve the final socially significant results. The problem with such indicators is that they often describe processes that go beyond the competence of regional authorities. In such a case, the government of a constituent entity of the Russian Federation is recommended to suggest that Rosstat should include the indicator in the federal plan of statistical work. Another problem is the delay in statistical reporting, but it is of a technical nature. When the evaluation of results based on statistics becomes a general principle, it is not difficult to synchronize the timing of receiving statistical data with the government agencies' reports. The Unified Interdepartmental Statistical Information System (UISIS) and the State Automated System "Upravleniye" ("Management") (SASU) have great potential.

Addressing the fourth, and the last task, we found that the distribution of civil servants in the EBs almost does not coincide with the priority areas of the region's development (H.4 hypothesis was not confirmed). The reduction of a number of civil servants also occurs without taking into account the processes in managed industries. Government authorities' focus on achieving development priorities is of great importance, because historically many priorities are not fully achieved due to a lack of interest of the bureaucracy.

To overcome the dysfunction, the author proposed a method connecting the projected government agency staff with SED dynamics and labor productivity growth, which is necessary for the management apparatus to focus on achieving socially significant results. The forecast of the distribution of a number of employees by industry areas under conservative, innovative and forced labor productivity scenarios is visualized in *figure 3*.

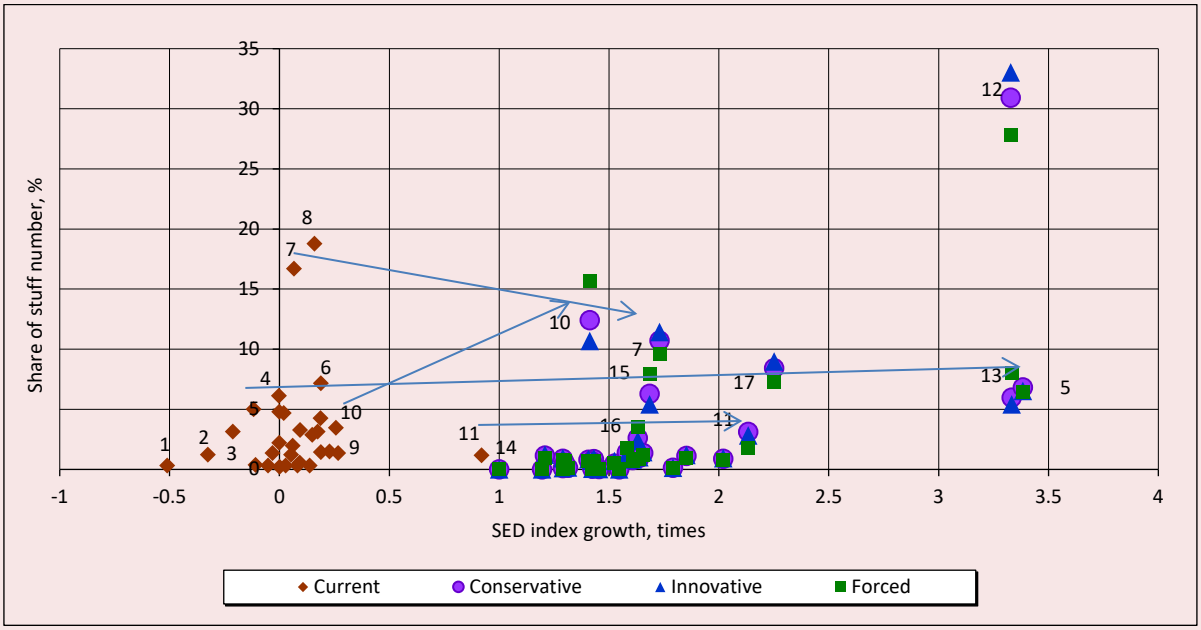
The points in the figure indicate individual priority areas. The coordinate points at the x-axis are the same for conservative, innovative, and forced scenarios, since the Strategy targets are not set on a variable basis. The arrows show the examples of changes in individual industries in 2019–2030. The limitation of the proposed method is the correctness of the Strategy target indicators values, which make up a basis for predicting the dynamics of the region's SED. Randomness or overly ambitious targets can significantly affect the forecast of the employees' number. The likelihood of such a situation is indicated by the weak link between the Strategy goals and statistical indicators.

It is predicted that the management apparatus will be reduced in most industries due to productivity growth (significant reduction is forecasted in industry, energy, foreign trade, and security). The staff of bodies, not involved in the Strategy implementation, is to be reduced. On the contrary, rapidly growing areas (land relations, culture, and information technology) need the increase of a number of civil servants.

In these circumstances, it will probably be necessary to integrate government bodies in the areas where a significant number of employees are to be reduced. We recommend forecasting the staff requirements for priority areas and setting the staff within a total number of areas, taking into account the changes in the government agencies' functions and structure.

The results obtained correlate with the trends of the labor market. The applied forecasting of employees' number will be correct only when the formation of the Strategy targets becomes

Fig. 3. Actual and forecast distribution of civil servants staff number by priority areas of the constituent entity's development



Designations: 1 – professional education; 2 – consumer market; 3 – fuel and energy complex; 4-ensuring the life of the population; 5 – financial sector; 6 – demographic policy; 7 –not participating in the Strategy; 8 – public administration; 9 – agricultural complex; 10 – ecology; 11 – tourism; 12 – land and property complex; 13 – information technology; 14 – export; 15 – natural resources; 16 – transport; 17 – culture.

Source: own compilation.

reasonable, and estimates of labor productivity dynamics are realistic. Constituent entities of the Russian Federation address the tasks similar to those of SED; the recommendations of the research may be applied in a broad regional context now and in the future.

References

1. Alekseev A.V., Kuznetsova I.V. Comparative characteristics of methods for assessing the level of socio-economic development of a regional socio-economic system. *Novye tekhnologii=New Technologies*, 2018, no 2, pp. 2–9 (in Russian).
2. Mishenin Y., Koblianska I., Medvid V., Maistrenko Y. Sustainable regional development policy formation: Role of industrial ecology and logistics. *Entrepreneurship and Sustainability Issues*, 2018, vol. 6, no 1, pp. 329–341.
3. Lewis D.C., Schneider S.K., Jacoby W.G. Institutional characteristics and state policy priorities: The impact of legislatures and governors. *State Politics & Policy Quarterly*, 2015, vol. 15, no 4, pp. 447–475.
4. Barabashev A.G., Makarov A.A., Makarov I.A. On the improvement of indicative quality assessment of public administration. *Voprosy gosudarstvennogo i munitsipal'nogo upravleniya=Public Administration Issues*, 2019, no. 2, pp. 7–39 (in Russian).
5. Jensen D.N. How Russia is ruled. In: *Business and State in Contemporary Russia*. Ed. by P. Rutland. Abingdon: Routledge, 2018, pp. 33–64.
6. Beer A., Ayres S., Clower T., Faller F., Sancino A., Sotarauta M. Place leadership and regional economic development: A framework for cross-regional analysis. *Regional Studies*, 2019, vol. 53, no 2, pp. 171–182.
7. Rondinelli D.A. *Applied Methods of Regional Analysis: The Spatial Dimensions of Development Policy*. Abingdon: Routledge, 2019.

8. Faggian A., Modrego F., McCann P. Human capital and regional development. In: *Handbook of regional growth and development theories*. Ed. by R. Capello, P. Nijkamp. Chatlenham: Edward Elgar Publishing, 2019. Pp. 149–171.
9. Kuklin A.A., Korobkov I.V. Selection of an effective trajectory of regional socio-economic development. *Ekonomika regiona=Economy of Region*, 2018, vol. 14, no 4, pp. 1145–1155 (in Russian).
10. Novoselov A.S., Marshalova A.S. Current issues of elaboration of strategy for regional socio-economic development. *Vestnik Kuzbasskogo gosudarstvennogo tekhnicheskogo universiteta=Vestnik Kuzbasskogo gosudarstvennogo tekhnicheskogo universiteta*, 2017, no 3, pp. 18–26 (in Russian).
11. Danson M., Halkier H., Cameron G. (Eds.). *Governance, Institutional Change and Regional Development*. Abingdon: Routledge, 2018.
12. Leksin V.N., Shvetsov A.N. *Reformy i regiony: sistemnyi analiz protsessov reformirovaniya regional'noi ekonomiki, stanovleniya federalizma i mestnogo samoupravleniya* [Reforms and Regions: A Systematic Analysis of the Processes of Reforming the Regional Economy, the Formation of Federalism and Local Self-Government]. Moscow: URSS, 2012.
13. Vedung E. *Public Policy and Program Evaluation*. Abingdon: Routledge, 2017.
14. McLaughlin P., Sherouse O. RegData 2.2: A panel dataset on US federal regulations. *Public Choice*, 2019, vol. 180, no. 1–2, pp. 43–55.
15. Stöhr W., Tödtling F. Quantitative, qualitative, and structural variables in the evaluation of regional development policies in Western Europe. In: *Regional Development*. Ed. by G. Demko. Abingdon: Routledge, 2017, pp. 157–173.
16. Gorzelak G., Smętkowski M. Regional development dynamics in Central and Eastern European countries. In: *Regional Development in Central and Eastern Europe*. Ed. by G. Gorzelak, J. Bachtler, M. Smętkowski. Abingdon: Routledge, 2018, pp. 34–58.
17. Kremlev N.D. Statistics as a tool of knowledge for sustainable regional development. *Statistika i ekonomika=Statistics and Economics*, 2018, no 3, pp. 4–13 (in Russian).
18. Nizhegorodtsev R.M., Piskun E.I., Kudrevich V.V. The forecasting of regional social and economic development. *Ekonomika regiona=Economy of Region*, 2017, no. 1, pp. 38–49 (in Russian).
19. Volkova E.N. Problems of integral statistical evaluation of social-economic development region. *Statistika i ekonomika=Statistics and Economics*, 2015, no 3, pp. 170–175 (in Russian).
20. Soyan Sh.Ch., Uganza D.A. Personnel policy and HR management in the public and civil service. *Vektor ekonomiki=Vector Economy*, 2019, no. 5, pp. 197–209 (in Russian).
21. Borschevskiy G.A. Models of bureaucracy management taking into account the economic development of regions. *Upravlencheskoe konsul'tirovanie=Administrative Consulting,* 2017, no 5, pp. 79–95 (in Russian).
22. Fotina L.V., Chapkin N.S. Is the amount of civil servants great in Russia? *Etnosotsium i mezhnatsional'naya kul'tura=Etnosocium (multinational society)*, 2017, no 1, pp. 45–51 (in Russian).
23. Rezer T.M., Akshentceva O.A. Rationing of labor as the design of professional activity of civil public servants. *Pravo i obrazovanie=Law and Education*, 2018, no 1, pp. 79–87 (in Russian).
24. Petukhov R.V. On the social content of local self-government. *Monitoring obshchestvennogo mneniya: Ekonomicheskie i sotsial'nye peremeny=Monitoring of Public Opinion: Economic and Social Changes*, 2018, no. 6, pp. 131–146 (in Russian).

Information about the Author

Georgy A. Borshchevskiy – Doctor of Sciences (Politics), Candidate of Sciences (History), Professor of the Institute, Russian Presidential Academy of National Economy and Public Administration (82, Vernadsky Avenue, Moscow, 119571, Russian Federation; e-mail: ga.borshchevskiy@igsu.ru)

Received April 23, 2020.

DOI: 10.15838/esc.2020.5.71.5
UDC 338.001.36.004; LBC 65.5

Inclusion of Population in Digital Space: Global Trends and Inequality of Russian Regions

Maria A. GRUZDEVA
Vologda Research Center of the Russian Academy of Sciences
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: mariya_antonovarsa@mail.ru
ORCID: 0000-0001-8759-4953; ResearcherID: H-4981-2017

Abstract. The issue of digital inequality and development of a methodology for measuring it has been at the center of attention of researchers, members of public administration, companies directly involved in the provision of Internet communication services, and other interested parties for more than twenty years. This issue became relevant with the increase of the rate of the Internet spread in certain parts of the world, and, accordingly, the lag of other countries behind them in the late 90s and early 21st century. The sphere of information and communication technologies is one of the most rapidly changing ones, which is probably why the theoretical and methodological foundations of the study of digital inequality are still not clearly defined, which actualizes research in this area and the importance of monitoring trends in the world and individual states. The purpose of our work is the usage of the three-level model of digital inequality for assessing first-level differences among population of Third World countries and Russian regions. It is assumed that the research results will create prerequisites for continuing study on other levels of digital asymmetry among Russian population, which will allow revealing not just the fact of its inclusion in digital space but the level of digital competencies and opportunities provide by the usage of modern information technologies. We use a set of scientific methods; for measuring inequality, the author resorts to the calculation of the variation coefficient, grouping of countries or regions based on levels of Internet connectivity. Conclusions are drawn about the existence of the first-level digital inequality in the world, despite a significant decrease of the differentiation of countries by Internet connectivity. It

For citation: Gruzdeva M.A. Inclusion of population in digital space: global trends and inequality of Russian regions. *Economic and Social Changes: Facts, Trends, Forecast,* 2020, vol. 13, no. 5, pp. 90–104. DOI: 10.15838/esc.2020.5.71.5

is revealed that Russia, in comparison with other countries, shows a significant increase of the share of Internet users, and there are elements of digital divide within Russian regions even with the decrease of variation coefficients. The scientific novelty of the study is the assessment of the scale and dynamics of the first-level digital inequality among population at the country and regional levels, grouping of countries, and Russian regions by the share of Internet users and the usage of mobile devices to access the network.

Key words: information and communication technologies, territorial digital inequality, Internet connectivity, levels of digital inequality, technological and economic factors of digital inequality, Russia.

Introduction

Modern world is on the threshold of the fourth industrial revolution, which is based on new digital, biological, physical, and other types of technologies. In this regard, scientific and public discourse more often uses terms that, in one way or another, characterize the impact of new digital technologies on the economy and society. Over the twenty-year history of using the terms "Internet economy", "digital economy", and its derivatives, they still have not acquired clear outlines, which, however, does not prevent their widespread usage in business environment, media, scientific publications, and other sources [1]. Indeed, it is quite difficult to delineate and make generally accepted boundaries of something that undergoes constant changes. Rapid development of modern digital technologies does not allow us to clearly "stabilize" the manifestations of their impact on the economy and society: if in the initial period direct access to information and communication technologies (ICTs) was of primary importance, now, when the Internet and other means of ICT became integral part a daily life of the majority of the world's population, the question of how and for what purposes these technologies are produced and used becomes more urgent.

Without a doubt, the introduction of digital technologies varies in different regions of the world, countries and within them, which is also related to the level of development strategy, technical capabilities and population's sensitivity to changes. Inequality of population's access to digital services and different opportunities for its usage, caused by many reasons, from material ones to availability of skills and motivation, put at the forefront new and barely studied aspects of social inequality. It may cause social exclusion of social and demographic groups from digital development processes. This sets new research tasks, which is partly what this work is devoted to. This is also stated in numerous foreign and domestic scientific papers [2–7]. The "leaders" of scientific research in this area in Russia are representatives of the "Higher School of Economics", who proposed methodological tools for assessing the contribution of the Internet economy to GDP [8], a composite indicator for measuring the size and dynamics of digital inequality in Russia [9], and other methods. They launched a statistical study of the digital economy in Russia[1] and emphasized that the changes, which take place in society

[1] Since 2017, in association with Rosstat, NRU HSE publishes collections of indicators that formed the basis of this study: *Information Society in the Russian Federation. 2018*: *Stat. Coll.* M.A. Sabel'nikova, G.I. Abdrahmanova, L.M. Gohberg, O.Ju. Dudorova et al.; Rosstat; Nat. Res. Un-ty "Higher School of Economics". Moscow: NRU HSE, 2018; *Information Society in the Russian Federation. 2019: Stat. Coll.* M.A. Sabel'nikova, G.I. Abdrahmanova, L.M. Gohberg, O.Ju. Dudorova et al.; Federal State Statistics Service; Nat. Res. Un-ty "Higher School of Economics". Moscow: NRU HSE, 2019.

within the transition to the digital economy, are still insufficiently studied and require development and usage of new indicators, approaches, and methods. It determined the relevance of the research.

The purpose of work is the application of the three-level digital inequality model to assess the first-level differences among population of different countries and Russian regions. To achieve this goal, the following objectives were set and implemented: theoretical and methodological approaches to the study of digital inequality were considered; trends of digital development in the world, developed and developing countries, and Russia were analyzed; the scale of unevenness of the world's countries and Russian regions in terms of Internet spread and usage was assessed; the studied objects were grouped by levels of digital development.

The scientific novelty of the study is the assessment of the scale and dynamics of the first-level digital inequality among population at the country and regional levels, grouping of different countries and Russian regions by the share of Internet users and the usage of mobile devices for accessing the network.

Materials and methods

The research uses a set of scientific methods, in particular comparative analysis, statistical analysis, and sociological methods to achieve its goals and objectives. The theoretical basis is scientific works that study the formation, development and methods of assessing the digital economy and digital inequality.

To measure global trends of digital development, data on a number of Internet users, landline and mobile phone subscribers, and Internet subscriptions, including mobile, published by the International Telecommunication Union (hereinafter – ITU) are used, since its sufficiency for showing overall distribution situation. To properly assess the scale of first-level digital inequality, data on the share of population using the Internet are considered.

The variation coefficient is used for measurement. Its values allow assessing the presence and scale of differences between regions and countries for a particular indicator within the following borders:

< 17% – aggregate is absolutely homogeneous;

17–33% – aggregate is fairly homogeneous;

35–40% – aggregate is not homogeneous enough;

40–60% – aggregate is significantly heterogeneous;

> 60% – aggregate is absolutely heterogeneous.

In order to study the distribution of countries by Internet penetration, we used a grouping of statistical data with closed intervals and identified three levels of it – above average, average, and below average.

In each case, the study period is limited by the availability of statistical data. For international data, this is 2001–2019. For the Russian Federation, the collection of most indicators (with the exception of ITU observations on the share of Internet users, which included almost all countries of the world) was started relatively recently, rather than in world statistics, in 2013 (analyzed until 2018). For Russian regions, the available information is collected for 2016, 2017, and 2018.

The research is based on official data from the International Telecommunication Union and collections of statistical indicators published jointly by Rosstat and NRU "Higher School of Economics": "Indicators of the digital economy", "Information society in the Russian Federation", and "Information society: Main characteristics of entities of the Russian Federation".

Results

Modern researchers of digital inequality agree, first, on the need to study it and create methodological foundations for its assessment, and, second, that it has a differentiated structure.

Initially, the approach to analyzing digital inequality was studied mainly in a geographical discourse, between countries that have and do not have access to the introduction of information and communication services, conditionally rich and poor [10; 11]. However, almost immediately, the scientific community came to the conclusion that these processes are more multifaceted and are not based only on access to ICTs, and, in this regard, several levels of digital inequality were identified. In 2001, E. Hargittai proposed a theory of two types of digital inequality: the first one shows unequal chances in accessing ICTs, and the second one is characterized directly by differences in the specifics of Internet usage. It was assumed that the second type of inequality is possible with more widespread penetration of ICTs into people's daily lives [12; 13].

It laid the foundation for the study of digital inequality from various fields of knowledge – sociology, economics, political science, media environment, marketing [14]. Foreign and domestic researchers considered various factors of unequal access to and usage of ICTs related to differences in incomes[2] [15], education level [16, 17, 18], age [19], gender[3] [20], and so on.

Currently, a theory of three levels of digital inequality is being developed, which has become the basis for a comprehensive study of the digital divide from a person's point of view [4; 21; 22]. According to it, the digital divide can manifest itself on three main levels: 1) the level of population's access to the Internet and other ICTs; 2) the level of digital competence of users and digital literacy; 3) the level of social benefits that users receive when using digital technologies correctly and fully in their professional and private lives.

Without using such terminology but studying the same characteristics of digital stratification of society, researchers from Ulyanovsk O.V. Shinyaeva, O.V. Poletaeva, O.M. Slepova [23] search for efficient practices of population adaptation to it, study the motivation of population to adapt to changes in order to increase their own efficiency in the digitalization era.

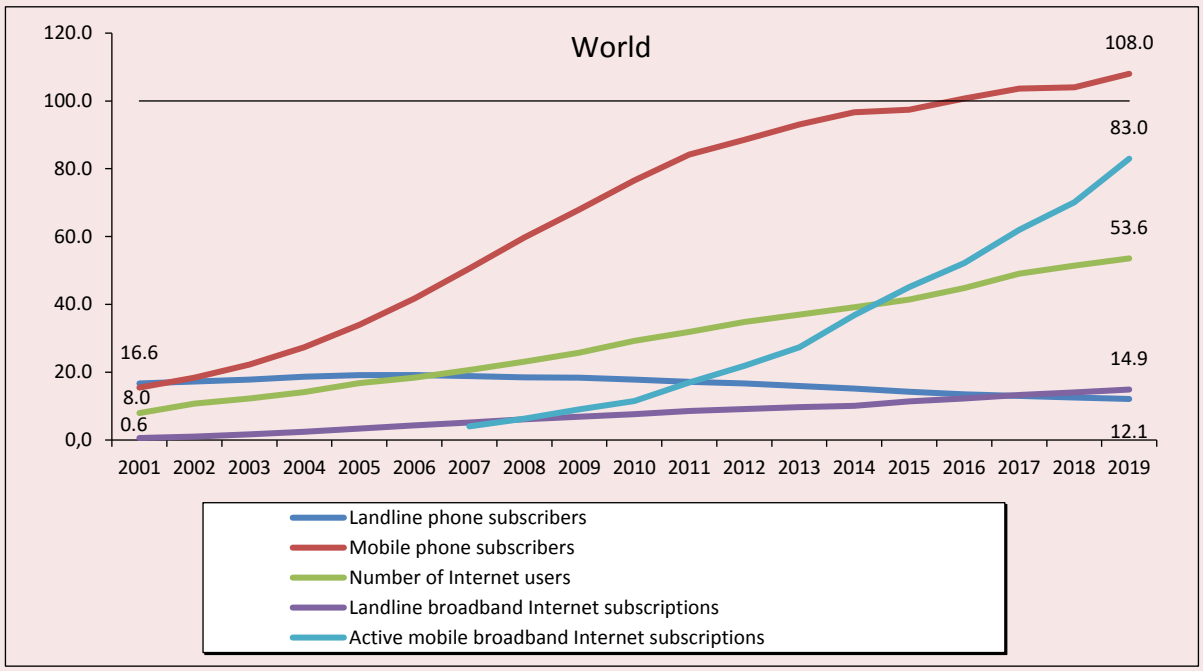
After studying the rich experience of publications on digital inequality, we remain in solidarity with the positions of modern researchers about the versatility and complexity of this phenomenon, the need to build effective methods for measuring it. Our study is based on a three-level model of the digital divide, which is common for foreign works (one of outstanding representatives of the direction is Massimo Ragnedda), and it develops in Russia (scientific school of NRU HSE – M.Y. Arkhipova, V.P. Sirotin; MSU University – A.A. Gladkova; Kazan Federal University – V.Z. Garifullin; Ulyanovsk State University – A.R. Safiullin, O.A. Moiseeva; Institute for Social and Economic Research at Ufa Research Center of RAS – D.A. Gainanov, T.F. Sharifiyanov).

Most of the discussion will focus on the first level of inequality in the availability and usage of ICTs by population; data on the reasons for non-usage of the Internet in households will be partially affected. The second and third levels of inequality, namely, the characteristics of development of digital competencies and

[2] Vershinskaya O.N. Digital divide – a new kind of economic inequality? *VIPERSON. Articles. Exclusive*, 2011. Available at: http://viperson.ru/articles/olga-vershinskaya-tsifrovoy-raskol-novyy-vid-ekonomicheskogo-neravenstva

[3] Smirnova O.V. The feminization of the Internet: Trends and forecasts. *Mediascope*, 2009, no. 1. Available at: http://www.mediascope.ru/феминизация-интернета-тенденции-и-прогнозы

Figure 1. Global trends of digital development (average across countries), number per 100 residents



Source: ITU world telecommunication indicators database. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx

Hereafter, a number of mobile cellular subscribers with data access (for example, the Internet) at a broadband transmission rate in a direct channel (hereafter defined as exceeding or equal to 256 Kbit/s).

benefits, received by active users, can be studied in depth and qualitatively only if there is a significant and, preferably, monitoring database of sociological studies. According to a number of scientists, the lack of such data is a limiting factor for comprehensive studies of the digital divide [4]. An in-depth study of the second and third levels of digital inequality with a case study of population from a specific region (namely, settlement, socio-demographic, socio-economic, and other aspects) is the prospect of our future work.

Assessment of the digital divide in the world

In general, global trends of ICT development in the world can be characterized by a desire for mobility: everywhere, a number of landline phone subscribers decreases, and a number of mobile phones rapidly grows. On average, a number of mobile subscribers in the world has exceeded 100 units per 100 people since 2016, that is, part of population needs access to mobile network from more than one device (in 2001–2019, the value increased by 7 times, the annual growth rate of 36.7% per year; *fig. 1*).

The history of the emergence and usage of the Internet dates back to the 60s of the 20th century, but it took no more than 30 years before it became a satellite of an average person. Significant mass individual usage of the World Wide Web can be seen since the late 1990s and early 2000s: it is when ITU began monitoring shares of users. Since then, Internet spread into everyday life and business processes continued at a significant pace, but there is still potential for growth: according to preliminary ITU estimates,

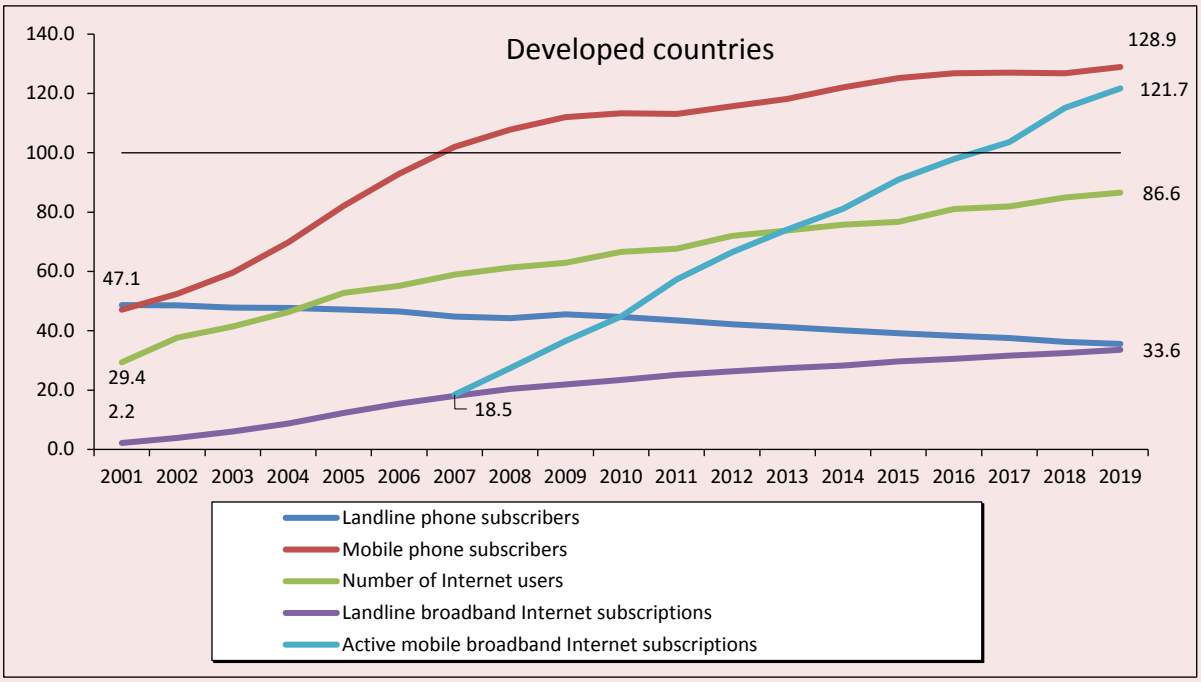
in 2019, one out of two people on Earth used the Internet (or 53.6 people out of 100). The same trend is observed here – mobile Internet is more widespread than landline access (in 2019, a number of active mobile Internet subscriptions were 5.5 times higher than a number of landline subscriptions; in each case, it is about broadband Internet with a data transfer rate of 256 Kbit per second or higher)[4].

The direction of trends of ICT usage in developed and developing countries is similar (*Fig. 2, 3*), but the scale remains different.

In developed countries, all indicators of digital development were higher at the initial stage of mass individual (for personal purposes) usage of the Internet (since the beginning of the 2000s), but this situation still persists. A number of mobile network users began to exceed population in 2007, and, over 2001–2019, the indicator value increased by 2.7 times or by 14.4% annually. In developed countries, more than 86% of population uses the Internet, and mobile broadband Internet is more in demand than landline Internet (in 2019, a number of mobile Internet subscriptions exceeds a number of landline subscriptions by 3.4 times). It means that users strive to ensure constant access to the network regardless of their location.

In regard to developing countries, it is possible to mention even more significant growth rates, especially in recent years. In the early 2000s, the positions of developed and

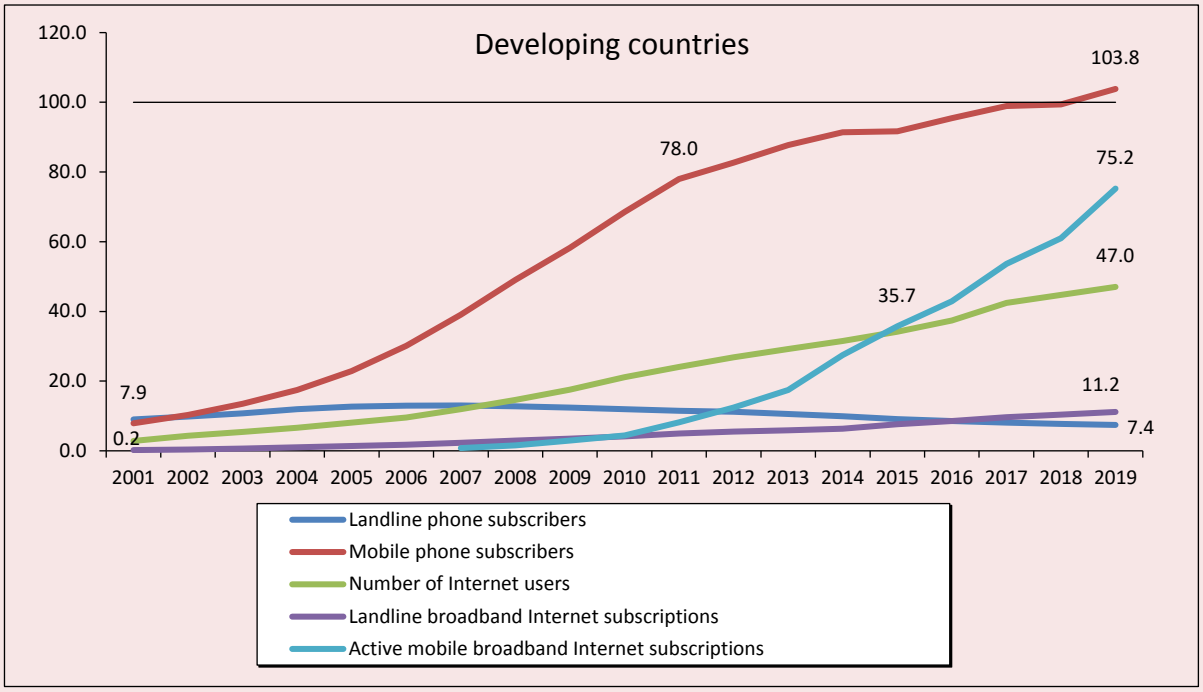
Figure 2. Trends of digital development in developed countries (average for developed countries), number per 100 residents



Source: ITU world telecommunication indicators database. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx

[4] Source: ITU world telecommunication indicators database. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx

Figure 3. Trends of digital development in developing countries (average for developing countries), number per 100 residents



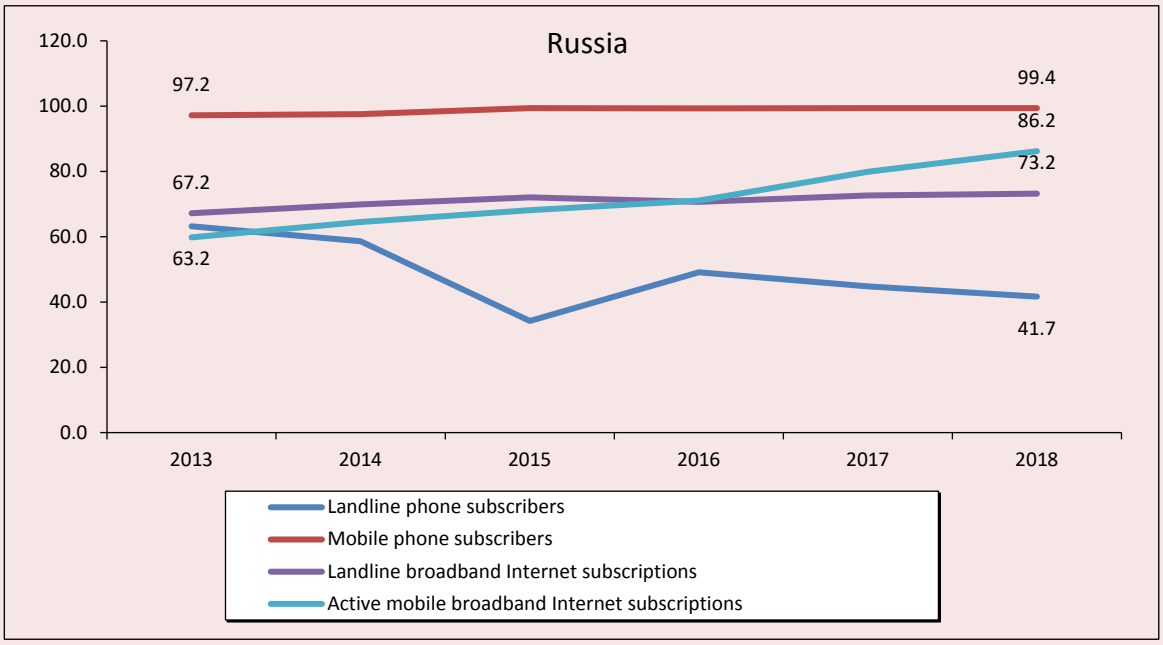
Source: ITU world telecommunication indicators database. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx

developing countries were different: in the former ones, the involvement of population was very high (probably due to the sufficient standard of living and education for the introduction of innovations), in the latter ones – minimal. However, the rate of Internet spread is higher in developing countries. In 2001–2019, a number of mobile subscribers increased by 13 times or 69% on average annually. One out of two people in developing countries use the Internet: 75 out of 100 of them are mobile, and only 11 out of 100 are stationary.

In Russia, detailed statistics on the introduction of digital technologies into people's daily lives began to be collected much later. Data have been published since 2013. Over a six-year period, we can see the same trends that occurred in the world: the decline of a number of landline phone subscribers and the growth of mobile network and broadband Internet users (*Fig. 4*). According to almost all indicators, in general, Russia is closer to developed countries according to digital development trends with the exception of a small number of mobile network subscribers (compared to the leaders of digital development).

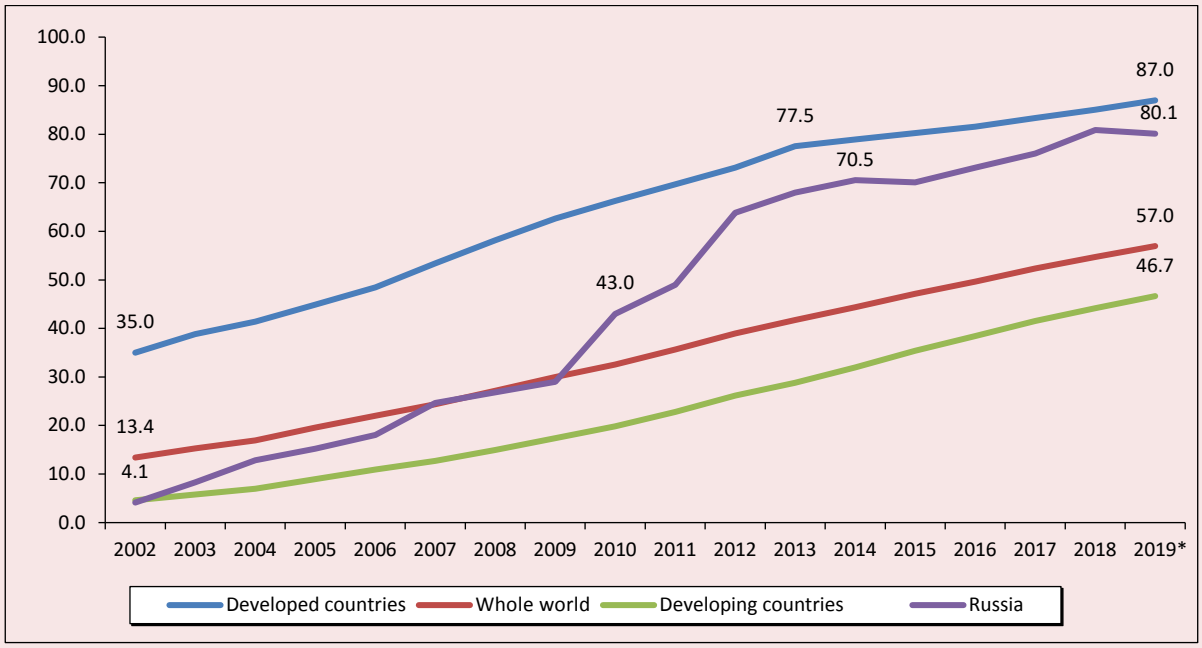
Due to statistical measurements of the International Telecommunication Union, it is possible to estimate the scale of first-level digital inequality in the world. The share of Internet users increases everywhere: on average, it grew by 43.6 p. p. in 2002–2019, by 42.6 percentage points in developing countries, and by 52 percentage points in developed countries (*Fig. 5*). In Russia, the share of Internet users also increased rapidly – by 76 p. p. during the studied period.

Figure 4. Trends of digital development in Russia, number per 100 residents



Source: *Information Society in the Russian Federation. 2018, 2019: Stat. Coll.*

Figure 5. Share of people using the Internet, %



* 2019 – preliminary estimates.

Source: ITU world telecommunication indicators database. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx

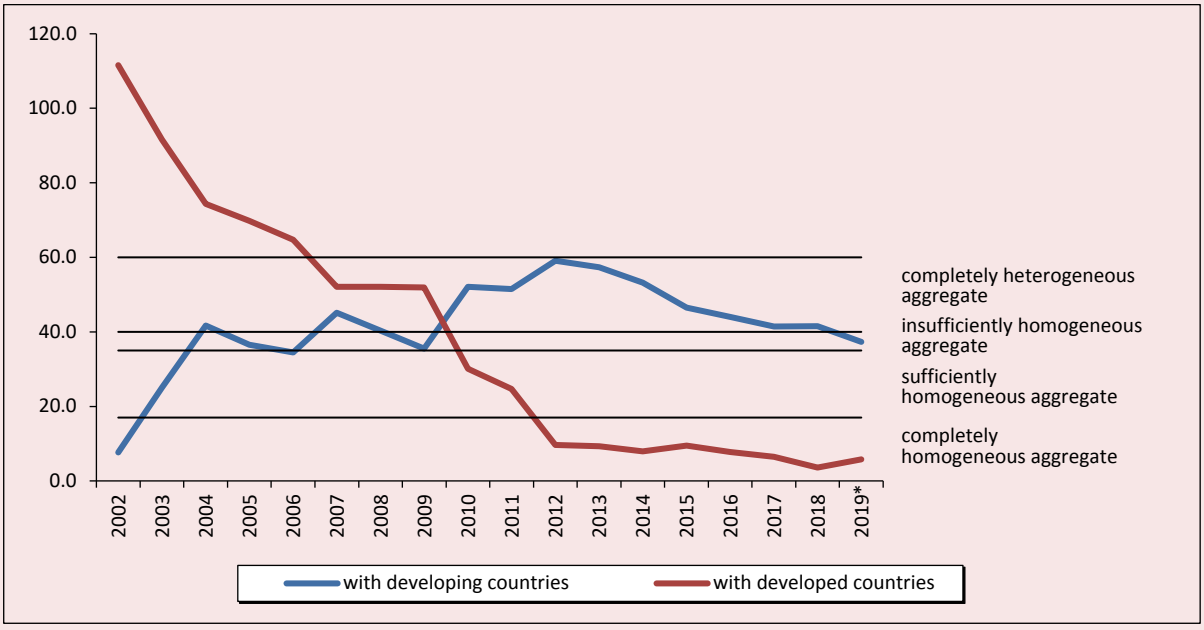
2010 is a turning point for digital development of the Russian Federation. It is the year when the share of Internet users exceeded the global average. Before 2009, Russia was closer to developing countries in terms of population involvement in Internet usage, but, since 2010, it has been closer to developed countries (*Fig. 6*). At the moment, it does not differ from developed countries in terms of population involvement in the usage of the Internet.

The scale of first-level digital inequality in the world decreases. When studying the percentage of people who use the Internet, it was revealed that the variation coefficient decreased by more than 65%. However, total number of countries in the world in terms of Internet spread remains heterogeneous: in 2017, values range from the minimum in East Africa and Eritrea (1.3%) to the maximum in Kuwait (100%; *tab. 1*).

In order to understand digitalization processes in the world, the countries were grouped by three levels of Internet spread, and the change of Russia's position in the proposed classification was analyzed.

Over the entire period, the top five countries with the largest share of Internet users were European countries, including the territories of Great Britain outside of its borders (for example, Bermuda, the Falkland Islands). A number of European microstates (Andorra, Luxembourg, and Liechtenstein) were in the leading group due to small population number (*Tab. 2*). Since 2016, Gulf countries are also

Figure 6. Dynamics of the variation coefficient for the indicator "Share of people using the Internet" between Russia, developed and developing countries, %



* 2019 – preliminary estimates.

Source: ITU world telecommunication indicators database. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx

Table 1. Variation of the indicator "Share of people using the Internet" in different countries

Indicator	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	Growth rate, 2017 to 2000, %
Maximum value	58.6	87.0	95.8	96.4	96.9	96.9	98.2	98.3	99.0	100.0	70.6
Minimum value	0.0059	0.0652	0.2500	0.7000	0.8000	0.9000	0.9900	1.0837	1.1771	1.3089	221 times
Variation coefficient	146.1	107.5	78.6	73.4	70.2	67.7	63.1	58.5	56.1	50.8	-65.2
Source: ITU world telecommunication indicators database. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx											

Table 2. Russia's position in the grouping of countries according to the indicator "Share of people using the Internet"

Level	2000	2005	2010	2012	2013	2014	2015	2016	2017
Above average	Norway Canada San Marino New Zealand Switzerland	Iceland Sweden Denmark Norway Netherlands	Iceland Norway Netherlands Luxembourg Sweden	Iceland Norway Sweden Netherlands Denmark	Iceland Norway Sweden Denmark Andorra . . . **Russia**	Iceland Norway Denmark Andorra Liechten-stein . . . **Russia**	Iceland Andorra Norway Liechten-stein Luxembourg . . . **Russia**	Iceland Luxembourg Liechten-stein Bahrain Andorra . . . **Russia**	Kuwait Iceland Liechten-stein Qatar Luxembourg . . . **Russia**
Average	Finland Liechten-stein Singapore Ascension island Austria	Greenland Hong Kong China Belgium Monaco Slovakia	Greenland Malta Saint Kitts and Nevis Poland Lithuania . . . **Russia**	Saint Kitts and Nevis Russia Poland Croatia Kazakhstan	Trinidad and Tobago Antigua and Barbuda Kazakhstan Poland Portugal	Saudi Arabia Argentina Portugal Malaysia Greece	Uruguay French Poly-nesia Venezuela Puerto Rico Albania	Armenia Dominican Republic Jordan Italy Palestine	Palestine Guatemala Bosnia and Herzegovina Armenia Turkey
Below average	**Russia** . . . Sudan Somalia Liberia Ethiopia Republic of Congo	**Russia** . . . Niger Ethiopia Sierra Leone East Timor Myanmar	Ethiopia Congo Eritrea Sierra Leone Myanmar	Eritrea Niger Burundi Somalia Congo	Eritrea Niger Burundi Somalia Congo	Eritrea Niger Burundi Somalia Chad	Guinea Bissau Chad Niger Somalia Eritrea	Niger Central African Republic Guinea Bissau Somalia Eritrea	Central African Republic Guinea Bissau Burundi Somalia Eritrea
Source: ITU world telecommunication indicators database. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/default.aspx Grouping is conducted by the author according to data on 207 countries, published by ITU, each group includes 5 countries and Russia. Ranked: above average and average levels – in descending order, the countries with the highest shares of people using the Internet. Below average – in ascending order, countries with the lowest proportion of Internet users.									

included in this list, the economy of which is based on oil production – Bahrain, Kuwait, and Qatar, where oil and gas made it the first country in terms of GDP per capita in the world.

As for the group of countries with the lowest proportions of Internet users, there is also some stability. Over the last 18 years, African countries have been at the bottom of the rating, and the situation there remains mostly unchanged – Internet connectivity is still minimal.

Based on the grouping of countries, there is also a significant rate of Internet entry into lives of Russian citizens: if Russia was included, along with African countries, in the group with below-medium spread in the early 2000s (in 2000, only 2% of population used the Internet), then it moved to the medium level in 2010, entered the top five within this group in 2012, and began to develop at the same pace as developed countries. At the moment, it is part of a group of states with a higher-than-medium level of the Internet usage.

Assessment of digital inequality in Russian regions

Russian regions are characterized by disproportions in development according to various aspects. This issue is successfully studied within the regional economy. Main causes of inequality include a whole complex of natural and artificial factors and conditions. Based on this, an assumption exists that there is also an asymmetry in the processes of using ICT. While testing this hypothesis, we analyzed the materials, statistical compilations, published by Rosstat together with NRU HSE, which allowed studying the differentiation of Russian regions by the share of households with Internet access (on average, without specifying landline or mobile connection) and the proportion of population who use mobile devices, including smartphones and other gadgets, to access the network. The analysis of these data helps to assess the scale of first-level digital inequality in the country, as well as indirectly track how the population corresponds to global trends related to the predominance of mobile Internet over landline access. It needs to be mentioned that the calculation of variation indicators allows us to judge the average convergence of regions by Internet spread and by using it from mobile devices (the variation coefficient in both cases indicates absolute and sufficient uniformity of regions, *tab. 3*).

However, if we consider values of indicators, the result is somewhat different. For example, in the Chechen Republic in 2018, only one out of two people had access to the network (50.2%, *tab. 4*), which corresponds to the level of developing countries, and, in the region with a high level of spread – the Republic of Buryatia, the value at the level of developed countries was recorded – more than 87%.

In this case, it is difficult to link the grouping of regions with trends of its socio-economic development, since leaders and outsiders change, and the growth of a number of users is not always shown. On the contrary, a significant decrease (not corresponding to the increase of population, which could affect relative indicators) was recorded in a number of regions. Among them are the Republic of Dagestan and the Chechen Republic (which had the decrease by 17 and 25 p. p. in 2018 compared to 2017, respectively), the Republic of Sakha, Tyva, Kalmykia, and Krasnodar Krai (which lost from 15 to 30 p. p. in the share of Internet users). The reasons for such trends may include inaccuracies in static accounting and infrastructure aspects (for example, unfavorable conditions for using landline Internet and the lack of access to it, or poor quality of mobile Internet).

A similar situation is recorded in relation to the usage of mobile devices. The variation is

Table 3. Variations of Internet usage indicators in Russian regions

Indicator	2016	2017	2018	Growth rate, 2018 to 2016, %
Share of households with Internet access				
Maximum value	88.6	88.1	87.4	-1.4
Minimum value	61.6	62.1	50.2	-18.5
Variation coefficient	7.6	7.4	10.0	31.6
Share of mobile devices usage (mobile phones or smartphones, e-book readers, etc.) for accessing the Internet				
Maximum value	70.5	79.3	n.d.	12.5
Minimum value	22	37	n.d.	68.2
Variation coefficient	22.2	16.2	n.d.	-27.0
Source: own calculations; *Information Society in the Russian Federation. 2018, 2019: Stat. Coll.*				

Table 4. Grouping of Russian regions by share of households with Internet access

Level	2016	2017	2018
Above average	Saint Petersburg Chukotka AO Magadan Oblast Republic of Ingushetia Kaliningrad Oblast	Republic of North Ossetia–Alania Saint-Petersburg Magadan Oblast Republic of Ingushetia Tuvan Republic	Republic of Buryatia Saint-Petersburg Altai Republic Tyumen Oblast Republic of North Ossetia–Alania
Average	Tula Oblast Republic of Karelia Moscow Oblast Kamchatka Krai Voronezh Oblast	Krasnodar Krai Primorsky Krai Sakhalin Oblast Kaliningrad Oblast Republic of Kalmykia	Orenburg Oblast Republic of Karelia Tambov Oblast Irkutsk Oblast Chelyabinsk Oblast
Below average	Nizhny Novgorod Oblast Vologda Oblast Ryazan Oblast Tomsk Oblast Republic of Buryatia	Republic of Mordovia Yaroslavl Oblast Chuvash Republic Ulyanovsk Oblast Kirov Oblast	Republic of Kalmykia Chukotka AO Republic of Dagestan Tuvan Republic Chechen Republic

Source: *Information Society in the Russian Federation. 2018, 2019: Stat. Coll.*
Grouping is conducted by the author according to data on 85 entities of the Russian Federation, each group includes 5 regions.
Ranked: above average and average level – in descending order, regions with the highest percentage of Internet users.
Below average level – in ascending order, regions with the lowest share of Internet users.

Table 5. Grouping of Russian regions by the share of mobile devices (mobile phones or smartphones, e-book readers, etc.) for accessing the Internet

Level	2016	2017
Above average	Chukotka AO Magadan Oblast Moscow Republic of Tatarstan Republic Of Sakha (Yakutia)	Magadan Oblast Republic Of Sakha (Yakutia) Karachay-Cherkess Republic Murmansk Oblast Moscow
Average	Krasnodar Krai Tyumen Oblast Kaliningrad Oblast Amur Oblast Sverdlovsk Oblast	Republic of Ingushetia Moscow Oblast Altai Republic Tyumen Oblast Khabarovsk Krai
Below average	Kaluga Oblast Kostroma Oblast Republic of Mordovia Samara Oblast Republic of Buryatia	Irkutsk Oblast Ulyanovsk Oblast Yaroslavl Oblast Krasnoyarsk Krai Oryol Oblast

Source: *Information Society in the Russian Federation. 2018, 2019: Stat. Coll.*
Grouping is conducted by the author according to data on 85 entities of the Russian Federation, each group includes 5 regions.
Ranked: above average and average level – in descending order, regions with the highest percentage of Internet users.
Below average level – in ascending order, regions with the lowest share of Internet users.

insignificant, and it tends to decrease in available data for 2016 and 2017; however, indicator values range from 37% in the Oryol Oblast to 79% in the Magadan Oblast (*Tab. 5*). In general, the usage of mobile devices in Russian regions is less common than in the world and developing countries.

Thus, digital development of Russian regions is uneven; some areas have development level which could be compared only to developing countries, while others have already exceeded the level of developed countries. It once again exposes differentiation problems in Russian regions by a set

of characteristics. Application of personal (individual) and environmental (regional) determinants to this cross-section will allow studying settlement (city/village), socio-demographic, and socio-economic aspects of digital inequality. The reasons for digital inequality are the lack of infrastructure development, socio-cultural characteristics of regions, differences in living standards, and the availability of population's digital competencies. This information is expected to be studied in detail in the future while assessing the second and third levels of inequality.

Conclusion

The conducted research made it possible to draw several conclusions. It is revealed that, despite a significant decrease of countries' differentiation in terms of Internet connectivity, there is first-level digital inequality in the world, and its scale is large. A number of countries and regions of the world do not have access to the Internet – it is one of the newest manifestations of social inequality. For example, over the past 18 years, the situation with the internetization of Africa (with the exception of Egypt, South Africa, and Morocco) has remained mostly unchanged, where the share of users does not exceed 2% of population. Countries with a high involvement of residents in the Internet usage are represented mainly by European states. Since 2016, the oil-producing countries of the Persian Gulf have also began to join them, which confirms the importance of the economic determinant of digital development (its infrastructure component at least).

While comparing digitalization trends in developed and developing countries, it is concluded that they have a common focus: active Internet spread rates, reorientation to wireless communications and the Internet. Without a doubt, ICT is used more often in developed countries, but developing countries experience rapid growth of network access.

It is revealed that Russia also shows a significant increase of the share of Internet users: global average level was exceeded in 2010, and, if the country was among a group of countries with below average indicators, along with African countries, and its informatization growth approached the level of developing countries in the early 2000s, then, since 2010, it have got closer to developed countries.

The calculation of variation among Russian regions does not show any striking differences in the usage of the Internet by its population. At the same time, there are elements of first-level digital divide: in some regions, only one out of two people uses the Internet, in other areas – only one out of eight or nine people. There are territories with the decrease of the share of Internet users.

Russian regions also lag behind in terms of mobile Internet adoption rates: in 31 regions, the share of access to the network via mobile phones and other gadgets does not exceed 52%, and in 39 more – 65%. At the same time, wireless Internet is more accessible in material terms (average cost of mobile devices is reduced, its purchase is cheaper than buying a personal computer, and mobile operators' offers are also more profitable for mobile Internet than access via a desktop computer/ laptop). The main problem is a technical one: for example, the mobile network is much more accessible for rural residents from an economic point of view, but, in some areas, there is either no access to it, or it is difficult due to poor connection quality. It may be a factor of its exclusion from the digital environment and, moreover, manifestation of social exclusion.

The results of the study will serve as the basis for further study of population's digital inequality within the three-level model with a

case study of Russia and within a single region (Vologda Oblast); in particular, it is proposed to study the differences in settlements (large towns, constituting two opposite poles of development of the region's business and cultural capital and industrial center, municipalities, rural areas) and differences determined by age, gender, level of education, income and sociocultural characteristics of a ICT user, and digital services.

The research topic is multidisciplinary; it attracts the attention of specialists from the media sphere, mass media, philosophy, philology, economics, sociology, etc. The results of conducted and future studies on this topic are at the intersection of regional economics (the study of regional development factors, including socio-cultural ones) and sociology (the study of adaptation, motivation and changes of population's behavior in relation with the spread of digital services). The materials of the work are relevant information basis for assessing the digital divide among population in the world and Russia in particular, which can be used as a basis for conducting research on digital development as part of teaching in higher school. Also, it may be used as a basis for making management decisions, developing strategic programs by regional and federal authorities to reduce all manifestations of social inequality of population without exceptions, including ones occurring during the implementation of the national project "Digital economy".

References

1. Ganichev N.A., Koshovets O.B. Quantifying the Digital Economy: Between Reality and Design. *EKO=ECO*, 2020, no. 2, pp. 8–36. DOI: 10.30680/ECO0131-7652-2020-2-8-36 (in Russian).
2. Dubinina M.G. Unequal development of the digital economy in federal districts of Russia. *Upravlenie naukoi i naukometriya=Science Governance and Scientometrics*, 2019, vol. 14, no. 3, pp. 368–399. DOI: 10.33873/2686-6706.2019.14-3.368-399 (in Russian).
3. Volchenko O.V. Dynamics of digital inequality in Russia. *Monitoring obshchestvennogo mneniya: ekonomicheskie i sotsial'nye peremeny=Monitoring of Public Opinion: Economic and Social Changes*, 2016, no. 5, pp. 163–182. DOI: 10.14515/monitoring.2016.5.10 (in Russian).
4. Gladkova A.A., Garifullin V.Z., Ragnedda M. Model of Three Levels of the Digital Divide: Current Advantages and Limitations (Exemplified by the Republic of Tatarstan). *Vestnik Moskovskogo universitet. Seriya 10. Zhurnalistika=Vestnik Moskovskogo universiteta. Seriya 10. Zhurnalistika*, 2019, no. 4, pp. 41–72 (in Russian).
5. Nieminen H. Digital divide and beyond: What do we know of information and communications technology's long-term social effects? Some uncomfortable questions. *European Journal of Communication*, 2016, vol. 31(1), pp.19–32. DOI: https://doi.org/10.1177/0267323115614198
6. Ragnedda M. Conceptualizing digital capital. *Telematics and Informatics*, 2018, vol. 35, pp. 2366–2375. DOI: https://doi.org/10.1016/j.tele.2018.10.006
7. Ragnedda M., Kreitem H. The three levels of digital divide in East EU countries. World of Media. *Journal of Russian Media and Journalism Studies*, 2018, vol. 4, pp. 5–27. DOI: 10.30547/worldofmedia.4.2018.1
8. Plaksin S., Abdrakhmanova G., Kovaleva G. Approaches to defining and measuring Russia's internet economy. *Foresight and STI Governance*, 2017, vol. 11, pp. 55–65. DOI: 10.17323/2500-2597.2017.1.55.65
9. Arkhipova M.Yu., Sirotin V.P., Sukhareva N.A. Development of a composite indicator for measuring the value and dynamics of digital inequality in Russia. *Voprosy statistiki=Voprosy statistiki*, 2018, no. 25(4), pp. 75–87 (in Russian).
10. Norris P. *The Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide*. Cambridge, UK: Cambridge University Press, 2001. 320 p. DOI: https://doi.org/10.1017/CBO9781139164887

11. Attewell P. The first and second digital divides. *Sociology of Education*, 2001, vol. 74 (3), pp. 252–259.
12. Hargittai E. Second-level digital divide: mapping differences in people's online skills. In: *29th TPRC Conference*, 2001. Available at: https://arxiv.org/abs/cs/0109068
13. DiMaggio P., Hargittai E. From the «digital divide» to «digital inequality»: Studying Internet use as penetration increases. *Working Papers from Princeton University*, 2001, no. 47.
14. Vartanova E.L. Conceptualization of digital divide: Major stages. *MediaAl'manakh=MediaAlmanah*, 2018, no. 5, pp. 8–12. DOI: 10.30547/mediaalmanah. 5.2018.812 (in Russian).
15. Polozhikhina M.A. Information and digital inequality as a new type of socio-economic differentiation of society. *Ekonomicheskie i sotsial'nye problemy Rossii=Economic and Social Problems of Russia*, 2017, no. 2, pp. 119–141 (in Russian).
16. Alam S.S., Abdullah Z., Ahsan N. Cyber café usage in Malaysia: An exploratory study. *Journal of Internet Banking and Commerce*, 2009, vol. 14 (1), pp. 1–13.
17. Avila A. Underdeveloped ICT areas in Sub-Saharan Africa. *Informatica Economica*, 2009, vol. 13 (2), pp. 136–146.
18. Shinyaeva O.V., Slepova O.M. Information Digital Inequality of Population: Risk and Anti-Risk Factors. *Izvestiya Saratovskogo universiteta. Novaya seriya. Seriya: Sotsiologiya. Politologiya=Izv. Saratov Univ. (N. S.), Ser. Sociology. Politology*, 2019, vol. 19, no. 1, pp. 53–61. DOI: https://doi.org/10.18500/1818-9601-2019-19-1-53-61 (in Russian).
19. Israelashvili M., Kim T., Bukobz G. Adolescents' over-use of the cyber world – Internet addiction or identity exploration? *Journal of Adolescence,* 2012, no. 35 (2), pp. 417–424.
20. Davaki K. *The Underlying Causes of the Digital Gender Gap and Possible Solutions for Enhanced Digital Inclusion of Women and Girls*. 2018. 53 p. Available at: http://www.europarl.europa.eu/RegData/etudes/STUD/2018/604940/IPOL_STU(2018)604940_EN.pdf
21. Ragnedda M. *The Third Digital Divide: A Weberian Approach to Digital Inequalities*. UK Routledge. 2017. 128 p.
22. Ragnedda M. Conceptualizing digital capital. *Telematics and Informatics*, 2018, no. 35, pp. 2366–2375. DOI: https://doi.org/10.1016/j.tele.2018.10.006
23. Shinyaeva O.V., Poletaeva O.V., Slepova O.M. Information and digital inequality: searching for effective population adaptation practices**.** *Monitoring obshchestvennogo mneniya: Ekonomicheskie i sotsial'nye peremeny=Monitoring Public Opinion: Economic and Social Changes*, 2019, no. 4, pp. 68–85. DOI: https://doi.org/10.14515/monitoring.2019.4.04 (in Russian).

Information about the Author

Maria A. Gruzdeva – Candidate of Sciences (Economics), Senior Researcher, Head of the Laboratory, Vologda Research Center of the Russian Academy of Sciences (56A, Gorky Street, Vologda, 160014, Russian Federation; e-mail: mariya_antonovarsa@mail.ru)

Received April 17, 2020.

DOI: 10.15838/esc.2020.5.71.6
UDC 332.14; LBC 65.049 (2)

Assessing the Regional Housing Market Development in the Northern and Arctic Regions of the Russian Federation*

Elena E.
EMELYANOVA
Luzin Institute for Economic Studies of the Kola Science Centre of the Russian Academy of Sciences
Apatity, Murmansk Oblast, Russian Federation, 24A, Fersman Street, 184209
E-mail: emelya@iep.kolasc.net.ru
ORCID: 0000-0003-4737-8265; ResearcherID: K-9654-2018

Anastasiya N.
CHAPARGINA
Luzin Institute for Economic Studies of the Kola Science Centre of the Russian Academy of Sciences
Apatity, Murmansk Oblast, Russian Federation, 24A, Fersman Street, 184209
E-mail: achapargina@yandex.ru
ORCID: 0000-0002-4399-4063; ResearcherID: I-9170-2018

Abstract. The purpose of the study is a comprehensive assessment of housing market development based on a new system of indicators reflecting the population's solvency and demand in the housing market, the economic development of the housing market, in order to identify trends in the housing market over a long period and reveal key problems hindering the housing market development in the Northern and Arctic regions of Russia. In this paper we propose a methodology to assess the regional housing markets, analyze the indicators of economic development in the North and the Arctic, estimate people's financial capacity and demand in the housing market, indicate major changes in the regions' housing sector that can occur on the background of the measures applied by the state due to the coronavirus pandemic.

* The work is performed within the state assignments of FRS KSC RAS no. 0226-2020-0005_IEP "Integrated interdisciplinary study and mathematical modeling of socio-economic transformation and management of regions and municipalities of the North-Arctic territories of the Russian Federation" and no. 0226-2020-0002_IEP "Scientific bases of formation and realization of financial and investment potential of the regions of the North and the Arctic".

For citation: Emelyanova E.E., Chapargina A.N. Assessing the regional housing market development in the Northern and Arctic regions of the Russian Federation. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, p. 105–120. DOI: 10.15838/esc.2020.5.71.6

The scientific novelty of the work is determined by a comprehensive study of regional housing markets in the Northern and Arctic regions using the indices proposed by the authors, which made it possible to formulate a number of proposals for developing the housing market in the Arctic and Northern regions of the Russian Federation. The study results can be used by the government and administrative authorities in developing policies in the field of providing the population with comfortable housing and improving the regions' housing stock, in working out the programs aimed at housing construction, as well as by specialists in the field of finance, researchers. In the future, based on a comparative analysis of the regions' housing development, the authors plan to predict the regional housing markets development taking into account the changing parameters of population solvency and construction industry, considering the specifics of the Federation subject's development and the effectiveness of government measures in this sector of the economy during the crisis period of the pandemic.

Key words: housing market, housing conditions, regions of the North and the Arctic, population solvency, regions ranking.

Introduction

The Russian construction industry is a complex related sector of the economy that determines the development of the industrial and social spheres of the country and its regions. Construction industry development largely depends on the development of the residential real estate market and the population's effective demand for it. Currently, the development of the housing market and consideration of its peculiarities in different regions are becoming more and more relevant. At the government level, the problem of providing the population with affordable quality housing in the country is at the forefront.

The purpose of our research is a comprehensive assessment of the regional housing market with indices based on a new system of indicators, which reflect the population's solvency and demand in the housing market and the economic development of the housing market, to reveal trends in the development of the housing market over a long period and identify key problems hindering its development in the Northern and Arctic regions of Russia.

To achieve this goal, we need to solve the following tasks:

1. Develop a comprehensive methodology for assessing the housing market development, select indicators for calculating the index of population solvency and the index of economic development in the housing market.

2. Rank the Northern and Arctic regions of the Russian Federation according to the final housing market development index and carry out their clustering, i.e. identify homogeneous groups of subjects with high, medium, and minimum index values.

3. Analyze the dynamics of the final housing market development index, calculated separately for each studied subject, for each year of the analyzed time period (2005–2018), focusing on the current state of housing development.

The scientific novelty consists in the development of the author's methodological tools for assessing the development of regional housing markets; identifying trends in the development of the housing market in the Northern and Arctic regions of the Russian Federation for the period of 2005–2018; and identifying key problems hindering its development.

Housing market development in the regions is not only related to housing prices, monetary policy, and financial stability in the country [1] but also largely depends on regional economic

conditions and has a pronounced local nature [2, p. 41–51]. For example, environmental events that have occurred in a region may devalue the nearby property units due to the actual pollution caused by imposing a "quasi-stigma" (negative perception) on these houses. The effect of stigmatization can be quite persistent, and it will be difficult to reverse it later in order to attract buyers to the regional real estate market [3]. In this regard, for example, China actively promotes the transition to environmentally friendly housing construction [4].

Studying the impact of heterogeneity of home buyers on prices, scientists concluded that non-local residents pay more than the local ones. So-called "anchoring effect" is manifested in case of people coming from places with higher housing prices [5]. At the same time, housing prices, mortgage interest rates, and insurance rates are mutually independent and equal to the prices in isolated markets, which is proved by researchers when analyzing agents with conflicting interests by mathematical describing a complex (three-agent) system of interactions – the housing market, mortgage market, and insurance market [6].

In addition, the housing market is related to the development of transport, engineering and social infrastructure in the regional context [7]. City authorities more often use the concept of "smart city" for direct interaction with community and infrastructure to see what happens in a city and how it develops. S. Maalsen first introduced the concept of "smart housing" with modern technologies to achieve environmental, economic and sociocultural sustainability, which is a new type of housing market, which is formed due to the growth of cities' "smartness" [8, p. 1–7]. Research by K. Butryn et al. is devoted to the assessment of the current trends in the housing market development that affect the socio-economic development of cities [9]. The works of M. Tomal [10] reflect modern trends in the development of real estate market, including innovative models and types of housing construction such as the concept of "smart housing" and "smart city" based on such indicators as demand, income level, unemployment, etc.

In Russia, despite the appearance of so-called "smart homes" in some cities of the country, where smart devices and technologies are used for the functioning of things inside the house [11; 12], the traditional housing market still prevails.

Regions and municipalities of the North and the Arctic of the Russian Federation, characterized by the specifics of functioning, social and economic development [13], determine the features of their housing market development. The specifics of the housing market development in the Northern region are studied by O.S. Favstritskaya, E.I. Gavrilova, and E.A. Shirokova [14; 15; 16]. Raising the issue of northern location and its impact on all spheres of life, including housing, they say that it is necessary to take into account the adverse impact of northern conditions when making management decisions regarding the standards of living, providing the population with comfortable housing, and use proactive, rather than catch-up measures in solving the housing issue in the North.

At the same time, real estate prices formed by general demand, which reflects the population solvency, and supply, which characterizes economic activity, are an important indicator of the population's income and prospects for the cities and regions development [17].

In addition, the analysis of the problems of housing market development and providing comfortable housing conditions to the population can be carried out through the prism of various factors that directly characterize

the life and activity of a person [18], for example, from the position of influence on demographic indicators in the region [19–23]. The researchers [24] proved that high rates on mortgage and housing loans in conditions of limited rental markets create prerequisites under which housing conditions limit the formation of independent households and, accordingly, restrain the birth rate.

A number of scientists associate the trends and prospects of housing market development with the quality of life, population migration and human potential [25; 26; 27]. It is believed that the problems of housing market development are reflected in the labor market, hindering the mobility of households [28]. Based on practical research, the relationship between housing and population indicators is proved [29]. In addition, poor housing conditions can affect the health of the population [30; 31], increasing the likelihood of mental disorders due to unsatisfactory living conditions [32; 33; 34].

Housing problems solution is usually complicated by the lack of available funds among the population in the regions, as well as differences in the level of socio-economic development of the constituent entities of the Russian Federation [35].

In contrast to Russia, in foreign Nordic countries (especially in the Scandinavian ones), social housing funds are used to solve housing problems; that is providing housing to needy citizens on preferential terms, and the rental market active developing [36]. The policy of housing sector socialization in Scandinavia is designed to provide the population with comfortable living conditions, regardless of social status, without allowing society stratification [37].

A problem analysis of the literature and other sources on the stated topic showed that one part of the research is devoted directly to the analysis of the housing market and its relations with the external environment, and the second – to the analysis of the population's housing conditions and their impact on health, including in individual regions. At the same time, it is practically impossible to find a comprehensive analysis of the features and trends in the development of regional housing markets, which would take into account the behavior and solvency of the population living in this territory.

Research methods. Rationale for indicators selection

Our research analyzes the traditional housing market, which is understood as a set of participants (buyers, sellers, government regulators, etc.) and transactions (purchase, sale, lease, etc.) made with a specific product – real estate. The leaseholders market is not considered.

The housing market of the Russian Federation and its regions is usually studied using statistical data in the following areas: analysis of the state of the market and its development, dynamics of real estate prices, assessment of housing conditions, mortgage housing market, etc. Currently, there are no generally recognized universal methods for assessing the regional housing market that would provide a comprehensive description of its development from the perspective of the population's solvency and economic factors in the region's real estate market. Most of the developed methods (see, for example, [38]) include a significant number of indicators and parameters for evaluation, which complicates the possibility of their application in practice, and the indicators used for evaluation do not allow fully and qualitatively assessing the state of the regional housing market in the aggregate in two specified areas.

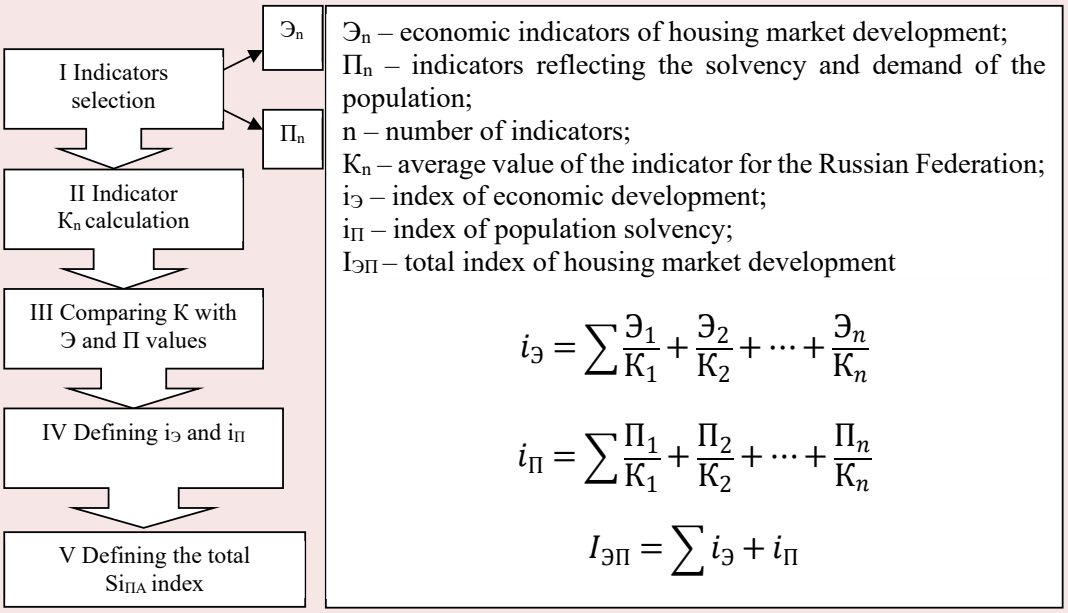
In this regard, we have developed and applied a scoring method (*Fig. 1*) based on the analysis of parameters that depend on the income of the population and characterize

its solvency, and economic indicators of the development of the housing market in the regions.

To assess the indicators of housing market development, we used a scale from 0 to 1, where 1 is the maximum value; 0.5 is the average; 0 is the minimum. We also applied intermediate values of 0.25 and 0.75, which were assigned if the value of the indicator was significantly higher (or lower) than the average value, which made it possible to reflect their level in more detail. The indicators comparison was carried out by scaling relative to the average values for the Russian Federation, after which each indicator was assigned an index in the specified numerical intervals ($i_Э$ and $i_П$). We should take into account that the indicators of the housing market development can be both "positive" (e.g., investment level) and "negative" (for example, the proportion of emergency housing); according to this, the indices were assigned (*Tab. 1*).

For a comprehensive analysis of the regional housing market in Northern and Arctic regions of the Russian Federation we have selected a number of indicators in two areas: economic, characterizing the activity of housing construction development, a number and quality of offers on the real estate market and indicators defined by the level of solvency of

Figure 1. Algorithm and methodology for the regional housing market assessment



Source: own compilation.

Table 1. Numerical intervals and indices of indicators assignment

Index	"Positive" indicators	"Negative" indicators
1	$i_э$; $i_п \geq 1.6$	$i_э$; $i_п < 0.4$
0.75	$1.2 \leq i_э$; $i_п < 1.6$	$0.4 \leq i_э$; $i_п < 0.8$
0.5	$0.8 \leq i_э$; $i_п < 1.2$	$0.8 \leq i_э$; $i_п < 1.2$
0.25	$0.4 \leq i_э$; $i_п < 0.8$	$1.2 \leq i_э$; $i_п < 1.6$
0	$i_э$; $i_п < 0.4$	$i_э$; $i_п \geq 1.6$
Source: own compilation.		

Table 2. Indicators for assessing the housing market development

Economic indicators	Indicators of the population's solvency
Commissioning of housing, sq. m / person	Proportion of families registered as needing better housing conditions in a total number of families in the region, %
Share of dilapidated housing in a total area of the housing stock, %	Proportion of families having improved housing conditions in a total number of families registered as needing to improve housing conditions, %
Investments in fixed capital by 'housing' fixed assets type (in actual prices), rub./person	Share of housing and utilities expenses in household consumer spending, %
Volume of public services per 1 person, rub.	Housing affordability index in the regions**
Share of comfortable housing in the total housing stock of the region, %*	Volume of housing and mortgage loans to individuals, rub./person
	Average annual level of the population's debt load on housing and mortgage loans***

* Calculated on average in terms of housing stock equipment with water supply, sewerage, central heating, gas, bathrooms (showers), hot water, electric floor stoves.
** The ratio of cost of 1 sq. m to the per capita income of the population. The lower the index, the greater the purchasing power of the population to housing purchase.
*** The ratio of debt on housing and mortgage loans to the average per capita income of the population.
Source: own compilation.

the population in the region and reflecting the population's demand for housing (*Tab. 2*).

The research area includes 24 constituent entities of the Russian Federation belonging to the Far North or equated to them, and 9 of them are also included in the Arctic zone of the Russian Federation. The time interval of the study was 14 years (from 2005 to 2018). Thus, the sample of indicators included 4032 values (12 indicators for 24 constituent entities of the Russian Federation over 14 years).

The methodological study of the regions is based on the study of open sources: state statistics and reporting data, data from the Central Bank of Russia, data from the Federal State Statistics Service, and databases developed by the authors[1]. The information basis of the study was made up by the theoretical and practical research of foreign and domestic specialists, information sites of government agencies, and publications in the media.

[1] Emelyanova E.E., Chapargina A.N. Database "Housing Market in the Northern and Arctic Regions of Russia". Certificate of state registration no. 2019621181, dated July 4, 2019; Emelyanova E.E., Chapargina A.N. Database "Most Important Indicators Characterizing the State of Municipal Budgets, Living Standards and Income Levels of the Urban Districts of AZ RF by Main Social Areas". Certificate of state registration no. 2018621190, dated August 6, 2018.

Research results

The specifics of the Northern and Arctic regions' socio-economic development consisting in the elevated costs for the provision of production, works, services, non-diversified economy, low density of population and its migration loss, as well as the harsh climatic conditions, determine the peculiarities of the housing market development in the North and the Arctic (*Tab. 3*), namely:

– high cost of construction and housing improvements;

– increased level of expenses for housing and communal services in people's spending;

– relationship between the place of production (mining) and the level of prices,

– minimum share of the elite and suburban housing,

– housing demand is formed mainly by the local working population,

– reduced demand for property due to relocation from the North within the resettlement programs,

– high proportion of dilapidated housing, low rates of housing commissioning,

– lack of demand for housing in remote areas related to the closure of production facilities.

Table 3. Housing market development trends in the Northern and Arctic regions of the Russian Federation

Indicator		2005	2010	2014	2015	2016	2017	2018
Commissioning of residential buildings per 1000 people, sq. m	RF	304	409	576	583	547	540	515
	N&A*	213.2	294.6	417.6	435.9	391.3	375.0	330.4
Share of condemned buildings in a total area of a total housing stock, %	RF	0.4	0.6	0.7	0.5	0.6	0.7	0.7
	N&A	0.8	1.7	1.9	1.7	2.0	2.2	2.6
Total area of residential premises per inhabitant on average, sq. m	RF	20.8	22.6	23.7	24.4	24.9	25.2	25.8
	N&A	20.5	22.3	23.0	23.4	23.7	23.9	24.2
Proportion of families registered as needing housing in a total number of families, %	RF	6.5	5.5	4.9	4.7	4.6	4.4	4.3
	N&A	9.3	8.3	7.6	7.2	7.1	7.4	6.9
Proportion of families who received housing, including families registered as needing housing, %	RF	3.6	8.6	5.0	5.0	4.9	4.8	4.0
	N&A	7.9	10.2	8.0	7.4	7.4	7.6	6.0
Share of household expenditures on housing and utilities, % of total consumer spending	RF	8.3	9.2	8.9	9.5	10.1	9.7	9.6
	N&A	8.5	10.1	9.4	10.2	10.8	10.9	10.8
Cost of 1 sq. m of total area of apartments in primary and secondary housing markets, rub.	RF	23780	54071	54899	53906	53635	54616	57155
	N&A	18334	41038	56181	56196	55878	54477	56028

* N&A – average values of indicators for the Northern and Arctic regions of the Russian Federation.
Source: own calculation and compilation on the basis of Database "Housing Market of the Northern and Arctic Regions of Russia", Certificate of state registration no. 2019621181, dated July 4, 2019.

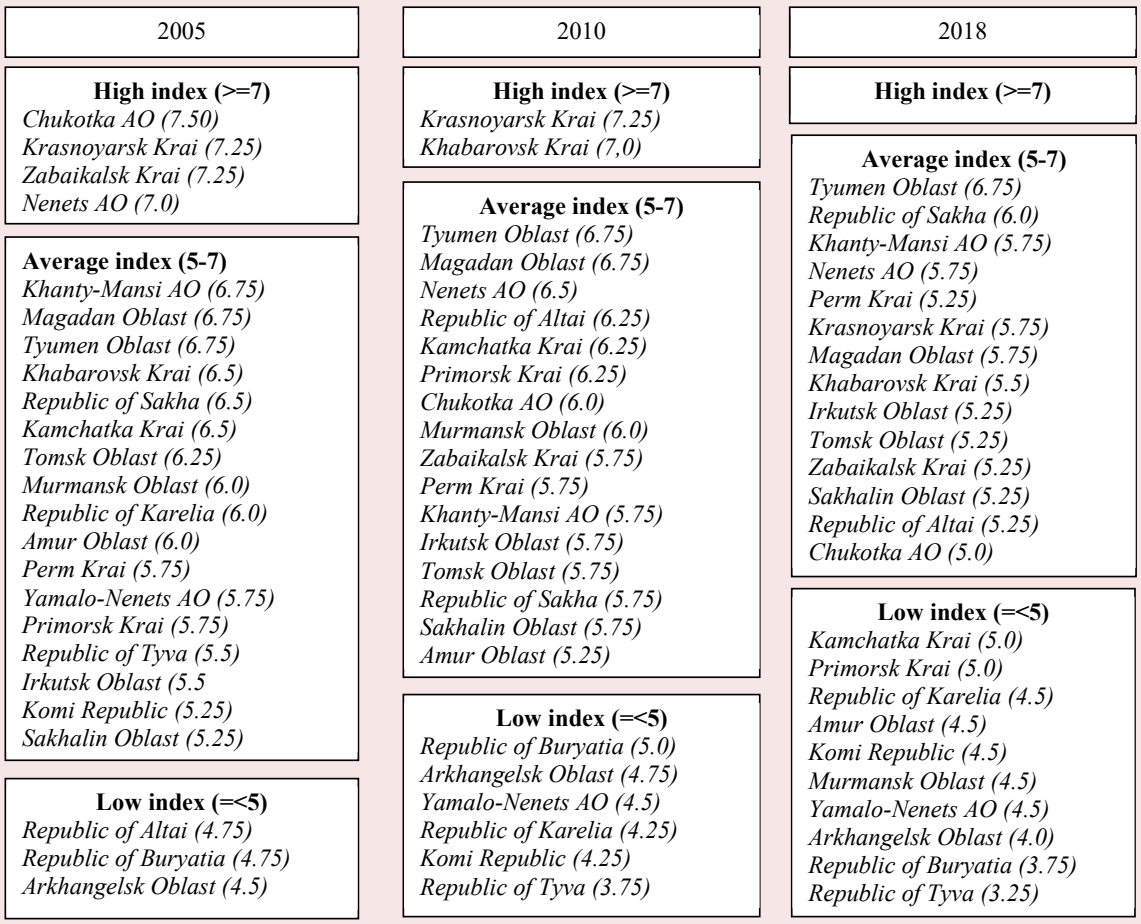
Based on the previously proposed estimation method, we calculated total indices of housing market development for all the years included in the sample to determine the dynamics and trends of the housing market development in the regions of the North and the Arctic. The results show a definite downward trend in housing market development in most of the Northern and Arctic regions relative to the national average in the period of 2005–2018. We should draw attention to the fact that, by 2018, none of the studied territories has shown an increase in the total index above 7. While the stability of the downward trend since 2010 is typical for almost all regions. Only the Yamalo-Nenets and Khanty-Mansi autonomous districts did not change their positions in 2018 compared to 2010, while the total housing market development index slightly improved in the republics of Sakha, Karelia, and Komi. The maximum decrease in the total index during the studied period occurred in the Krasnoyarsk Krai (from 7.25 in 2005 to 5.75 in 2018; *Fig. 2*).

The identified move of the Arctic and Northern regions into groups with minimum and average value of the total index of housing market development, the lack of areas with a high index value, on the one hand, provide the preconditions for reducing differentiation in the levels of housing market development in the North and in the Arctic, but, on the other hand, they indicate the worsening situation in the housing sector of the studied subjects.

To explain the reasons for the regions' movement from groups with a higher total index of housing market development to the groups with a lower one, it is necessary to disaggregate this index into two: the population solvency index and the housing market economic development index (*Tab. 4*).

The performed calculations showed that, when assessing the population solvency index, the greatest change is produced by such indicators as "housing affordability index in the region", "volume of housing and mortgage loans to individuals", "average annual level

Figure 2. Ranking and clustering of the Northern and Arctic regions of the Russian Federation according to the total housing market development index in 2005, 2010, and 2018



Source: own compilation.

of the population's debt load on housing and mortgage loans".

When assessing the index of economic development of the housing market, the most significant indicator was "investment in fixed assets by "housing" type of fixed assets". The points added for this index decreased in almost all regions, which was reflected to a greater extent in the total index. The scores for the indices of "total area of residential premises per inhabitant on average" and "improvement of the housing stock" remained almost unchanged in the dynamics for the regions.

The advancement of the republics of Sakha, Komi, and Karelia according to the outcome index is associated with an increase of the economic development index of the housing market, namely, accrual of points in terms of "dwelling houses". In the Yamalo-Nenets and Khanty-Mansi autonomous okrugs, the housing market economic development index declined sharply due to changes in the indicators "commissioning of residential buildings", "investment in fixed assets by type of fixed assets "housing", and "the share of emergency housing stock in the total area of the entire housing stock", but, for the final index, this trend in these subjects was offset by a noticeable change in the population's solvency index.

Table 4. Dynamics of the housing market economic development index and the population solvency index

Region	Housing market economic development index			Population solvency index		
	2005	2010	2018	2005	2010	2018
Republic of Karelia	3	2	2.25	3	2.25	2.25
Komi Republic	1.75	1.25	1.5	3.5	3	3
Nenets AO	4.5	3.75	2.75	2.5	2.75	3
Arkhangelsk Oblast	1.75	1.75	1.75	2.75	3	2.25
Murmansk Oblast	2	2	1	4	4	3.5
Perm Krai	2.5	2.5	2.5	3.25	3.25	2.75
Khanty-Mansi AO	3.25	3.25	2.5	3.5	2.5	3.25
Yamalo-Nenets AO	2.75	1.75	1.5	3	2.75	3
Tyumen Oblast	3.5	3.5	4.25	3.25	3.25	2.5
Republic of Altai	2.5	2.75	3.25	2.25	3.5	2
Republic of Tyva	3	2.25	1.75	2.5	1.5	1.5
Krasnoyarsk Krai	3.25	3.5	2.5	4	3.75	3.25
Irkutsk Oblast	2.5	2.75	2.25	3	3	3
Tomsk Oblast	3	3	2.5	3.25	2.75	2.75
Republic of Buryatia	2.5	2.5	1.75	2.25	2.5	2
Republic of Sakha (Yakutia)	2.5	2.5	2.75	4.25	3.25	3.25
Zabaykalsky Krai	3	2.5	2	4.25	3.25	3.25
Kamchatka Krai	3	2.5	1.25	3.5	3.75	3.75
Primorsky Krai	3	3.25	2.25	2.75	3	2.75
Khabarovsk Krai	3.25	3.25	2	3.25	3.75	3.5
Amur Oblast	2.5	2.5	1.5	3.5	2.75	3
Magadan Oblast	2.5	2.5	1.25	4.25	4.25	4.5
Sakhalin Oblast	2	2.5	2.25	3.25	3.25	3
Chukotka AO	4.25	2.5	1.5	3.25	3.5	3.5
Source: own calculation.						

For a detailed analysis of the current state of the housing sector and the specifics of the development of the housing market in the regions of the North and Arctic, the matrix regions were built (*Fig. 3*), where the population's solvency and demand reflected in the Y-axis, and economic parameters for the housing market development are on the X-axis. The aggregate housing market development index is characterized by the size of circles.

Square A shows a low level of the housing market development in all the specified areas and indicators;

Square B – high level of population's solvency in the region with low indicators of economic indicators of housing market development;

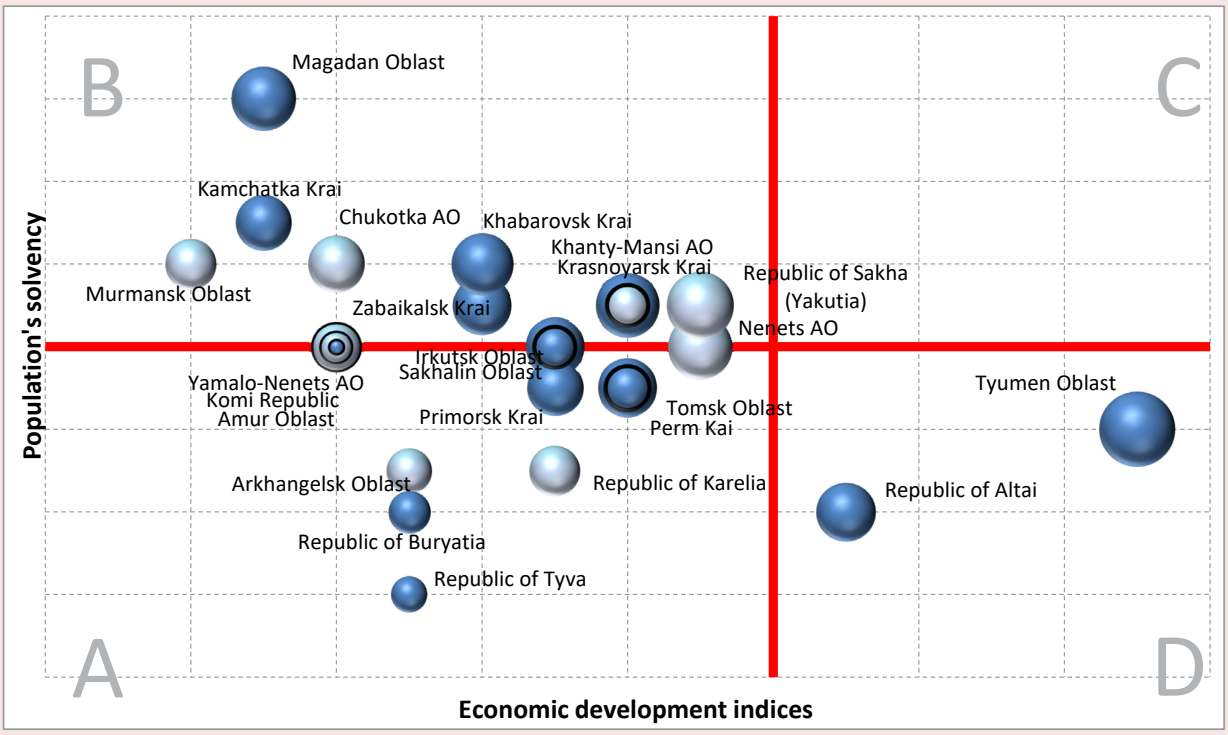
Square C – high level of housing market development in the region in the specified areas;

Square D – high level of development of economic indicators of the housing market with a low population's solvency level.

The information presented in the form of the Matrix for 2018 clearly shows that almost all regions (except the Republic of Altai and the Tyumen Oblast) lag behind the average Russian level in terms of economic indicators of housing market development. The outsider regions for this type of indicators include the Murmansk and Magadan oblasts and the Kamchatka Krai, where there is practically no housing development, and the investment level in the housing sector is one of the lowest among the Northern regions.

The leading regions, caught at square D, in the direction of economic development indicators (Tyumen Oblast and Republic of Altai), where is housing construction is active (Tyumen Oblast takes the first place among the studied

Figure 3. Housing market assessment Matrix in the Northern and Arctic regions (2018)



The regions included in the Arctic zone of the Russian Federation are highlighted in a lighter tone.

Source: own calculation.

entities at the putting into housing operation), and the level of emergency and dilapidated housing is insignificant (in the Republic of Altai – the lowest specific weight of dilapidated housing), indicators of population's solvency are significantly behind the average numbers in the country and other regions of the North and Arctic. In this regard, their housing market is unbalanced in terms of purchasing power and population's solvency demand. The lag in the Republic of Altai is primarily due to the high proportion of families who are in need of housing (this is the anti-leader region after the Nenets Autonomous Okrug, where this indicator is 4 times higher than the national average), and the low level of per person income (19.503 rubles/person in 2018). According to the housing affordability index, the region also occupies one of the last positions among all regions of the North and Arctic.

Unlike the Republic of Altai, the Tyumen Oblast, with rather medium values (for the worse) from the national ones by the above indicators, takes one of the last places among the regions in the share of household expenditures for housing and utility services (12.1%), which is more than 25% higher than the average for the country. With a fairly low level of average per person income and a relatively high cost of housing in the region, there is a significant level of population's creditworthiness. The average annual level of the population's debt burden on housing and mortgage loans in the Tyumen Oblast (excluding AO) is about 4.4 which is 1.7 times worse than in the whole country. This is the worst result among the regions of the North and Arctic after the Khanty-Mansi Autonomous Okrug.

The most unbalanced housing market is represented by six North and Arctic regions in

square A. Despite the fact that the Perm Oblast, Primorsky Krai, and the Tomsk Oblast fall into this square, they occupy quite high positions in the aggregate housing market development index, associated with minor deviations for the worse from the average values in Russia in both assessment areas. The remaining four regions of square A (the Republic of Tyva, Buryatia, Karelia, and the Arkhangelsk Oblast) are clear outsiders in terms of housing market development (the lowest aggregate index and a significant lag in economic parameters of development and population's solvency).

The most numerous in terms of representation (15 regions) square B which includes the regions with medium indicators, signals a fairly good population's solvency and housing affordability. This is primarily due to the high population's incomes. This group includes seven Far East regions (the Republic of Sakha (Yakutia), Khabarovsk, Zabaikalsky and Kamchatka krais, Amur and Magadan oblasts and the Chukotka Autonomous Okrug), where the federal program for subsidizing mortgage loans operates: thanks to it, the regions are characterized by a low debt burden on the population for paying housing and mortgage loans.

None of the Northern and Arctic regions was included in square C which serves as a reference point for the balanced housing market development in terms of the population's ability to pay and economic indicators at or above the national average. The housing markets in the Nenets Autonomous Okrug and the Republic of Sakha (Yakutia) are the closest to this indicator, where the population's solvency and housing quality are higher or at the average level, and economic parameters are slightly lower than the national average.

Discussion

The housing market is a kind of indicator of the social and economic situation in the country and region; it determines the level and prospects of the territory's development. The housing market of the Northern and Arctic regions is characterized, on the one hand, by a fairly high degree of population's solvency due to the high income level in most subjects, on the other – by low rates of housing development and a high level of emergency housing due to increased depreciation of fixed assets in extreme climatic conditions of the Far North. In addition, in the Northern regions with a characteristic predominance of the extractive sector in the economy, there is a growing trend of shift work at large city-forming enterprises. Attracting employees from other regions and neighboring countries in order to save on the salary payroll causes an imbalance in the real estate market in favor of rental housing and refusal to purchase it as property, leads to the depopulation of the territories, especially small single-industry cities and peripheral settlements, and, accordingly, affects the indicators of housing construction activity [39].

Migration outflows from the regions of the North and Arctic affect both demand and supply in the housing market. On the one hand, a decrease in the population leads to a lack of demand for housing in localities in the Northern and Arctic regions; on the other hand, it increases its availability due to a decrease in demand for real estate. The largest population's outflow to other regions is observed in the Murmansk Oblast and Yamalo-Nenets Autonomous Okrug. In 2018, the coefficients of migration growth (loss) per 10,000 people there were -59 and -32, respectively; therefore, a number of departures is not compensated by arrivals[2].

The problem of attracting and securing human resources in the vast Northern territories (although only in the Far East) was partly solved by the state through the development and

[2] *Russia's Regions. Socio-Economic Indicators, 2019: Stat. Coll.* Rosstat. Moscow, 2019. P. 1204.

implementation of Federal programs ("Far Eastern Hectare") and subsidizing part of mortgage rates for these regions. However, these measures do not cover the problems of other entities of the North and Arctic in addressing issues of human resource development. In addition, during the implementation of the national projects in housing sector in the Northern and Arctic regions of the Russian Federation, characterized by a significant amount of dilapidated housing stock, more than 20% of the funding will be directed not at solving the problem of housing construction (due to high cost) but at emergency demolition of dilapidated shelters. It is proposed to solve the issues of replacement of the emergency fund and its resettlement by resettling people to other regions of the country[3] which will not contribute to the housing market development in the North and Arctic.

The housing market is sensitive to changes in macroeconomic indicators due to its close connection with such sectors of the economy as construction, investment, household income and effective demand [7]. Not having time to recover after the global financial crisis of 2014, the housing market in subsequent years will even more feel the negative trends in the economy caused by another decline in oil prices, complicated epidemiological situation of coronavirus and the government measures that have already led to the suspension of many branches of production and economic activity, services, small and medium businesses, increased unemployment and a significant loss of income and population's solvency. In the forecast period, this is bound to affect (and is already affecting) the housing market.

The period of the crisis beginning in 2020 was characterized by a high demand for residential real estate due to the population's attempts to save their savings. However, non-working days announced in April by the President of the Russian Federation have already led to a decline in real incomes of citizens due to mass layoffs and "vacations at their own expense" which caused a reduction in effective demand for housing. Now, after a surge in demand for real estate, sales are declining, people are not confident in the economic situation and their own income, they are not ready to take on long-term liabilities for the housing and mortgage loans which are common when buying real estate. We can also predict the growth of debt on previously issued housing loans. According to the Bank of Russia[4], the household debt level of the population has a stable positive trend with an average annual growth of about 15%.

However, the impact and consequences of these processes can be fully assessed only in 2021–2023, and the housing market recovery can be expected no earlier than in 2022, given the increased volatility of the national currency and oil prices, the depreciation of household incomes and increasing unemployment.

To date, a package of measures has been adopted at the state level to support the housing market; for example: a program of subsidized mortgage lending for housing in new buildings with a rate of 6.5% (similar to the 2014–2016 program, but with a lower rate); housing purchase by the state company "DOM.RF" in projects where 30–80% of the total number of apartments is sold (in the future, it is planned to provide it to beneficiaries who are waiting in line for housing or sell it after the market demand has recovered). The construction industry was one of the first to get out of the

[3] The specifics of the Arctic regions can be taken into account when resettling emergency housing, *Official website of the Ministry of Construction, Housing, and Utilities of the Russian Federation*. Available at: https://www.minstroyrf.ru/press/spetsifika-arkticheskikh-regionov-mozhet-byt-uchtena-pri-rasselenii-avariynogo-zhilya-/ (accessed: September 5, 2020).

[4] Debt on mortgage and housing loans. *Official website of the Bank of Russia*. Available at: https://cbr.ru/statistics/pdko/Mortgage/ML/ (accessed: May 2, 2020).

long "non-working days", and the companies themselves in the real estate market provoke demand by providing discounts, benefits for paying interest on mortgage loans for a certain period, etc.

The ongoing support measures are among the largest in the history of the housing sector. However, all the adopted legislative initiatives are primarily aimed at supporting the primary housing market, usually in the capital regions, and regional housing markets for the most part remain without support.

The significance of the research consists in the formation of scientific provisions for stimulating regional housing markets, and the development of methodological tools for their assessment which allows determining the level and trends of development in different regions. The results of the research can be used by government and administrative authorities in developing policies for providing the population with comfortable housing and improving the housing stock of regions, in creating programs aimed at housing construction, as well as by specialists in the field of finance and researchers. In the future, through a comparative analysis of the housing sector development in the regions, we are planning to present the forecast for the development of the regional housing markets based on changing parameters of the population's solvency and the construction industry taking into account the specifics of the development of the federation and the effectiveness during the crisis period of the pandemic, government measures against this sector of the economy.

Conclusion

We started preparing the article at the very beginning of the height of the sanitary and epidemiological situation related to COVID-19, and, unfortunately, statistics regarding economic indicators and the population's solvency do not allow assessing the current state of the real estate market and its impact on the epidemiological factor of the economic crisis expansion which aggravated the next drop in oil prices.

At this stage of the research, we evaluated the regional housing market of the Northern and Arctic regions of the Russian Federation on the basis of a system of indices reflecting economic indicators of housing market development and population's solvency in order to determine the dynamics and key problems that hinder the housing market development in the Northern and Arctic regions of the country in the pre-crisis period. According to the tasks set, a methodology for assessing the regional housing market has been developed based on data analysis and determining the most significant indicators for it, reflecting the level of its development in macro-regions. In assessing the state of the housing market dynamics of the selected regions with the subsequent ranking of the results revealed, on the one hand, the preconditions for the reduction of differentiation in levels of housing market development between the actors of the Northern and Arctic entities, and, on the other hand, worsening situation in the housing sector of the studied area in connection with a decrease in the final index housing market development in most of the Northern and Arctic regions. It was revealed that, by 2018, against the background of a steady decline in the aggregate index since 2010, none of the studied entities reached high indicators of housing market development relative to the national average.

The housing markets of the Republic of Sakha (Yakutia) and the Nenets Autonomous Okrug are the most balanced in two areas of research – the population's solvency and economic development indicators – despite the fact that they "fall short" of the national average. The Khanty-Mansi Autonomous Okrug, the Krasnoyarsk Krai, the Perm Krai, and the Tomsk Oblast can be included into

the same group with slightly worse results. The Arkhangelsk Oblast (except the Nenets AO), the Republic of Tyva and Buryatia became clear outsiders in terms of market balance and the total development index.

Based on the research results, projecting the economic situation in the country, complicated by the epidemiological situation, to change the current situation and maintain the regional housing market in the Northern and Arctic regions of the country, it is necessary to develop the following main directions:

– creating favorable economic, social and labor conditions for attracting permanent residents to the regions of the North and the Arctic which implies a significant increase in the population's income level in comparison with the more southern regions of Russia, as it was during the years of industrial development of the North, as well as providing guarantees of benefits and compensation to employees of the Far North not only in the public sector. Only with the growth in a number of permanent residents in the Northern regions, it is worth talking about the prospects for the housing construction development and the real estate market;

– increasing the solvency and reducing the debt burden on the population by reducing interest rates on housing and mortgage loans. In addition, in the context of the pandemic, it is necessary to provide state subsidies for the income of employees who are in a state of temporary downtime, and state support for organizations and enterprises in the most affected sectors of the economy (transport, culture, leisure and entertainment, tourism and hotel business, public catering, etc.). This will reduce or prevent a significant growth in overdue payments of housing loans;

– supporting regional housing markets and effectively distributing financial assistance from the state that stimulate the development and coverage of all the entities of the Russian Federation, it is necessary to implement special federal and regional housing programs (similar to the Far East), extended to all regions of the North and Arctic, and state subsidization of the interest rate on the purchase of real estate not only in new buildings, but also in the secondary housing market.

It is impossible to implement all three areas without an active participation of the state as a regulator of the real estate market, guarantor of stability, which increases income, compensation, and benefits for employees of the Far North, and the main developer of targeted development programs and plans for economic recovery in the post-pandemic period.

References

1. Pandey R., Jessica V.M. Determinants of Indian housing market: Effects and counter-effects. *Property Management*, 2019, vol. 38, no. 2, pp. 199–218. DOI: 10.1108/PM-06-2018-0038
2. Łaszek J., Olszewski K. Regional development of residential and commercial real estate in Poland and the risk of real estate cycles. *Barometr Regionalny*, 2018, no. 51, pp. 41–51.
3. Wenze Yu., Chaoran N., Chuanhao T., Haizhen W., Li F. Impacts of an urban environmental event on housing prices: Evidence from the Hangzhou pesticide plant incident. *Journal of Urban Planning and Development*, 2020, vol. 146, no. 2. DOI: 10.1061/(ASCE)UP.1943-5444.0000564
4. Jiang H., Payne S. Green housing transition in the Chinese housing market: A behavioural analysis of real estate enterprises. *Journal of Cleaner Production*, 2019, vol. 241. DOI: 10.1016/j.jclepro.2019.118381
5. Qiu L., Tu Y., Zhao D. Information asymmetry and anchoring in the housing market: A stochastic frontier approach. *Journal of Housing and the Built Environment,* 2019, vol. 35, pp. 573–591. DOI: 10.1007/s10901-019-09701-y
6. Geraskin M. Pricing analysis of interconnected markets of housing, mortgage lending and insurance. *Kybernetes*, 2020, vol. 1, no.2. DOI: 10.1108/K-12-2019-0849

7. Vanina T., Obolonkova A. State influence on the housing market. *Belgorodskii ekonomicheskii vestnik=Belgorod Economic Bulletin*, 2013, no. 3(71), pp. 29–35 (in Russian).
8. Maalsen S. Smart housing: The political and market responses of the intersections between housing, new sharing economies and smart cities. *Cities,* 2019, no. 84, pp. 1–7.
9. Butryn K., Jasin´ska E., Kovalyshyn O., Preweda E. Sustainable formation of urban development on the example of the primary real estate market in Krakow. *E3S Web of Conferences,* 2019, no. 86. DOI: 10.1051/e3sconf/20198600010
10. Tomal M. Moving towards a smarter housing market: The example of Poland. *Sustainability*, 2020, vol. 683, no. 12, pp. 2–25. DOI: 10.3390/su12020683
11. Imran J., Ahmad S., Kim D. Design and implementation of thermal comfort system based on tasks allocation mechanism in smart homes. *Sustainability,* 2019, vol. 11, DOI: 10.3390/su11205849
12. Gu W., Bao P., Hao W., Kim J. Empirical examination of intention to continue to use smart home services. *Sustainability*, 2019, vol. 11. DOI: 10.3390/su11195213
13. Emelyanova E.E., Chapargina A.N. Expenditure of municipalities budget and population incomes in the Russian Arctic. *EKO=ECO*, 2019, no. 7(541), pp. 80–98 (in Russian).
14. Favstritskaya O.S. Formation of the investment mechanism of the housing markets in the conditions of depressive northern economy (on the example of the Magadan region). *Upravlenie ekonomicheskimi sistemami=Management of Economic Systems*, 2016, no. 4, pp. 80–87 (in Russian).
15. Shirokova E.A. *Formirovanie regional'noi strategii obespecheniya zhil'em naseleniya severnoi territorii: monografiya* [Formation of a Regional Strategy for Providing Housing for the Population of the Northern Territory: Monograph]. Magadan: Izd-vo SVGU, 2013. 152 p.
16. Gavrilova E.I. Housing development management in the northern regions of Russia. *Rossiiskii ekonomicheskii internet-zhurnal=Russian Economic Journal*, 2009, no. 1, pp. 145–154 (in Russian).
17. Kolomak E.A., Kukushkin R.G. Estimating the impact of agglomeration on housing market. *Mir ekonomiki i upravleniya=World of Economics and Management*, 2019, vol. 19, no. 1, pp. 55–63 (in Russian).
18. Zainakova S.R. Housing market in Russia: current state, problems and forecasts. *Sotsial'no-ekonomicheskie nauki i gumanitarnye issledovaniya=Socio-Economic Sciences and Humanities* research, 2014, no. 1, pp. 58–62 (in Russian).
19. Asaul A. N. The status and prospects of investment and construction activities in the Russian Federation. *Ekonomicheskoe vozrozhdenie Rossii=The Economic Revival of Russia*, 2008, no. 2, pp. 3–9 (in Russian).
20. Sternik G.M., Sternik S.G., Apal'kov A.A. New methodology for assessing housing affordability for the population. *Urbanistika i rynok nedvizhimosti=Urban Studies and the Real Estate Market*, 2014, no. 2, pp. 31–49 (in Russian).
21. Buzyrev V.V., Vladimirov S.A., Buzyrev A.V. Accelerating the solution of housing problem in regions of the Russian federation on the basis of implementation of innovations in construction. *Zhilishchnoe stroitel'stvo= Zhilishchnoe Stroitel'stvo (Housing Construction)*, 2017, no. 10, pp. 6–10 (in Russian).
22. Kuznetsova I.G., Molyavko A.V. Securing young professionals in rural areas is as a priority area of regional personnel policy. *Ekonomika sel'skogo khozyaistva Rossii=Agricultural Economics of Russia*, 2020, no. 5, pp. 30–37 (in Russian).
23. Zeng S., Zhang X., Wang X. Population Aging, household savings and asset prices: A study based on urban commercial housing prices. *Sustainability*, 2019, vol. 11, no. 11. DOI: 10.3390/su11113194
24. Makszin K., Bohle D. Housing as a fertility trap: The inability of states, markets, or families to provide adequate housing in East Central Europe. *East European Politics and Societies: and Cultures*, 2020. DOI: 10.1177/0888325419897748
25. Kinder T. Social innovation in services: Technologically assisted new care models for people with dementia and their usability. *International Journal of Technology Management,* 2010, vol. 51, no.1, pp. 106–120. DOI: 10.1504/IJTM.2010.033131
26. Grishanov V.I., Nozdrina N.N., Schneiderman I.M. The role of housing in migration processes in Russia. *Narodonaselenie=Population*, 2017, no. 4 (78), pp. 91–104 (in Russian).
27. Korolkova D.I. The increase of housing accessibility as a factor of human potential development of the region. *Upravlenie gorodom: teoriya i praktika=City Governance: Theory and Practice*, 2018, no. 3 (30), pp. 65–70 (in Russian).

28. Brown J., Matsa D. Locked in by leverage: Job search during the housing crisis. *Journal of Financial Economics*, 2020, vol. 136, no. 3, pp. 623–648.
29. Mulder C.H. Population and housing: A two-sided relationship. *Demographic Research,* 2006, vol. 15, pp. 401–412. DOI: 10.4054/DemRes.2006.15.13
30. Pevalin D.J., Reeves A., Baker E., Bentley R. The impact of persistent poor housing conditions on mental health: A longitudinal population-based study. *Preventive Medicine*, 2017, vol. 105, pp. 304–310.
31. Braubach M., Ferrand A. Energy efficiency, housing, equity and health. *International Journal Of Public Health,* 2013, vol. 58, pp. 331–332. DOI: 10.1007/s00038-012-0441-2
32. Chung RY, Chung GK, Gordon D, et al. Housing affordability effects on physical and mental health: Household survey in a population with the world's greatest housing affordability stress. *Journal of epidemiology and community health*, 2020, vol. 74, pp. 164–172. DOI:10.1136/jech-2019-212286
33. Curl A., Kearn A., Mason P., Egan M., Tannahill C., Ellaway A. Physical and mental health outcomes following housing improvements: Evidence from the GoWell study. *Journal of Epidemiol. Community Health*, 2015, vol. 69, pp. 12–19. DOI: 10.1136/jech-2014-204064
34. Willand N., Ridley I., Maller, C. Towards explaining the health impacts of residential energy efficiency interventions – a realist review. Part 1: Pathways. *Social Science and Medicine*, 2015, vol. 61, pp. 191–201. DOI: 10.1016/j.socscimed.2015.02.005
35. Favstritskaya O.S. Features of housing market in the northern depressive regions of the Far East. *Ekonomika i upravlenie=Economics and Management*, 2014, no. 8 (106), pp. 55–61 (in Russian).
36. Torstensen K.N., Roszbach K. Housing markets in Scandinavia: Supply, demand and regulation. In: Nijskens R., Lohuis M., Hilbers P., Heeringa W. (eds) *Hot Property*. Springer, Cham, 2019. DOI: https://doi.org/10.1007/978-3-030-11674-3_11
37. Nordahl B.I. Convergences and discrepancies between the policy of inclusionary housing and Norway's liberal housing and planning policy: an institutional perspective. *J Hous and the Built Environ*, 2014, no. 29, pp. 489–506. DOI: https://doi.org/10.1007/s10901-013-9357-2
38. Bredikhin V.V., Volkova A.V. Methodological aspects of evaluating the efficiency of development of the regional housing market. *Region: sistemy, ekonomika, upravlenie=Region: Systems, Economics, Management*, 2019, no. 3(46), pp. 94–99 (in Russian).
39. Kolodina E.A. Study of the trends in local self-government development in contemporary Russia. *Izvestiya Baikal'skogo gosudarstvennogo universiteta=Bulletin of Baikal State University*, 2017, vol. 27, no. 2, pp. 162–170 (in Russian).

Information about the Authors

Elena E. Emelyanova – Candidate of Sciences (Economics), Senior Researcher, Kola Science Centre of the Russian Academy of Sciences, Luzin Institute for Economic Studies (24A, Fersman Street, Apatity, Murmansk Oblast, 184209, Russian Federation; e-mail: emelya@iep.kolasc.net.ru)

Anastasiya N. Chapargina – Candidate of Sciences (Economics), Senior Researcher, Kola Science Centre of the Russian Academy of Sciences, Luzin Institute for Economic Studies (24A, Fersman Street, Apatity, Murmansk Oblast, 184209, Russian Federation; e-mail: achapargina@yandex.ru)

Received June 5, 2020.

MODELING AND FORECAST OF SOCIO-ECONOMIC PROCESSES

DOI: 10.15838/esc.2020.5.71.7
UDC 330.59:004.942; LBC 60.526:32.81

Assessing Population's Quality of Life on the Basis of Intelligent Algorithms and Dynamic Modeling*

Damir A. GAINANOV
Institute for Socio-Economic Research of the Ufa Research Centre of the Russian Academy of Sciences
Ufa, Republic of Bashkortostan, Russian Federation, 71, October Avenue, 450054
E-mail: 2d2@inbox.ru
ORCID: 0000-0002-2606-2459; ResearcherID: O-5141-2015

Elena Sh. ZAKIEVA
Ufa State Aviation Technical University
Ufa, Russian Federation, 12, Karl Marx Street, 450000
E-mail: zakievae@mail.ru
ORCID: 0000-0002-6921-7473; ResearcherID: D-4447-2017

Abstract. The article deals with the issues of research, modeling and management of society as a societal system. The authors propose a methodology for studying society based on the system composition of the main structures of activities organization, as well as the integration of general scientific laws and approaches. The peculiarity of the methodology is that society is represented as system integrity and a unity of economic, political, social, spiritual, and cultural sub-systems. Improving population's quality of life is considered a criterion for society's development and, at the same time, the effectiveness of its management. The paper proposes the models for assessing the quality of life as an integral indicator of the society's quality of functioning and development, which allow evaluating this indicator, studying

* The reported study was conducted within the state assignment of UFRC RAS no. 075-01211-20-01 for 2020.
For citation: Gainanov D.A., Zakieva E.Sh. Assessing population's quality of life on the basis of intelligent algorithms and dynamic modeling. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 121–134. DOI: 10.15838/esc.2020.5.71.7

its structure, and the dynamics of its changes. An algorithm for managing the functioning quality of the societal system, based on the assessment of the integral index, is developed. A special feature of the algorithm is the complex application of data mining and dynamic modeling methods. The algorithm includes two main stages. At the first stage, data mining is performed on the quality of the system functioning in the selected area in the regional context. The results of the analysis allow identifying the clusters of regions and determining their characteristic features. The second stage involves developing the integral index structure and a dynamic model for assessing the functioning quality of the societal system on the basis of the integral index calculation, producing control actions in the form of changes in the volume of investments taking into account the characteristics of the constructed clusters. The authors consider the case of the developed algorithm implementation for quality management of social infrastructure in the regions of the Russian Federation, which allowed determining the recommended change in the level of investment in social infrastructure development by the regional clusters.

Key words: societal system, quality of life, integral index, management algorithm, sampling, principal component method, regional clusters, dynamic model, social infrastructure quality.

Introduction

The current stage of civilization development is characterized by a high degree of dynamism, instability and uncertainty, the acceleration of mutual influence and interdependence of the world's regions, and the globalization processes strengthening [1]. Global community is now in fundamentally new conditions that can define our era as an era of change, planetary vulnerability, and emerging new conditions for humanity existence. Global transformations and technological development led to the formation of a new world order, where the leading positions will be occupied by the countries that have moved to a post-industrial society [2]. The principal difference between this society and the previous socio-economic formations is that the main goal of development is to improve the quality of human life based on technological progress and fundamental science [3].

Under these conditions, there is an increasing need to study society as an organized system integrity, as a societal system, which is understood as a system of phenomena and processes considered at the level of society as a whole [4, 5].

The analysis of social systems features has shown that society as a whole and its individual spheres of life are complex dynamic objects that can be considered in statics at certain (fixed) moments of time, and in dynamics at continuous changes in time. Social statics reflects the conditions and laws of society functioning, and social dynamics describes the laws of society's development and changes [6].

Modeling the dynamics of social systems is one of the most difficult scientific tasks. This is caused by the presence of a large number of system parameters, the dynamic instability of social processes, its multi-level and multi-scale (micro- and macro-processes), weak formalizability of parameters and structures, the need of taking many factors into account, the weak predictability of the system behavior, and other reasons.

The purpose of this paper is to study society as a complex dynamic system, which involves developing a conceptual framework for research, a set of models and algorithms to support decision-making in society management. The scientific novelty and

significance of the proposed approach to society studying is in the methodology of research, modeling and management of society, which allows studying the features of its functioning and development and working out recommendations for its management.

Methodology of research, modeling and management of society as a societal system

The proposed methodology includes the following main components:

– the concept of the societal system models building, which is based on the system composition of the main structures of activities organization, as well as the integration of general scientific approaches and laws [7];

– a set of models (system, cognitive, dynamic, simulation) of the societal system, its sub-systems, an integral index of the quality of the system and its components functioning;

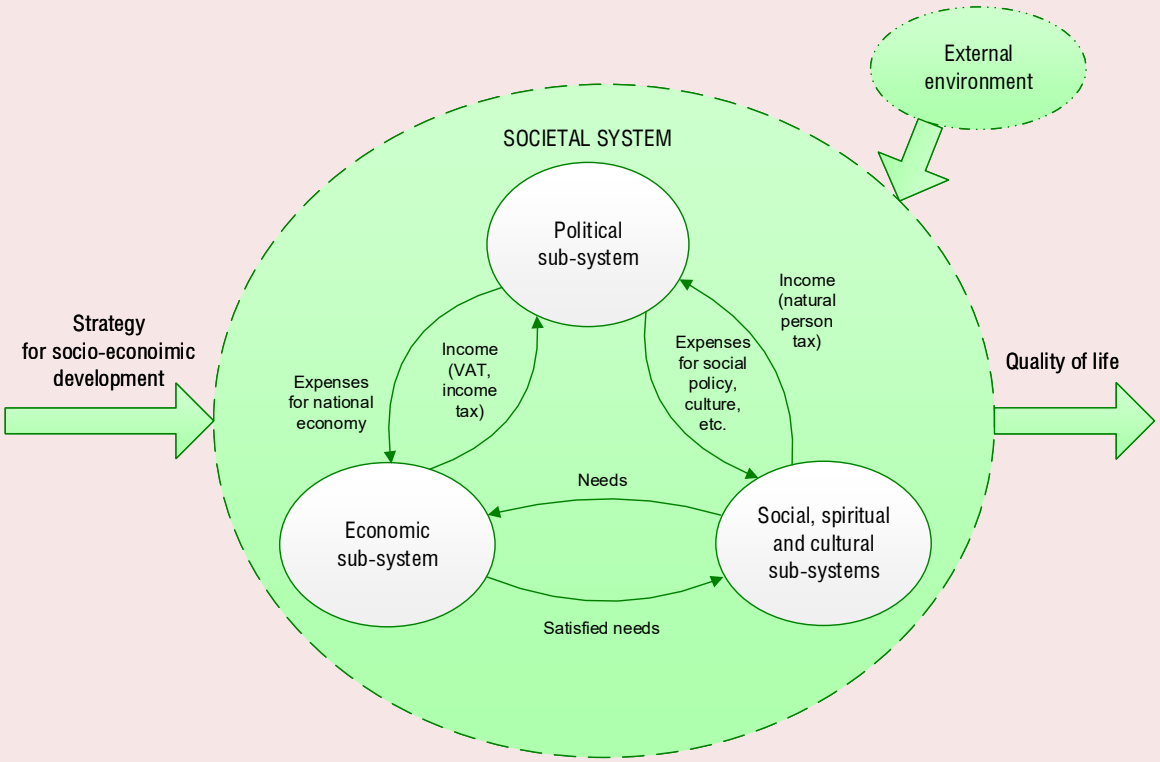
– intelligent decision support algorithms for managing the societal system.

When studying society's properties, the authors followed a structural and functional approach [8], according to which society is considered a societal system capable of self-organization and representation of a unity of economic, political, social, spiritual, and cultural sub-systems (*Fig. 1*).

Each sub-system performs its own functions, and all of them are closely related to each other and interact giving the system a new quality that is not reducible to the properties of its individual sub-systems. Such an integral property is, for example, the property of society to develop in conditions of uncertainty.

The quality of life indicator, based on which the government determines the policy of resource allocation, is considered the main

Figure 1. Society as a societal system



Source: authors' development.

indicator of society's functioning and development. Improvement of the population's quality of life is the most important strategic task of public administration. The quality of life indicator serves as a criterion for the society's socio-economic development and a criterion for the efficiency of public administration bodies [9].

Quality of life assessment models

The concept of quality of life is used in various sciences: medicine, philosophy, sociology, economics, geography, and others, and it is interdisciplinary. Each science interprets this concept in its own way. Along with the variety of definitions of quality of life, there is a large number of methods for measuring it [10–15]. There are two main approaches to assessing the quality of life: an objective approach based on the analysis of statistical data, and a subjective approach based on the sociological surveys results processing [9, 16]. In international practice, a combined approach is also common, according to which objective and subjective indicators are considered equivalent [17].

The quality of life indicator is integral, it is a complex system consisting of many elements and links between them. To study its structure, it is advisable to apply a systematic approach, according to which the integral indicator is sequentially decomposed into a set of interrelated components and presented as their hierarchy. The authors proposed a model of quality of life in the form of a hierarchy of triads [18]. Each level has a triad of interrelated private indicators forming a system indicator of the corresponding level. There are three levels: the bottom one characterizing the quality of life (J_1) and including components such as income and expenses, housing conditions, quality of food; the average one characterizing the quality life potential (J_2), and including such components as level of education, quality of health, level of culture; the upper one characterizing the quality of living environment (J_3) and including components such as environmental quality, quality of social infrastructure and quality of working life. System indicators form an integral indicator of quality of life (Q).

To calculate the integral index, a weighted assessment is used, which is common in most existing methods for assessing the quality of life:

$$Q = \sum_{i=1}^{3} \alpha_i J_i, \qquad (1)$$

where α_i is the significance coefficient of the system indicator of the i level. The values of α_i coefficientsare determined by expert analysis or based on statistical data, while $\sum_{i=1}^{3} \alpha_i = 1$.

We have considered a different view on the formation of an integral index of quality of life, where this indicator is represented as a multi-connected multi-layer dynamic object, while maintaining the transition from vertical links in the hierarchical structure to horizontal ones. The peculiarity of this model is that each system and particular integral index has its own mechanism of self-organization, implemented in the form of the corresponding feedback coefficients. Based on this approach, a dynamic model for assessing the quality of life is developed, presented in the form of continuous nonlinear differential equations.

The dynamics of changes in the integral index is described by a differential equation as follows:

$$\dot{Q} = -Q + \alpha_1 J_1 + \alpha_2 J_2 + \alpha_3 J_3. \qquad (2)$$

The dynamics of changes in system indicators is described by differential equations as follows:

$$\begin{cases} \dot{J}_1 = -A_1(z_1)J_1 + \lambda_{12}J_2 + \lambda_{13}J_3 + J_{10}, \\ \dot{J}_2 = -A_2(z_2)J_2 + \lambda_{21}J_1 + \lambda_{23}J_3 + J_{20}, \\ \dot{J}_3 = -A_3(z_3)J_3 + \lambda_{31}J_1 + \lambda_{32}J_2 + J_{30}, \end{cases} \qquad (3)$$

where $J_{i0}, i = \overline{1,3}$ are the initial values of indicators; J_i; $\lambda_{ij}, i \neq j$ are the weight coefficients reflecting the mutual influence of J_i indicators. The values of λ_{ij} coefficients are determined by experts based on the analysis of statistical data; $A_i(z_i)$ are feedback coefficients of system integral indicators that depend on z_i administrative and legal control actions at the level of federal government structures.

The initial values of J_i indicators are defined as the weighted sum of x_{i1}, x_{i2}, x_{i3} particular indicators of *i* level:

$$J_{i0} = \beta_{i1}x_{i1} + \beta_{i2}x_{i2} + \beta_{i3}x_{i3}, \quad (4)$$

where β_{ij} are coefficients of significance of x_{i1}, x_{i2}, x_{i3} particular indicators. The values of β_{ij} coefficients are determined by expert analysis or based on statistical data, while $\sum_{j=1}^{3}\beta_{ij} = 1$.

The x_{i1}, x_{i2}, x_{i3} particular indicators are calculated by solving a system of equations:

$$\begin{cases} \dot{x}_{i1} = -a_{i1}(z_{i1})x_{i1} + k_{12}x_{i2} + k_{13}x_{i3} + u_{i1}, \\ \dot{x}_{i2} = -a_{i2}(z_{i2})x_{i2} + k_{21}x_{i1} + k_{23}x_{i3} + u_{i2}, \\ \dot{x}_{i3} = -a_{i3}(z_{i3})x_{i3} + k_{31}x_{i1} + k_{32}x_{i2} + u_{i3}, \end{cases} \quad (5)$$

where $k_{ij}, i \neq j$ are the coefficients of mutual influence of x_{i1}, x_{i2}, x_{i3} particular indicators. Numerical values of k_{ij} coefficients are determined by expert analysis; $a_{ij}(z_{ij})$ are the coefficients of feedbacks of private integral indicators that depend on z_{ij} administrative and legal control actions at the level of regional management structures; u_{i1}, u_{i2}, u_{i3} are financial and economic control actions.

The proposed models of quality of life as an integral index of the quality of the societal system functioning and development allowed us to study the structure, evaluate this indicator and study the dynamics of its changes.

Algorithm for managing the quality of the societal system functioning

The algorithm developed by the authors is designed to work out recommendations for managing the societal system based on an assessment of the integral index of its functioning quality. The algorithm includes two main stages (*Fig. 2*).

The first stage involves data mining on the functioning quality of the societal system in the regional context in the selected area. The second stage includes developing a dynamic model of quality assessment and recommendations for managing the societal system in the form of changes in the volume of investments. Let us look at these stages in more detail.

The first step of the algorithm includes the formation of the original sample of data on the quality of the societal system functioning in the selected area.

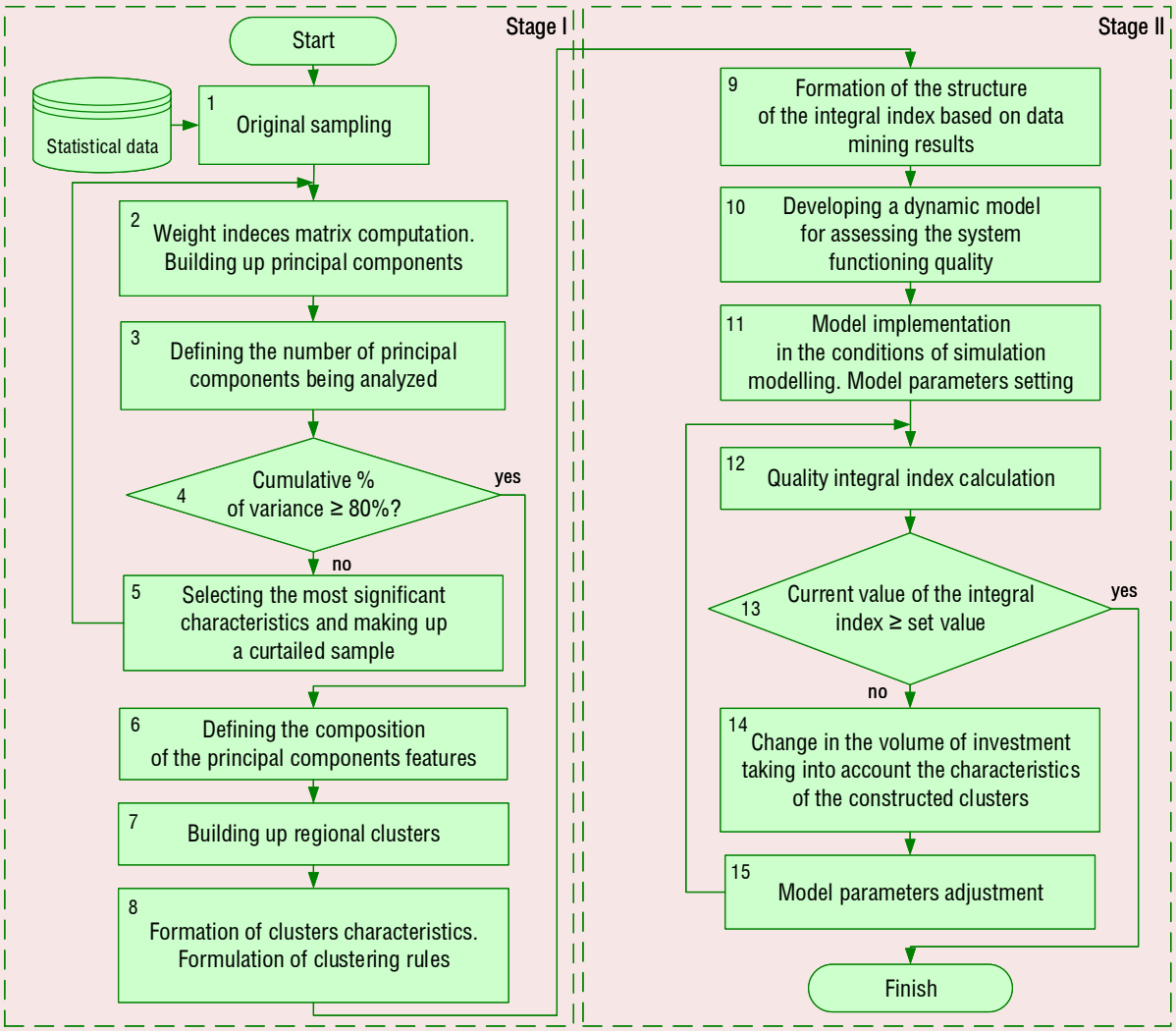
At the second step, a component analysis of the original sample is performed using the static data analysis package *StatGraphics*: a table of feature weights in the principal components is constructed; significant features with large modulo weight coefficients are identified; the composition of the main components is determined based on the information coefficients calculation.

The *StatGraphics* package was chosen due to its advantages, such as a combination of scientific methods for processing various types of data with the ability to create modern high-quality interactive graphics; extensive interaction with other software products (spreadsheets, databases); high-quality two-dimensional and three-dimensional graphics, and more. A comparative analysis of software products for static data analysis is given, for example, in [19].

The third step determines a number of principal components to be analyzed.

The fourth step involves checking up whether the required cumulative percentage of variance is reached. If this condition is not

Figure 2. Algorithm scheme of quality management of the societal system functioning



Source: authors' development.

met, then *the fifth step* is as follows: the weight coefficients of the features are analyzed and the most significant features having highest weight are selected. Next, a component analysis of the curtailed sample is performed (steps 2–4).

If the condition is met, then *the sixth step* includes determining the composition of the principal component features, based on the information coefficients calculating.

At *the seventh step*, the regional clusters are built.

At *the eighth step*, the clusters' characteristics, relative to the principal components and relative to the features, are formed. The rules of assigning regions to clusters are formulated.

On *the ninth step*, the structure of the integral index of quality of the societal system functioning based on the principal components and the composition of features is formed: a number of the subsystems and their elements are determined, and the coefficients of the relations between elements and subsystems are calculated.

A number of subsystems corresponds to a number of principal components being analyzed, and a number of subsystem elements corresponds to a number of features of corresponding components.

The values of the influence coefficients of i component of α_i on the integral index of the system functioning quality are calculated using the following formula:

$$\alpha_i = \frac{\Delta_i}{\Delta_\Sigma}, \quad (6)$$

where Δ_i is the percentage of variance of the i component; Δ_Σ is the cumulative percentage of variance for the constructed principal components.

The values of the coefficients of influence of j attribute on i component β_{ij} are calculated using the formula:

$$\beta_{ij} = \frac{w_{ij}}{\sum_{j=1}^{m} w_{ij}}, \quad (7)$$

where w_{ij} is weight coefficients of the features of i component, m is a number of features of i component.

At *the tenth step*, a dynamic model for assessing the quality of the societal system functioning, based on the calculation of an integral index, is developed. The model is presented in the form of continuous differential equations and is used for conducting experimental studies to assess the quality of the societal system functioning in different areas, as well as to study the dynamics of changes in the integral index under controlling and disturbing influences.

At the eleventh step, a simulation model based on the dynamic model is developed, and the model parameters are set. The model is implemented by means of the *MatLab Simulink* mathematical modeling package. The choice of this package is caused by the fact that it has a wide range of functions for plotting and visualizing results, the ability to develop a user interface, as well as opportunities for dynamic modeling and development of control systems. A comparative analysis of software products for simulation modeling is given, for example, in [20].

At the twelfth step, an integral index of the system's functioning quality is calculated.

At the thirteenth step, the calculated (current) value of the integral index is compared with the specified (target) value and the deviation is calculated. If the deviation is greater than zero (the current value is greater than or equal to the target value), the algorithm terminates. If the deviation is less than zero, then the transition to the fourteenth step is performed, which involves changing the investment volume taking into account the characteristics of the built clusters.

At the fifteenth step, the model parameters are adjusted, and the transition to step 12 is performed.

It should be noted that the proposed algorithm does not limit the choice of tools for its implementation, and other tools available to the researcher can be used for statistical data analysis and dynamic modeling.

Social infrastructure quality management

Let us consider the application of the proposed algorithm for managing the quality of social infrastructure, based on the assessment of an integral index and working out recommendations by changing the volume of investments in social infrastructure development.

In modern conditions, infrastructure plays an important role in the formation of a single economic space, and it is considered a special social and market institution [21].

There are production and non-production (social) infrastructure. Social infrastructure in a broad sense refers to industries and economic activities that meet the needs of the population in maintaining health, getting education,

spending leisure time, etc. in order to form and accumulate social capital, reproduce intangible assets to support the country's global competitiveness [22]. In a narrow sense, social infrastructure includes health care, education, housing and communal services, social services, culture and sports, and employment organizations. Thus, the social infrastructure provides the necessary level and quality of life.

One of the most important problems in Russia today is the problem of financing social infrastructure. The main investor providing financial resources in social infrastructure development is the government. The analysis of theoretical and methodological approaches to assessing the effectiveness of public investment in infrastructure is given in [22]. The authors' works [23] devoted to the study of the impact of public investment on social infrastructure as the most powerful factor contributing to the growth of labor productivity, the creation of new jobs, and the equalization of the pace of regions' socio-economic development are particularly noted.

However, public funds are not enough for the social sphere development, and private investors need to be attracted. To this end, public-private partnership projects are being implemented, most of them are in the field of health and education, much less are in the field of tourism, culture, physical education, sports, and social services [24].

Given the complex territorial organization of the Russian Federation and its considerable territorial extent, it is advisable to consider the social infrastructure of the country as a whole and its regions. It should be noted that one of the key priorities of regional policy is balanced spatial development, and this task should be addressed at the federal and regional levels [25]. However, according to the authors of the study [26], there is currently no systematic approach to development of infrastructure in Russia's regions: there is no clear plan for integrated development of territories, a unified assessment of the infrastructure state, investments are determined based on the current needs, the planning horizon does not exceed two or three years, and development strategies are often not implemented.

We prepared a sample of data describing the state of various areas of social infrastructure in the context of the Russian Federation' regions. The sample is based on data published by the Federal State Statistics Service of the Russian Federation[1]. Initially, we considered twenty-two features that characterize the state of housing and communal services, education, health, culture and art, information communications, and retail trade.

A component analysis of the original sample was carried out; based on the results of the analysis, the most significant features for each area were selected, and a curtailed sample was formed. Then a component analysis of the curtailed sample was performed and four principal components (PC) were constructed. The weight coefficients of the indicators of the constructed principal components are presented in *table 1.*

The authors identified significant indicators having large modulo weight coefficients (they are highlighted in *tab. 1* in bold) and calculated the values of the information coefficients of the principal components, which made it possible to determine their composition. The first principal component includes the following indicators: coverage of children by preschool education, number of organizations of secondary vocational education, number of hospital beds, capacity of outpatient clinics, number of museums, number of gyms.

[1] *Regions of Russia. Socio-Economic Indicators. 2017. Stat. Coll.* Rosstat. M., 2017. 1402 p.

Table 1. Weight coefficients of the principal components' features

Indicator	Weight coefficients			
	PC1	PC2	PC3	PC4
Total area of residential premises, on average per inhabitant	0.146	-0.321	**-0.398**	0.224
Volume of public services per capita	0.218	**-0.438**	0.145	0.021
Coverage of children by preschool education	**0.336**	-0.277	-0.232	-0.018
Number of comprehensive educational organizations	0.288	**0.400**	0.122	-0.097
Number of organizations of secondary vocational education	**0.415**	0.157	0.112	0.075
Number of organizations of higher education	-0.103	-0.195	0.383	**0.505**
Number of hospital beds	**0.363**	-0.014	0.163	0.089
Capacity of outpatient clinics	**0.358**	-0.137	-0.004	0.153
Number of theaters	-0.011	0.103	0.422	**0.543**
Number of museums	**0.385**	0.111	0.102	-0.071
Number of flat sports facilities	0.016	-0.001	**-0.469**	0.437
Number of gyms	**0.379**	0.150	-0.068	-0.101
Population using the Internet	0.005	-0.293	**0.377**	-0.338
Retail trade turnover per capita	0.015	**-0.506**	0.104	-0.182

All indicators have positive coefficients. The second principal component includes two indicators with negative coefficients (volume of public services per capita and retail trade turnover per capita) and one indicator with a positive coefficient (number of comprehensive educational organizations). The third principal component included two indicators with negative coefficients (total area of residential premises, on average per inhabitant and number of flat sports facilities), and one indicator with a positive coefficient (population using the Internet). The fourth main component includes two indicators with positive coefficients: number of organizations of higher education and number of theatres. The signs of the coefficients are taken into account when making recommendations for changing the volume of investments in infrastructure development.

The authors constructed two-dimensional and three-dimensional scattering diagrams of principal components. After its analysis, 9 regional clusters with different levels of social infrastructure development were identified. The clusters characteristics relative to the principal components are shown in *table 2*.

Table 2. Clusters characteristics relative to the principal components

Development level	Cluster number	PC1	PC2	PC3	PC4
Most developed infrastructure	4	low	low	high	average
	5	high	average	high	average
	9	high	low	high	high
Medium developed infrastructure	1	average	average	low	low
	2	average	average	average	low
	7	low	low	average	low
Least developed infrastructure	3	low	average	high	low
	6	average	high	high	average
	8	low	high	high	low

Source: compiled by the authors based on the results of the analysis of the location of clusters in the space of principal components.

The regional clusters with most advanced infrastructure include Moscow, St. Petersburg, Nenets AO, Chukotka AO, Kamchatka Krai, Jewish AO, Sakhalin Oblast, Magadan Oblast, and others.

The clusters with medium-developed infrastructure include the Republic of Bashkortostan, Sverdlovsk Oblast, Chelyabinsk Oblast, Bryansk Oblast, Kaluga Oblast, Astrakhan Oblast, Volgograd Oblast, Novosibirsk Oblast, and others.

The clusters with the least developed infrastructure include Murmansk Oblast, Tula Oblast, Republic of Kalmykia, Altai Republic, Zabaykalsky Krai, Dagestan, Ingushetia, and other.

It should be noted that, when determining the level of infrastructure development, the signs of the indicators' weight coefficients, included in the principal components, are taken into account. Thus, the first and fourth principal components include indicators that have only positive coefficients, so the higher their values, the higher the level of infrastructure development. And the second and third principal components include indicators that have negative coefficients: "Volume of public services", "Retail trade turnover", "Total area of residential premises, on average per inhabitant" and "Sports flat structures". Therefore, the lower the values of these indicators are, the higher the level of infrastructure development is.

Based on the constructed principal components and the composition of their indicators, the structure of the integral index of social infrastructure quality is formed. A number of subsystems corresponds to a number of principal components, and it is equal to four, a number of subsystems elements is equal to a number of indicators included in the corresponding principal component. Thus, for the first principal component, a number of indicators is six, for the second and third principal components – three, for the fourth principal component – two.

The integral index of social infrastructure quality I_s is calculated similarly to the integral index of the quality of life as a weighted sum of the components K_i:

$$I_s = \sum_{i=1}^{4} \alpha_i K_i, \tag{8}$$

where α_i coefficients are found by the formula (6).

The dynamics of changes in the integral index I_s is described by a differential equation as follows:

$$\dot{I}_s = -I_s + \alpha_1 K_1 + \alpha_2 K_2 + \alpha_3 K_3. \tag{9}$$

The dynamics of changes in K_i components is described by differential equations as follows:

$$\begin{cases} \dot{K}_1 = -\lambda_{11} K_1 + \lambda_{12} K_2 + \lambda_{13} K_3 + \lambda_{14} K_4 + K_{10}, \\ \dot{K}_2 = -\lambda_{22} K_2 + \lambda_{21} K_1 + \lambda_{23} K_3 + \lambda_{24} K_4 + K_{20}, \\ \dot{K}_3 = -\lambda_{33} K_3 + \lambda_{31} K_1 + \lambda_{32} K_2 + \lambda_{34} K_4 + K_{30}, \\ \dot{K}_4 = -\lambda_{44} K_4 + \lambda_{41} K_1 + \lambda_{42} K_2 + \lambda_{43} K_3 + K_{40}, \end{cases} \tag{10}$$

where $K_{i0}, i = \overline{1,4}$ are the initial value of K_i components; $\lambda_{ij}, i \neq j$ are the weight coefficients reflecting the mutual influence of K_i components. The values of λ_{ij} coefficients are determined by expert analysis based on statistical data.

The initial values of K_i components are defined as the weighted sum of the indicators values included in the corresponding principal component:

$$K_{10} = \beta_{11} x_{11} + \beta_{12} x_{12} + \beta_{13} x_{13} + \beta_{14} x_{14} + \\ + \beta_{15} x_{15} + \beta_{16} x_{16}, \tag{11}$$

$$K_{20} = \beta_{21} x_{21} + \beta_{22} x_{22} + \beta_{23} x_{23}, \tag{12}$$

$$K_{30} = \beta_{31} x_{31} + \beta_{32} x_{32} + \beta_{33} x_{33}, \tag{13}$$

$$K_{40} = \beta_{41} x_{41} + \beta_{42} x_{42}, \tag{14}$$

where β_{ij} coefficients are calculated by the formula (7).

The dynamics of indicators' changes $x_{1j}, j = \overline{1,6}$ for the first principal component is described by the differential equations as follows:

$$\begin{cases} \dot{x}_{11} = -x_{11} + k_{112}x_{12} + k_{113}x_{13} + k_{114}x_{14} + k_{115}x_{15} + k_{116}x_{16} + u_{11}, \\ \dot{x}_{12} = -x_{12} + k_{121}x_{11} + k_{123}x_{13} + k_{124}x_{14} + k_{125}x_{15} + k_{126}x_{16} + u_{12}, \\ \dot{x}_{13} = -x_{13} + k_{131}x_{11} + k_{132}x_{12} + k_{134}x_{14} + k_{135}x_{15} + k_{136}x_{16} + u_{13}, \\ \dot{x}_{14} = -x_{14} + k_{141}x_{11} + k_{142}x_{12} + k_{143}x_{13} + k_{145}x_{15} + k_{146}x_{16} + u_{14}, \\ \dot{x}_{15} = -x_{15} + k_{151}x_{11} + k_{152}x_{12} + k_{153}x_{13} + k_{154}x_{14} + k_{156}x_{16} + u_{15}, \\ \dot{x}_{16} = -x_{16} + k_{161}x_{11} + k_{162}x_{12} + k_{163}x_{13} + k_{164}x_{14} + k_{165}x_{15} + u_{16}, \end{cases} \quad (15)$$

The dynamics of indicators' changes $x_{2j}, j = \overline{1,3}$ for the second principal component is described by the differential equations as follows:

$$\begin{cases} \dot{x}_{21} = -x_{21} + k_{212}x_{22} + k_{213}x_{23} + u_{21}, \\ \dot{x}_{22} = -x_{22} + k_{221}x_{21} + k_{223}x_{23} + u_{22}, \\ \dot{x}_{23} = -x_{23} + k_{231}x_{21} + k_{232}x_{22} + u_{23}, \end{cases} \quad (16)$$

The dynamics of indicators' changes $x_{3j}, j = \overline{1,3}$ for the third principal component is described by the differential equations as follows:

$$\begin{cases} \dot{x}_{31} = -x_{31} + k_{312}x_{32} + k_{313}x_{33} + u_{31}, \\ \dot{x}_{32} = -x_{32} + k_{321}x_{31} + k_{323}x_{33} + u_{32}, \\ \dot{x}_{33} = -x_{33} + k_{331}x_{31} + k_{332}x_{32} + u_{33}, \end{cases} \quad (17)$$

The dynamics of indicators' changes $x_{4j}, j = \overline{1,2}$ for the fourth principal component is described by the differential equations as follows:

$$\begin{cases} \dot{x}_{41} = -x_{41} + k_{412}x_{42} + u_{41}, \\ \dot{x}_{42} = -x_{42} + k_{421}x_{41} + u_{42}, \end{cases} \quad (18)$$

where k_{ijl} are weight coefficients reflecting the mutual influence of indicators. Numerical values of k_{ijl} coefficients are determined by expert analysis based on statistical data; u_{ij} are the financial and economic control effects (investment volume).

Based on the clusters' characteristics relative to the principal components, given in table 2, we developed recommendations for changing the volume of investment (U_i) in social infrastructure by regional clusters *(Tab. 3)*. The up arrow "↑" indicates the need to increase investment in the relevant areas. For example, for cluster 8, the PC1 value is "low", therefore, to increase the level of development of social infrastructure for cluster 8, it is necessary to increase the amount of investment in those areas (indicators) that are included in the specified component. The signs of the weight coefficients of the indicators included in the principal components are taken into account. For example, for cluster 7, the PC2 value is "low", but it includes indicators with a negative sign, and a low sign of the indicator means a high level of development in this area, so no additional investment is required.

It should be noted that no additional investment was planned for the regional clusters with the most developed infrastructure.

The volume of investment in social infrastructure in the regions of the Russian Federation for 2016 and 2017 is compared, and the relative changes in the values of investment in different areas by cluster are calculated. Taking into account the recommended changes in investment volume for regional clusters and

Table 3. The recommended change in investment volume

Cluster no.	recommended change in investment volume			
	U_1	U_2	U_3	U_4
Cluster 8	↑	↑	↑	↑
Cluster 6		↑	↑	
Cluster 3	↑		↑	↑
Cluster 7	↑			↑
Cluster 2		↑	↑	
Cluster 1				↑

Table 4. Assessment of social infrastructure quality

Experiment no.	ΔU_1,%	ΔU_2,%	ΔU_3,%	ΔU_4,%	I_s	ΔI_s,%
Basic experiment	-	-	-	-	1.123	-
Experiment 1 (for cluster 8)	0.45	0.39	0.64	0.1	1.526	36
Experiment 2 (for cluster 6)	-	0.23	0.11	-	1.298	15
Experiment 3 (for cluster 3)	0.01		0.08	0.1	1.239	10.3
Experiment 4 (for cluster 7)	0.06			0.1	1.199	6.7
Experiment 5 (for cluster 2)		0.13	0.06		1.192	6.1
Experiment 6 (for cluster 1)				0.1	1.137	1.2

calculated relative changes in investment volume, the quality of social infrastructure is estimated (*Table 4*).

The research results showed that the increase of investments in social infrastructure development improved its quality, while the highest quality growth $\Delta I_s = 36\%$ was achieved in cluster 8, which includes such regions as the Republic of Dagestan, the Republic of Ingushetia, and the lowest growth $\Delta I_s = 1.2\%$ is in cluster 1, which includes, for example, the Republic of Bashkortostan and the Sverdlovsk Oblast. For the regions in cluster 6 (e.g., Altai Republic, Zabaykalsky Krai) the quality of social infrastructure increased by 15%; for the regions in cluster 3 (for example, Murmansk Oblast, Tula Oblast) by 10.3%; for the regions in cluster 7 (e.g., Astrakhan Oblast, Volgograd Oblast) by 6.7%; for the regions in cluster 2 (for example, Bryansk Oblast, Kaluga Oblast) by 6.1%.

Thus, the developed algorithm made it possible to build regional clusters characterized by different levels of social infrastructure development, assess the quality of social infrastructure based on the calculation of an integral index, and develop control actions in the form of recommended changes in the volume of investments in the development of social infrastructure by the regional clusters.

Conclusion

The proposed methodology of research, modeling, and management of society considers it a societal system, which is an organized system integrity and a unity of economic, political, social,spiritual, and cultural sub-systems. As a criterion for society development, the integral index of the quality of life is studied that is also a criterion for the effectiveness of public administration bodies. We developed the models of life quality which allow studying the structure of the integral index from the standpoint of asystematic approach and presenting it as ahierarchy of triads of the interrelated components, presenting the integral index as a multi-layered and a multi-connected object having the property of self-organization, and developing a dynamic model for evaluating the integral index. An algorithm for managing the quality of the societal system functioning on the basis of the evaluation of an integral index, based on the usage of data mining and dynamic modeling methods, is proposed. The authors considered the application of the algorithm for managing the social infrastructure quality in the Russian regions, which made it possible

to build regional clusters which have different level of social infrastructure development, to work out the structure of an integral index and a dynamic model for assessing the quality of social infrastructure, and to formulate control actions in the form of recommended changes in the volume of investments, taking into account the characteristics of the constructed clusters.

Developed recommendations may be used by federal and regional authorities while developing strategic documents aimed at improving population's quality of life.

References

1. Shtompka P. *Sotsiologiya. Analiz sovremennogo obshchestva* [Sociology. Analysis of Modern Society]. Translated from Polish by S.M. Chervonnaya. Moscow: Logos, 2005. 664 p.
2. Bell D. *Gryadushchee postindustrial'noe obshchestvo. Opyt sotsial'nogo prognozirovaniya* [The Coming Post-Industrial Society. A Venture of Social Forecasting]. Moscow: Akademiya, 1999. 462 p.
3. Ivanov V.V., Malinetskii G.G. *Rossiya XXI vek. Strategiya proryva. Tekhnologii. Obrazovanie* [Russia 21st Century. Breakthrough Strategy. Technologies. Education]. Nauka. Izd. 3-e, stereotip. Moscow: LENAND, 2018. 304 p.
4. Lapin N.I. Socio-cultural approach and the societal and functional structures. *Sotsiologicheskie issledovaniya=Sociological Studies*, 2000, no. 7, pp. 3–12 (in Russian).
5. Morozov V.A. The structure of society, interaction of its subsystems and elements. *Ekonomicheskie strategii=Economic Strategies*, 2017, no. 6, pp. 202–211 (in Russian).
6. Podvoiskii D.G. Subject-methodological self-determination of the new science of human society: Auguste Comte and his theory. *Vestnik RUDN, seriya Sotsiologiya=RUDN Journal of Sociology*, 2002, no. 1, pp. 100–115 (in Russian).
7. Zakieva E.Sh. Analysis of the properties of the society as a dynamical system on the basis of simulation modeling. *Informatizatsiya obrazovaniya i nauki=Informatization of Education and Science*, 2019, no. 3 (43), pp. 148–160 (in Russian).
8. Parsons T. *Sistema sovremennykh obshchestv* [The System of Modern Societies]. Translated from English. Ed. by M.S. Kovaleva. Moscow: Aspekt Press, 1998. 270 p.
9. Aivazyan S.A. *Analiz kachestva i obraza zhizni naseleniya* [Analysis of the Quality and Lifestyle of the Population]. Moscow: Nauka, 2012. 432 p.
10. Sinha B.R.K. *Multidimensional Approach to Quality of Life Issues: A Spatial Analysis*. Springer Nature, 2019. 457 p.
11. Discoli C., Martini I., San Luan G., Barbero D., Dicroce L., Ferreyro C., Esparza J. Methodology aimed at evaluating urban life quality levels. *Sustainable Cities and Society*, 2014, no. 10, pp. 140–148.
12. Massam B.H. Quality of life: public planning and private living. *Progress in planning*, 2002, no. 58, pp. 141–227.
13. Mellor D., Cummins R.A., Loquet T. Life quality and wealth: A qualitative and quantitative comparison of affluent and poor people. *Journal of Social Research and Policy*, 2012, vol. 3, no 2, pp. 7–18.
14. Ruževičius J., Akranavičiūtė D. Quality of life and its components measurement. *Engineering economics,* 2007, vol. 2, pp. 43–48.
15. Somarriba N., Pena B. Synthetic indicators of quality of life in Europe. *Social Indicators Research*, 2009, no. 94(1), pp. 115–133.
16. Rossoshanskii A.I., Chekmareva E.A. Current state and development of the theory and the method to study quality of life of the population. *Problemy razvitiya territorii=Problems of Territory's Development*, 2016, no. 1 (81), pp. 145–159 (in Russian).
17. Cummins R.A. Objective and subjective quality of life: An interactive model. *Social Indicators Research,* 2000, vol. 52, no. 1, pp. 55–72.
18. Ilyasov B.G., Gerasimova I.B., Makarova E.A., Zakieva E.Sh. Objective-subjective approach to the assessment of quality of life. *Kachestvo. Innovatsii. Obrazovanie=Quality.Innovation.Education*, 2016, no. 2 (129), pp. 47–57 (in Russian).

19. Gorokhov M.M., Saetova L.G. Comparison of software for statistical data analysis. *Sotsial'no-ekonomicheskoe upravlenie: teoriya i praktika=Socio-Economic Management: Theory and Practice*, 2018, no. 2 (33), pp. 61–63 (in Russian).
20. Skorodumov P.V. Simulation modelling of economic systems: Software tools and areas of improvement. *Problemy razvitiya territorii=Problems of Territory's Development*, 2015, no. 2 (76), pp. 62–72 (in Russian).
21. Logacheva N.M. Social infrastructure as a factor of regional development. *Vestnik Ural'skogo instituta ekonomiki, upravleniya i prava=Bulletin of the Ural Institute of Economics, Management and Law*, 2011, no. 2(15), pp. 57–65 (in Russian).
22. Smirnova T.L. Trends in budget financing of infrastructure in Russia. *Ekonomicheskie otnosheniya=Journal of International Economic Affairs*, 2019, vol. 9, no. 3, pp. 2093–2106. DOI: 10.18334/eo.9.3.40658 (in Russian).
23. Chatterjee S., Gibson J., Rioja F. Public investment, debt, and welfare: A quantitative analysis. *Journal of Macroeconomics*, 2018, pp. 204–217. DOI: 10.1016/j.jmacro.2018.01.007.
24. Voronina V.S. Characteristics of social infrastructure financing. *Gosudarstvenno-chastnoe partnerstvo=Public-Private Partnership*, 2016, vol. 3, no. 4, pp. 235–246. DOI: 10.18334/ppp.3.4.37415 (in Russian).
25. Gainanov D.A., Biglova G.F., Ataeva A.G. Strategic management of key development potential of split-level territorial socio-economic systems. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2017, vol. 10, no. 2, pp. 77–89. DOI: 10.15838/esc/2017.2.50.4 (in Russian).
26. Zhundrikov A. et al. *Infrastruktura Rossii: indeks razvitiya* [Infrastructure of Russia: Development Index]. Available at: https://infraone.ru/analitika/Index_razvitiia_infrastruktury_Rossii_InfraONE_Research.pdf (accessed: 08.06.2020).

Information about the Authors

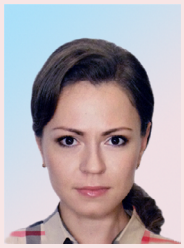
Damir A. Gainanov – Doctor of Sciences (Economics), Professor, Director, Ufa Research Centre of the Russian Academy of Sciences, Institute for Socio-Economic Research (71, October Avenue, Ufa, 450054, Republic of Bashkortostan, Russian Federation; e-mail: 2d2@inbox.ru)

Elena Sh. Zakiyeva – Candidate of Sciences (Engineering), Associate Professor, Associate Professor at the Department, Ufa State Aviation Technical University (12, Karl Marx Street, Ufa, 450000, Russian Federation; e-mail: zakievae@mail.ru)

Received February 11, 2020.

DOI: 10.15838/esc.2020.5.71.8
UDC 330.59; LBC 65.49

Theoretical and Methodological Problems of Measuring Social Comfort: Results of Empirical Analysis Based on Russian Data*



Marina V.
SHAKLEINA
Moscow School of Economics at Lomonosov Moscow State University
Moscow, Russian Federation, 1, Leninskie Gory, build. 61, 119991
E-mail: shakleina@mse-msu.ru
ORCID: 0000-0002-1947-8640; ResearcherID: AAS-5460-2020

Maria I.
VOLKOVA
Central Economic Mathematical Institute of the Russian Academy of Sciences
Moscow, Russian Federation, 47, Nakhimovsky Prospekt,117418
E-mail: mvolkova@cemi.rssi.ru
ORCID: 0000-0001-8941-0548; ResearcherID: N-4341-2018

Konstantin I.
SHAKLEIN
OJSC "Russian Railways"
Moscow, Russian Federation, 2, Novaya Basmannaya Street,107174
E-mail: shakleinki@center.rzd.ru
ORCID: 0000-0003-3508-7372; ResearcherID: E-6910-2018

Stanislav R.
YAKIRO
JSC "SOGAZ"
Moscow, Russian Federation, 10, Akademika Sakharova Avenue, 107078
E-mail: yakirosr@yandex.ru
ORCID: 0000-0003-2365-8043; ResearcherID: AAS-4494-2020

* Acknowledgments: The reported study was funded by RFBR, project number 20-310-70037.

For citation: Shakleina M.V., Volkova M.I., Shaklein K.I., Yakiro S.R. Theoretical and methodological problems of measuring social comfort: results of empirical analysis based on Russian data. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 135–152. DOI: 10.15838/esc.2020.5.71.8

Abstract. The research is aimed at developing theoretical aspects of the latent category "social comfort", searching for new assessment methods and opportunities for using various types of information resources (big data, continuous and sample population surveys, state and administrative statistics). Development of the axiomatics of a new category and its modeling are necessary to determine a real level of population's well-being in dynamics, to assess true quality of people's life. The purpose of the research is aimed at development of theoretical and methodological foundations of social comfort as a latent category in the discourse of social processes and the test of its assessment using the method of generalized principal components. The main results of the study include the clarification of connotations and development of axiomatics for the new category "social comfort"; systematization of relevant international surveys, and the formation of reliable categories that ensure the validity of the results; assessment of the level of social comfort using the method of generalized principal components for a space-time sample – the STATIS method. The peculiarity of the method, used for space-time sampling, is an opportunity to simultaneously study object-feature matrices, related to different time points, and the identification of the parameters that mostly determine the scattering of observation objects: in our case, the regions of the Russian Federation, on a plane of main components of the generalized (compromise) space. The scientific novelty of the research is development of the axiomatics of the new category "social comfort", which allows measuring and studying a person from the point of view of his inclusion in society, semantic correlation of various types of activity with time and external situation, expanding the subjective aspect of measuring the quality of life as one of the most important categories of social and economic science; the formation of new approaches to modeling and evaluating social comfort. The study is of practical interest to researchers, and its results may be used for creating socio-economic development programs in Russian regions.

Key words: social comfort, axiomatics, synthetic latent category, quality of life, STATIS.

Introduction

The relevance of developing theoretical aspects of the latent category of social comfort and improving the methodology for measuring its components is primarily caused by the fact that currently used macroeconomic statistical indicators are not enough to assess a real level of well-being in dynamics and measure true quality of people's life, taking into account non-directly measurable, implicit values in a certain socio-economic context. This thesis is supported by the results of the work of the Stiglitz-Sen-Fitoussi Commission, which presented "Report on the Measurement of Economic Performance and Social Progress" in 2009, justifying the need to build more accurate and adequate statistical tools for measuring the quality of life. Based on the Commission's findings, OECD and Eurostat approved in 2010 a number of documents that encourage countries to develop a comprehensive system of life quality indicators that fully utilize available statistical information on the interaction between different aspects of human life and are suitable for measuring well-being within each area of individuals' daily activity. Russia is currently in the process of reforming social statistics in accordance with the OECD standards and recommendations.

The problem of measuring multi-aspect categories is discussed in the works of many foreign (Easterlin R.A. [1], Frey B. [2], Powdthavee N. [3], Miringoff M. [4], Lane R.E. [5],

Layard R. [6], etc.) and domestic (S. Ayvazyan [7], O. Antipina [8], L. Rodionova [9], etc.) authors.

Currently, it is known about a large number of various integral measures of life quality, population's well-being, etc. A linear convolution of incoming variables, which are aggregated without weight values, either with equal weights or weights determined by an expert group, is common to the methods used. A general problem while constructing composite aggregate indicators is the weak validity of the weights of indices included in indicators.

Proposed methods of linear convolution also differ according to the type of data used. There are known integral indices based on statistical indicators [4; 7; 10–15], data from sociological surveys [16; 17, etc.], as well as ones combining subjectivist and objectivist information [18–21, etc.].

Big data have a great potential for measuring complex multidimensional latent categories[1] [22–29]. Attempts to use Google data in building a summary indicator of well-being are discussed [30; 31]. As part of OECD projects, in March 2016, Y. Algan and his colleagues used big data to build the "Google Well-Being Index" in America to understand which aspects of life are associated with negative and positive emotions. Many studies show that data from search queries and social networks are superior in quality to data from sociological surveys, since they exclude distorted responses from respondents [32; 33].

Advantages of Google Trends Data [34]:

1) available with high frequency; possible to observe daily changes of users' moods and preferences;

2) many people respond to questionnaire for altruistic reasons, since there is no motive to answer frankly and thoroughly [35]. Search queries can reveal more personal information. For example, the topic of job loss may be very sensitive for a respondent, and they may not want to communicate about it. On the other hand, volume of searches for words "find a job", "job search" shows a person's concern for this problem. It is emphasized that data obtained from the search system is more objective [36].

To build reliable categories of social comfort, it is necessary to select data that is relevant and will not lead to the risk of retraining. Problems of primary processing of big data, comparability, consistency, and adequacy are discussed in the works of Askitas N., Varian H., Reimsbach S., Penna D., Benjamin D., and Baker S. [37–42].

In "Human Development Report in the Russian Federation", dedicated to the analysis and adaptation of the UN sustainable development goals (SDGs) to Russian realities, the dominance of social goals over economic and environmental ones is confirmed. In the paradigm of sustainable development, the role of implementing human potential becomes more important. It increases the need to monitor the implementation of the SDGs, which depends on development of statistical database, big data, indicators, and aggregated indices. Despite the fact that the most popular index for assessing human potential is the UN Human Development Index, the search for the most universal way to assess well-being, quality of life, life satisfaction, and other latent categories continues.

The purpose of the research is development of theoretical and methodological basics of social comfort as a latent category in the discourse of social processes and to a test of its assessment using the method of generalized principal components.

[1] Big data can be characterized by four dimensions: volume, diversity, speed, and value. Available at: *Big Data: Related Technologies, Challenges and Future Prospects*. Vol. 96. Heidelberg: Springer, 2014.

To achieve it, the following tasks were defined:

1) clarification of connotations and development of axiomatics for the new category "social comfort" in contextual conditions of Russian regions;

2) systematization of current international surveys and formation of reliable categories that ensure the validity of results when building a semantic search system for information about the components of social comfort;

3) analysis of matrix-valued time series based on information about the level of social comfort in Russian regions using the STATIS method.

Theoretical and methodological overview

The term "comfort" in social theories goes back to the French word conforter/confort, which means physical and emotional support, comfort, reassurance, and it is not associated with physical or material comforts. In this connotation, consistent with the fundamental paradigm for achieving SDGs, the center of which is a Man, it is necessary to analyze the category of social conformity and the degree of achievement for an individual in the specific context of socio-economic, cultural, and institutional environment. Let us see how the etymology of the "comfort" category has changed (*Tab. 1*).

The study of the epistemological foundations of the term "comfort" shows a rather complex nature of this phenomenon. Social comfort is a latent multidimensional category that has a dynamic development nature and combines subjective and objective assessments [60; 61; 62].

An individual's desire for comfortable conditions is studied in a number of disciplines: psychology, sociology, medicine, etc. Research in psychology claims that the search for comfort is the basis of human behavior from birth to death [49].

Thus, modern understanding conceptualizes comfort as an optimization process carried out through active perception, interpretation, and change of the socio-physical environment. However, most researchers may question whether it is appropriate to introduce the category "social comfort" in a scientific glossary, while there is life satisfaction, economic well-being, quality of life, level of happiness, subjective well-being, etc. In the work of M.V. Leshaikina [63], a distinction between three categories is made: social comfort, quality of life, level of happiness, and the problems of its measurement are studied for an individual and conglomerates of individuals. The difference is in the structure of incoming indicators and the usage of assessment approaches, which is associated with a different composition of questionnaires, for example, to study the level of happiness, on the basis of which the components of the final meter are formed. In particular, if priority is given to the study of the inner world of an individual and his psychophysiological feelings during the assessment of the level of happiness, in assessing the quality of life, priority is given to welfare issues, then, in assessing social comfort, the focus is on contextual conditions of an individual's social life, "motivating to various forms of positive activity and expressed in the balance of preferences, social environmental properties, and inclinations of an individual" [63]. In addition, the introduced category is defined as an optimization process of interaction between a person and external environment, aimed at maximizing the state of comfort. If comfort is an objective function that an individual maximizes, then the components of comfort (various types of an individual's activity) are the parameters of the objective function. The task is to find the target values of parameters under current restrictions for each type of activity. The maximum of the

Table 1. Etymology of the "comfort" category

Century	Meaning
16	R. Josselin: "The term "comfort" characterizes the state of spiritual connection with God" [43]
17	Legal documents: "The term „comfortable" means necessary material and physical support, which consists of clean clothes, hygiene rules, etc." [44]
	G. Winstanley: "Comfort is mental and physical well-being. Comfort for "body and mind", according to G. Winstanley, is "the final result of a right related to political and economic freedom" [45]
18	Theoretical economists: "Comfort is a measure of meeting the standards for fulfilling human needs. The «index of ten items» is created", which is used to assess the level of comfort and cleanliness. This index includes the usage of the following items: a mattress, a bed, bed linen, a table, one or more chairs, pots for boiling food, other cooking utensils, some ceramic items, table forks, and indoor lighting" [44]
	A. Smith: "The term "comfort" is the possession of a set of material goods" [46]
	T. Malthus: "The state of comfort is happiness, which is achieved through the increase of living standards and material well-being" [44]
19	Comfort is the standard of a virtuous life, it supports the norms of thrift, morality, and political righteousness [47]
	Understanding of the term "comfort" develops from the point of view of the material side of the issue [44]
20	The search for comfort, or comfort conditions, is a motive of human activity, it is recognized that comfort may be experienced in several ways: physically (pain relief), physiologically (involuntary reaction to uncomfortable environmental conditions, such as coughing), and psychologically (peace of mind) [48]
	The connotation of comfort means an increasing connection with new technologies and innovations, which directly affects the behavior patterns of an individual, and, therefore, the culture of comfort can be studied and demonstrated as a sign of social progress [44]
	Comfort is a multidimensional category that contains three components: physical, physiological, and psychological [49]
	The discipline "comfort theory" is created, which is currently used in patient care. Comfort is a state of complete well-being that results from the therapeutic care of nurses. There are three levels of comfort: relief, lightness, and transcendence [50]
21	Categories of "environmental comfort", "comfort of the landscape" are widely used. Comfort is a set of positive psychophysiological feelings of a person as the result of interaction with external environment [51; 52]
	Ecological and social comfort is a set of conditions that fulfill basic physiological needs of a person, territorial organization of social infrastructure [53]
	Comfort is a stable balanced state, which is sometimes referred to as the "comfort zone" [54]
	The level of comfort depends on gender, social competence, lifestyle, and nationality [55]
	Comfort as positive emotions defined by a sense of ease [56]
	Consumer comfort is conditions that help consumers make purchases [57]
	Social comfort goes beyond individual comfort, and it is viewed through the prism of a collective understanding of experienced comfort and joint development of means to achieve comfort, since its judgment is formed on the basis of norms and standards that are shared among members of society. The field of study of comfort goes beyond passive sensation and perception [58]
	Comfort is an optimization process carried out through an individual's active interaction with social and physical environment through perception and its changes. All actions of an individual, as the result, are aimed at creating a better environment in which they achieve environmental satisfaction and comfort. This process is considered to be continuous and cyclical [59]
Source: own compilation.	

target function of social comfort is achieved not by maximizing individual activities but by searching for optimal data sets of activities, taking into account an individual's life priorities, embedded in the context of his institutional environment. The complexity of the introduced category implies the usage of new measurement and evaluation methods.

Statistical specification of social comfort is partially characterized by properties of related categories "life satisfaction", "quality of life", etc., but it conceptually represents a continuous dynamic process of searching for an optimal set of an individual's life priorities unlike static categories "life satisfaction" or "quality of life". In this regard, the socio-economic context of the introduced category will differ in the functional affiliation of analyzed indicators. It is noted that the assessment of social comfort should be formed taking

into account information about social living conditions and infrastructure, which includes social, transport, information, technological, energy, cultural and entertainment components [63]. A significant limitation of the work, in our opinion, is the absence in the hierarchical structure of the category of a block of indicators that characterizes the financial well-being of an individual. This aspect of the issue should not be ignored, since one of the defining activities of an individual is the process of achieving material well-being. T. Skitovskiy notes that comfort is a release of tension, the decrease of arousal. Due to the fact that economics is a science that studies the distribution of resources by society in order to reduce the tension caused by its limited nature, behavioral aspects of consumption and production are directly related to comfort [64].

Empirical basis of the study

Social comfort is a complex multi-aspect category that requires new approaches to assessment, as well as an update and innovation in the selection of indicators. In this regard, it is proposed to analyze existing international and Russian databases. Systematization of current surveys will allow creating reliable categories that ensure the validity of the results while building a semantic search system for information about the components of social comfort. Next, we examine the most well-known microdata databases (*Tab.2*).

Desk analysis of the composition of variables, contained in the programs of sample observations on socio-demographic problems, allows making a statistical specification of the social comfort components. It is noted that contextual environmental conditions are not the background where various forms and types of human activities occur, but a factor that determines human actions and judgments [59], which is why the study of comfort expands. Analyzing the epistemological principles of contextuality, it should be said that it is impossible to reliably substantiate constantly existing invariably acting set of factors that determine a particular situation in reality [67]. Contextual conditions of social comfort should be evaluated not only at a given time but also in dynamics. The composition of indicators of social comfort covers a wide range of economic, environmental, social, political, institutional, and other conditions in a town, region, and country as a whole. At this stage of the research, we form the components of social comfort in such a way that they are characterized by a comprehensive coverage of contextual conditions and subjective, psychological assessments of an individual; in this regard, we use the key components of living conditions and personal well-being of an individual from listed databases. Separate studies will be devoted to further analysis and formation of a reduced set of indicators at the macro level, as well as on the basis of big data usage. A generalized set of components (or incoming categories) of studied social comfort may be represented in a diagram form (*Fig. 1*). The need to use subjectivist information in subsequent assessment and modeling is explained by the conceptual features and functional conditionality of social comfort.

Incoming categories of social comfort are formed on the basis of the European panel of indicators, which makes up the main part of foreign surveys, and they are adapted to take into account surveys on living conditions and quality of life conducted in Russia. A single database, used for analysis, can only reveal certain aspects of the phenomenon. For example, the European Health Interview Survey (EHIS) focuses primarily on population health

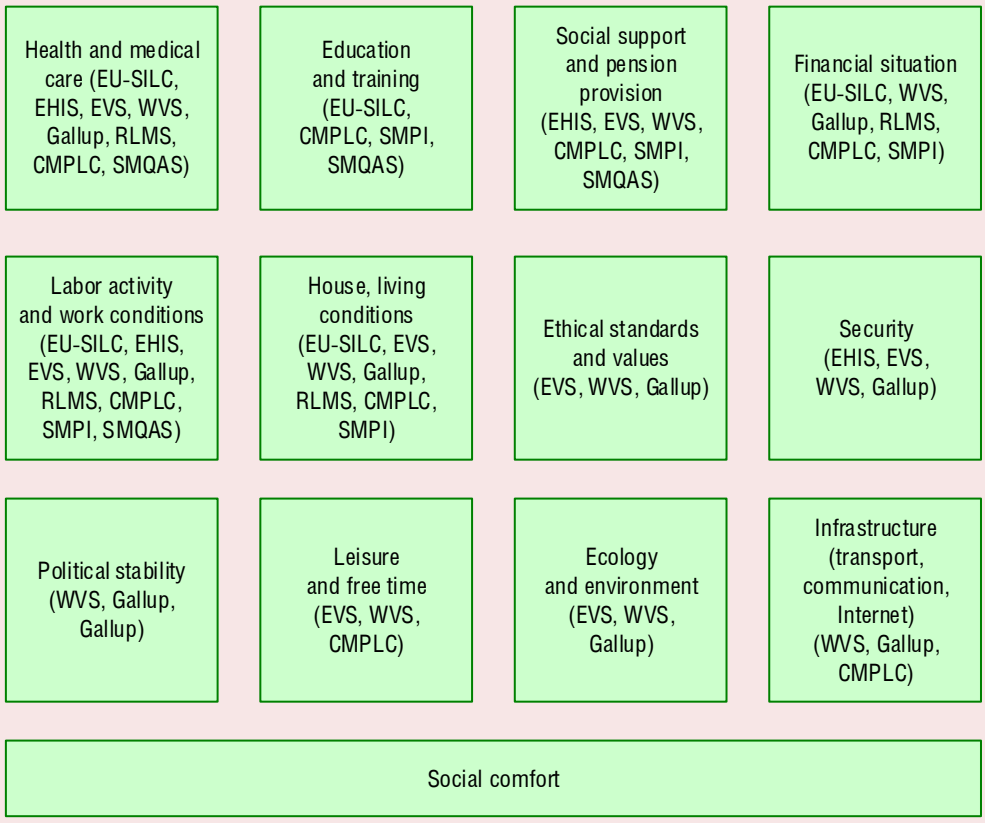
Table 2. Systematization of current international and Russian surveys

Name of survey / database	Purpose of survey	Waves	Countries / average number of respondents	Covered aspects of well-being / life quality
European Union Statistics on Income and Living Conditions (EU-SILC)	Collection of timely and comparable cross and longitudinal multidimensional microdata on income, poverty, social exclusion, and living conditions	Since 2003, it has been conducted annually within comparable cross-sectional data and every 4 years – within longitudinal data	European countries, Turkey	Housing, consumer durables, housing costs, employment, pension, education, health, child care, financial situation, source of income, and material support
European Health Interview Survey (EHIS)	Collection of information about population's health status and health-related topics based on answers of respondents according to a representative sample	2006–2009 2013–2015	European countries, Turkey. The sample size is determined by each country	Health, accidents, absence from work, physical restrictions, personal hygiene and self-care activities, pain, mental health, medication use, prevention, satisfaction with the healthcare Institute, physical activity, vegetable/fruit consumption, smoking, alcohol consumption, social support, provision of informal care or assistance
European Values Study (EVS)	Identification of common European values and monitoring of its changes over time	1981, 1990, 1999, 2008, 2017 (in process)	European countries, Russia, USA, Canada, Turkey. 1000–1500 people	Mass media usage, attitude to politics, trust in government and public institutions, attitude to immigrants, views on crime, assessment of personal health, religion, social well-being, life values, demographic parameters
World Values Survey (WVS)	Survey attempts to capture people's worldviews and values	Since 1981. At the moment, the 7th wave takes place (2017–2021). 1981–1984; 1990–1994; 1995–1998; 1999–2004; 2005–2009; 2010–2014	100 countries, including Russia. At least 1.200 people are interviewed in each country	Social values, attitudes, stereotypes, happiness and well-being, social capital, trust, membership in organizations, economic values, corruption, migration, security, science and technology, religious values, ethical norms and values, political culture and political regime, demography
Gallup	Carrying out of population's regular surveys on various social, political, economic, and other issues	Annual surveys since 1935	More than 160 countries. From 500 to 2000 people in each country	Law and order, food and housing, institutions and infrastructure, work, well-being, trust in police, media freedom, entrepreneurship, religion, corruption, etc.
RLMS (NRU "Higher School of Economics")	Russian monitoring of economic situation and public health. Main research topics are population's health and well-being	Annually since 1994	Russia	Family questionnaire : living conditions, housing conditions, availability of durable goods, agricultural activities (subsidiary farming), income, expenses Individual questionnaire: migration and nationality, work; job search, for unemployed – duration of employment, reasons for dismissal from the last job, education, computer and Internet use, pension provision, health status, alcohol consumption and smoking, sports, use of medical services, women's health and fertility

Table 2 (ending)

Name of survey / database	Purpose of survey	Waves	Countries / average number of respondents	Covered aspects of well-being / life quality
Comprehensive monitoring of population's living conditions (CMPLC) (Rosstat)	Acquisition of statistical information that reflects actual living conditions of Russian families	2011–2018	Russia	Questions for households: household composition, living conditions, appeal to public authorities, financial situation of a household, accessibility of social infrastructure for disabled people Individual questionnaire: marital status, opinion on living conditions in a locality, transport services, employment and working conditions, social security, education and training, Internet use, leisure and leisure time, health and medical care
Selective monitoring of population's income and participation in social programs (SMPI)	Acquisition of statistical information reflecting the role of wages, income from self-employment and property, pensions and social benefits in ensuring material well-being of families	2011–2019	Russia	Questions for households: household composition, payments for children under the age of 16, social benefits and other assistance to households, living conditions, property income and taxes, agricultural activities, financial situation of the household Individual questionnaire: social status and education, pensions and social support, employment and income from work
Selective monitoring of quality and availability of services in education, health, and social services, and employment promotion (SMQAS)(Rosstat)	Acquisition of statistical information that reflects the actual needs of population in obtaining educational and medical services, population's satisfaction with volume and quality of services received, and its impact on level of family welfare	2018–2020	Russia	Household composition, education, employment promotion, health, rehabilitation and social services, medical services, and social services
Source: own compilation according to data of European and Russian sociological surveys.				

Figure 1. Incoming categories of social comfort



Source: own compilation on the basis of foreign and domestic databases.

research. In this regard, the "social comfort" category should be considered dynamic in terms of the composition of components, and it will be updated with the emergence of new registered statistical indicators.

Measurement methodology

To assess the level of social comfort, we use the tools of generalized principal components for spatial and temporal sampling – the STATIS method (Structuring Three-Way Data Sets in Statistics) [66; 67]. Its peculiarity is an opportunity to conduct a simultaneous study of object-feature matrices related to different times, as well as to determine the parameters on which the scattering of objects of observation depends the most. STATIS has a wide range of capabilities for analyzing multidimensional data. It can be used to analyze any statistical indicators. The most important thing is to comply with the requirement to maintain a constant number of observation objects and studied indicators: i.e., time is a variable. STATIS may be used in economics, social sciences, meteorology, and even wine-making. In our case, we analyze the position of the regions of the Russian Federation on a plane of main components of the generalized (compromise) space. The source data is a matrix of p feature values $(j = 1, \dots, p)$ according to number of observations $(i = 1, \dots, n)$ for time gap of years $(t = 1, \dots, k)$. Due to limited information and statistical base, we consider only three moments in time: $t_1 = 2014, t_2 = 2016, t_3 = 2018$.

The results of complex observations of population's living conditions in Russian regions for 2014, 2016, and 2018 were used as initial data (Rosstat); the modeling was performed in the Matlab environment.

The analysis includes features that characterize living conditions, the quality of the surrounding area, working conditions, and health status: the parameters that, among others, form the assessment of a comfortable living environment. It should be mentioned that a limited list of indicators does not reflect all aspects of the studied category, since it is based on the Russian monitoring of the economic situation and public health. At the same time, we consider the sufficiency of included components to be reasonable, since the experimental assessment is carried out on the basis of a single database using the method of generalized principal components for a space-time sample, which takes into account one of the most important properties – the dynamism of contextual conditions of social comfort.

The STATIS data analysis tool can be represented as an iterative procedure.

The first iteration defines the matrix product $S_t = X_t X_t^T, S_t\,(n \times n)$, where $X_t(n \times p)$ is the matrix of values for the year t, $t = 1, \ldots, k$ [68], and $X_t^T(n \times p)$ is the transposed matrix of initial values. During the second step, we find the scalar product $\langle S_t, S_{t'} \rangle_{H-S} = trace(S_t^T S_{t'})$, where $S_{t'} = X_{t'} X_{t'}^T$ $t' = 1, \ldots, k-1$. Then the correlation coefficients are calculated to determine the pairs of time points with the closest statistical connection, and the correlation matrix is constructed $C = UVU^{-1}$, where $U^{-1}U = I$ [69]. *U* matrix elements are eigenvectors of the *C* correlation matrix, on the diagonal of the matrix *V*, there are the eigenvalues of the *C* matrix. From this, it is possible to determine the coordinates of the source data sets in the space of principal components of the correlation matrix: $G = UV^{1/2}\,(n \times n)$.

Normalized weight coefficients $a_t = {}^{u_t}/_{\sum_{t=1}^{k} u_t}$ are calculated according to the components of the *U* eigenvector corresponding to the maximum eigenvalue of the *C* correlation matrix.

One of the main stages of data analysis, using the STATIS tool, is the calculation of the components of the generalized (compromise) matrix $S_{comp}(n \times n)$ as a linear combination $S_{comp} = \sum_{t=1}^{k} a_t S_t$. However, there are alternative methods, such as averaging of all matrices S_t. The accounting matrix and the load matrix are determined as the result of the spectral decomposition of the compromise matrix: $S_{comp} = QLQ^{-1}$ [70].

Results of the research

To assess the level of social comfort in the regions of the Russian Federation, a set of indicators, presented on the portal of the Federal State Statistic Service based on the results of a comprehensive monitoring of population's living conditions, was formed. To achieve uniformity of statistical base in 2014, 2016, and 2018, a collection of comfortable living and working conditions of individuals was collected (*Tab. 3*), which is consistent with the input categories of social comfort, defined in accordance with European and Russian dashboards indicators of sociological surveys.

Statistical links between the studied periods are expected to be strong, but the most noticeable link is between 2016 and 2018 (0.995; *tab. 4*).

Insufficient variability of the estimates of the Russian households is explained not only by the inertia of many socio-economic processes but also by time stable attitude of the majority of individuals toward assessment of living

Table 3. Initial set of indicators

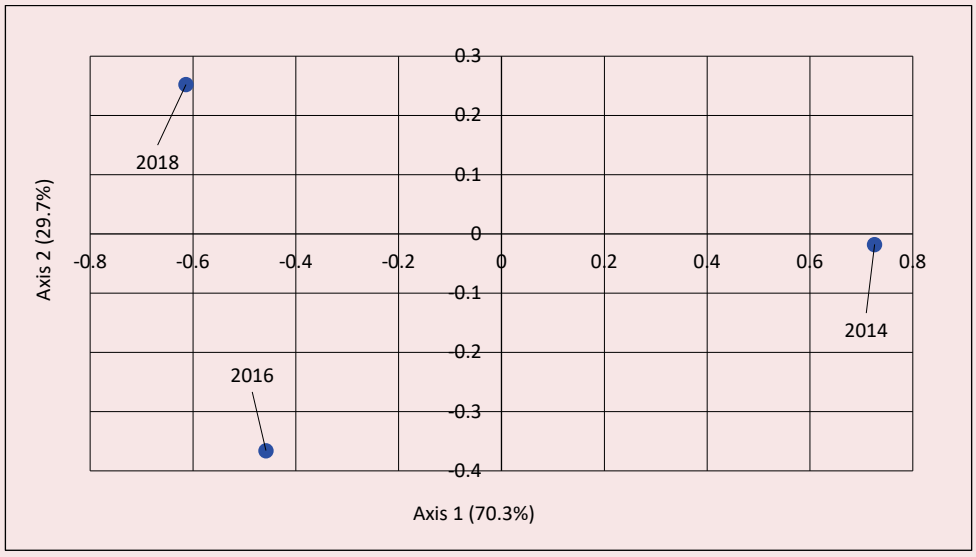
Designation	Indicator, % of a number of respondents
$x^{(1)}$	Share of respondents who are quite satisfied with their earnings
$x^{(2)}$	Share of respondents who are quite satisfied with their work schedule
$x^{(3)}$	Share of respondents who are quite satisfied with work conditions
$x^{(4)}$	Share of respondents who are quite satisfied with distance to work
$x^{(5)}$	Share of respondents experiencing professional satisfaction from work
$x^{(6)}$	Share of respondents experiencing moral satisfaction from work
$x^{(7)}$	Share of respondents who highly assess their health
$x^{(8)}$	Share of households which report the presence of playgrounds in good condition in a local area
$x^{(9)}$	Households that indicated that they do not feel constrained while living there
$x^{(10)}$	Respondents who note a sufficient level of heat in a household
$x^{(11)}$	Respondents who note absence of dampness, freezing of walls and floors in a househild
$x^{(12)}$	Respondents who note absence of noise, air pollution in a place of residence, dust and soot from streets
$x^{(13)}$	Respondents who note sufficient illumination of a household's surrounding area or in its entrance
Source: own compilation according to Comprehensive monitoring of population's living conditions (Rosstat).	

Table 4. Correlation matrix *C*

Year	2014	2016	2018
2014	1	0.993	0.992
2016	0.993	1	0.995
2018	0.992	0.995	1
Source: own compilation.			

environment comfort, characteristic for 2014, 2016, 2018: in the analyzed period, there is a relative constancy of the estimates. *Figure 2* shows the projection of the original data sets on the plane of the first two principal components of the correlation matrix *C*.

Figure 2. Projection of data sets for 2014, 2016, and 2018 on the axis of main components of the matrix *C*



Source: own compilation.

In order to determine the components of the load and accounting matrices according to available data, a compromise (generalized) matrix is calculated which includes all three initial object-feature sets. Of all possible procedures for calculating matrix components S_{comp}, we chose variant of weighted estimates, meaning $S_{comp} = \sum_{t=1}^{k} a_t S_t$, since it allowed us to get the maximum value of the information content criterion of the compromise matrix in comparison with others $Qual_{S_{comp}} = {\lambda_1}/{\sum_l \lambda_l}$. In this case, $Qual_{S_{comp}} = 70{,}2\%$.

Weight coefficients, $a_t = {|u_t|}/{\sum_{t=1}^{k}|u_t|}$, calculated in proportion to the components of the eigenvector, corresponding to the maximum eigenvalue of the correlation matrix C, have the following values: $a_{2014} = 0.403, a_{2016} = 0.254, a_{2018} = 0.341$.

To evaluate the structure of the generalized information, a spectral decomposition of the compromise matrix is performed: $S_{comp} = QLQ^{-1}$. As the result, the groups of variables that are most closely statistically related to each other and correlated with the first two axes of the compromise space are determined.

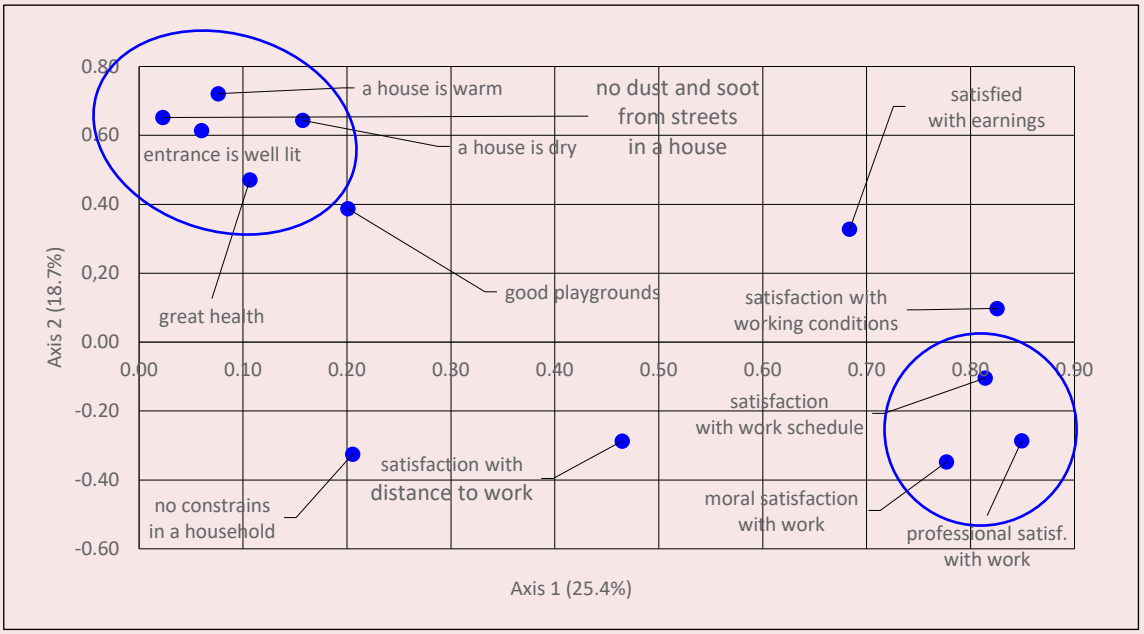
The characteristics of Russian population's satisfaction with the level of wages and working conditions in regions are of primary importance for forming the level of social comfort (*Fig. 3*).

There are several groups of variables that are most closely related to each other in the context of generalized space analysis:

– good health is naturally associated with the quality of housing, the absence of adverse factors that can cause or exacerbate existing chronic diseases;

– evaluation of the quality of work, such as moral and professional pleasure to be associated with the regime of work.

Figure 3. Projection of elements of the load matrix on the plane of the first principal components of the compromise space



Source: own compilation.

Satisfaction with working conditions rather than earnings is of the greatest importance, which once again confirms the thesis that it is necessary to introduce and study such latent categories as social comfort.

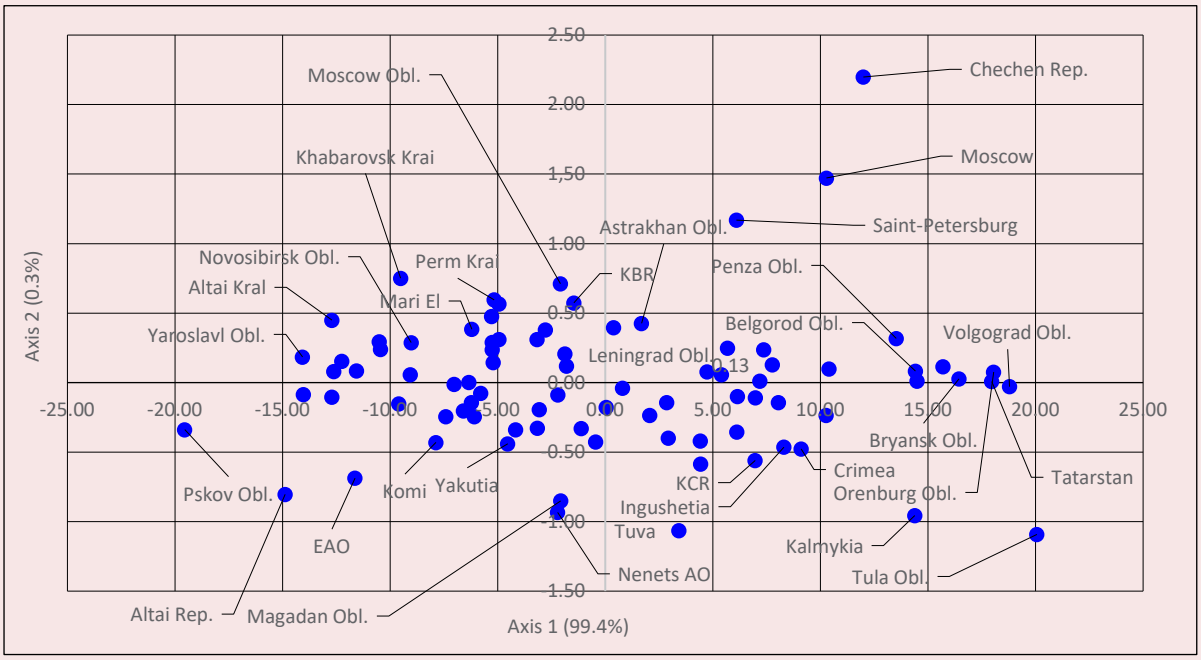
The projection of all observation points (regions of the Russian Federation) on the plane of the first two axes of the generalized space makes it possible to estimate the degree of their distance from each other. For this purpose, the components of the matrix of accounts are calculated, each row of which is an object of observation, and the columns are the axes of the compromise space (*Fig. 4*).

As the result of using the STATIS method to assess the level of social comfort based on subjective data, groups of regions where population is more or less satisfied with their living conditions are identified. The leaders are Moscow, St. Petersburg, and the Chechen Republic. This could be explained not only by higher (in comparison with other territories) estimates of wages, working conditions, and professional and moral satisfaction from work but also by the well-being of surrounding territories, including the availability of good playgrounds. In addition, groups of regions that are similar in terms of socio-economic development and, in our opinion, the peculiarities of the mentality in a particular area have been formed. These are, for example, the southern territories of Russia: Crimea, Karachay-Cherkess, Ingushetia republics; Penza, Volgograd, Orenburg oblasts and the Republic of Tatarstan.

Conclusion

Currently, there is a significant gap between traditional dimensions of economic growth, employment, and other important socio-economic phenomena (level of happiness, quality of life). In some countries, this gap undermines public confidence in official

Figure 4. Projection of objects on the first two axes of the compromise space



Source: own compilation.

statistics. All this suggests that the current system of socio-economic phenomena measurement is imperfect. J. Stiglitz's analysis [71] showed that existing macroeconomic indicators are clearly insufficient to assess the real level of well-being in the country, and, therefore, there is a need to introduce the new category of "population's social comfort of living".

Justification and introduction of the complex latent category "social comfort" into scientific usage will make a significant contribution to development of the theory of life quality, allowing us to measure and study a person from the prospect of his/her inclusion in society, the semantic correlation of various activities in relation to time and external situation, expanding the subjective aspect of life quality measurement as one of the most important categories of social and economic science.

Systematization and analysis of current international and domestic surveys (European Union Statistics on Income and Living Conditions (EU-SILC), European Health Interview Survey (EHIS), European Values Study, World Values Survey, Gallup, RLMS (NRU "Higher School of Economics"), Comprehensive monitoring of population's living conditions (Rosstat), Selective monitoring of population's income and participation in social programs (Rosstat), Selective monitoring of the quality and availability of services in education, health and social services, and employment promotion (Rosstat)) allow making statistical specification and create a reliable panel of valid indicators of social comfort, which will be further reduced in accordance with the estimated level (individual group, city, region, country) of comfort and possibilities of harmonization of various information resources.

Due to its relevance, multi-aspect, and high role of the contextual factor, social comfort requires new approaches and methods for its assessment. In this regard, matrix-valued time series, based on information about the level of social comfort in Russian regions, using the STATIS method, were analyzed in this paper. Groups of regions that are similar in terms of socio-economic development and, in our opinion, mentality in a particular area were revealed (Crimea, Karachay-Cherkess, Ingushetia republics, Penza, Volgograd, Orenburg oblasts, and the Republic of Tatarstan). The method allowed us to consider the entire set of initial information in one block, to find the key parameters that form the main axes of the generalized space, and to identify the features of the distribution of regions on the plane of its main axes.

The results of the study are the first stage of the project. Taking into account the potential and prospects of using big data in measuring complex latent categories, we will have to solve the problem of creating methodological approaches to big data processing in terms of building statistical series based on them in compliance with basic principles that ensure the quality of statistics – comparability, consistency, accuracy and uniformity of data, and, based on the interconnection of various data types, to build a dynamic system of social comfort with the ability to model the institutional design of the socio-economic environment depending on the expected trends in national economy development. Deepening of the analysis on the studied problem will expand the practical significance of the research. Its results may be used by executive authorities at the federal, regional, and municipal levels to develop organizational, administrative, and program-oriented documents for implementing social policies

of executive authorities at the appropriate level. It could also be used for determining the strategic priorities of the government's social policy: at the federal level, it is possible to typologize entities of the Russian Federation by the level of social comfort in order to conduct a holistic-oriented social policy of the government.

References

1. Easterlin R.A. Explaining happiness. *Proceedings of the National Academy of Sciences*, 2003, vol. 100, no. 19, pp. 11176–11183. DOI: 10.1073/pnas.1633144100
2. Frey B.S., Stutzer A. *Happiness and Economics: How the Economy and Institutions Affect Human Well-Being*. Princeton University Press, 2010. 220 p.
3. Powdthavee N. Unhappiness and crime: Evidence from South Africa. *Economica,* 2005, vol.72, no. 287, pp. 531–547. DOI: 10.1111/j.0013-0427.2005.00429.x
4. Miringoff M., Miringoff M.L. *The Social Health of the Nation: How America is Really Doing*. Oxford University Press, 1999. 241 p.
5. Lane R.E. Quality of life and quality of persons: A new role for government? *Political theory*, 1994, vol. 22(2), pp. 219–252. DOI: 10.1177/0090591794022002002
6. Layard P.R.G., Layard R. *Happiness: Lessons from a New Science*. Penguin UK, 2011. DOI: 10.2307/20031793
7. Aivazyan S.A. *Analiz kachestva i obraza zhizni naseleniya: monografiya* [Analysis of the Quality and Lifestyle of the Population: Monograph]. Moscow: TsEMI RAN, 2012. 432 p.
8. Antipina O.N. Economics of happiness as an academic research discipline. *Voprosy ekonomiki=Voprosy Ekonomiki*, 2012, no. 2, pp. 94–107. DOI: 10.32609/0042-8736-2012-2-94-107 9 (in Russian).
9. Rodionova L.A. Methodological aspects of measuring and modeling the level of happiness. *Ekonomika. Upravlenie. Pravo= Economics.Management. Law*, 2012, no. 1-2(25), pp. 25–30 (in Russian).
10. Cobb C., Halstead T., Rowe J. *The Genuine Progress Indicator: Summary of Data and Methodology*. Redefining Progress, San Francisco, 1995. Vol. 15.
11. Estes R.J. *Praxis: Resources for social and economic development.* School of Social work & Practice, University of Pennsylvania, 1995.
12. Rahman T., Mittelhammer R.C., Wandschneider P. Measuring quality of life across countries: A multiple indicators and multiple causes approach. *The Journal of Socio-Economics*, 2011, vol. 40(1), pp.43–52. DOI: 10.1016/j.socec.2010.06.002
13. Kacapyr E. Are you middle class? *American Demographics*, 1996, vol. 18(10), pp. 30–35.
14. Andreev E.M., Alekseev A.I., Zubarevich N.V. *Rossiya regionov: v kakom sotsial'nom prostranstve my zhivem?* [Russia of Regions: What Social Space Do We Live in?]. Moscow: Pomatur, 2005. 278 p.
15. Schmidt-Traub G, Kroll C., Teksoz K., Durand-Delacre D., Sachs D. National baselines for the sustainable development goals assessed in the SDG Index and dashboards. *Nature Geoscience*, 2017, vol. 10, pp. 547–555. DOI: 10.1038/NGEO2985
16. Ferrans C., Powers M. Quality of life index: Development and psychometric properties. *Advances in Nursing Science*, 1985, vol. 8, pp. 15–24. DOI: 10.1097/00012272-198510000-00005
17. Raphael D., Waalen J., Karbanow A. Factor analytic properties of the quality of life profile: Examination of the nine subdomain Quality of Life model. *Psychological Reports*, vol. 88(1), pp. 265–276. DOI: 10.2466/pr0.2001.88.1.265
18. Hagerty M. et al. Quality of life Indexes for National Policy: Review and Agenda for Research. *Social Indicator Research*, 2001, vol. 55(1), pp. 1–97. DOI: 10.1023/A:1010811312332
19. Veenhoven R. Happy life expectancy: A comprehensive measure of quality of life in nations. *Social Indicators Research*, 1996, vol. 39(1), pp. 1–58. DOI: 10.1007/BF00300831

20. Kahneman D., Deaton A. High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences,* 2010, vol. 107(38), pp. 16489–16493. DOI: 10.1073/pnas.1011492107
21. *How's Life? 2020: Measuring Well-being*. Paris, OECD Publishing, 2020. DOI: 10.1787/9870c393-en
22. Prata D.N. et al Social data analysis of Brazilian's mood from Twitter. *International Journal of Social Science and Humanity,* 2016, vol. 6(3), pp. 179. DOI: 10.7763/IJSSH.2016.V6.640
23. Nguyen Q.C. Leveraging geotagged Twitter data to examine neighborhood happiness, diet, and physical activity. *Applied Geography*, 2016, vol. 73, pp. 77–88. DOI: 10.1016/j.apgeog.2016.06.003
24. Yang C., Srinivasan P. Life satisfaction and the pursuit of happiness on Twitter. *PloS one,* 2016, vol. 11(3), pp. 1–30. DOI: 10.1371/journal.pone.0150881
25. Wang W., Hernandez I., Newman D.A., He J., Bian J. Twitter analysis: Studying US weekly trends in work stress and emotion. *Applied Psychology*, 2016, vol. 65(2), pp. 355–378. DOI: 10.1111/apps.12065
26. Liu P., Tov W., Kosinski M., Stillwell D.J., Qiu L. Do Facebook status updates reflect subjective well-being? *Cyberpsychology, Behavior, and Social Networking*, 2015, vol. 18(7), pp. 373–379. DOI: 10.1089/cyber.2015.0022
27. LiKamWa R., Liu Y., Lane N.D., Zhong L. Moodscope: Building a mood sensor from smartphone usage patterns. *Proceeding of the 11th annual international conference on Mobile systems, applications, and services*, 2013, pp. 389–402. DOI: 10.1145/2462456.2464449
28. Schwartz H.A., Sap M., Kern M.L., Eichstaedt J.C., Kapelner A., Agrawal M., Kosinski M. Predicting individual well-being through the language of social media. *Biocomputing 2016: Proceedings of the Pacific Symposium*, 2016, pp. 516–527, DOI: 10.1142/9789814749411_0047
29. Carlquist E., Nafstad H., Blakar R., Ulleberg P., Delle Fave A., Phelps J. Well-being vocabulary in media language: An analysis of changing word usage in Norwegian newspapers. *The Journal of Positive Psychology*, 2017, vol. 12 (2), pp. 99–109, DOI: 10.1080/17439760.2016.1163411
30. Algan Y., Beasley E., Guyot F., Higa K., Murtin F.,Senik,C. Big data measures of well-being: Evidence from a Google well-being index in the United States. *OECD Statistics Working Papers*, 2016. 38 p. DOI: 10.1787/5jlz9hpg0rd1-en
31. Fantazzini D., Shakleina M., Yuras N. Big data for computing social well-being indices of the Russian population. *Applied Econometrics*, 2018, vol. 50, pp. 43–66.
32. Mavragani A., Tsagarakis K. YES or NO: Predicting the 2015 Greek Referendum results using Google Trends. *Technological Forecasting and Social Change*, 2016, vol. 109, pp. 1–5. DOI: 10.1016/j.techfore.2016.04.028
33. Oliveira-Brochado A. Google search-based sentiment indexes. *IIMB Management Review*, 2019, pp. 1–38. DOI: 10.1016/j.iimb.2019.10.015
34. Da Z., Engelberg J., Gao P. The sum of all FEARS investor sentiment and asset prices. *The Review of Financial Studies*, 2015, vol. 28(1), pp. 1–32. DOI: 10.1093/rfs/hhu072
35. Singer E. The use of incentives to reduce nonresponse in household surveys. *Survey nonresponse*, 2002, vol. 51, pp. 163–177.
36. Vissing-Jorgensen A. Perspectives on behavioral finance: Does" irrationality" disappear with wealth? Evidence from expectations and actions. *NBER macroeconomics annual*, 2003, vol. 18, pp. 139–194. DOI: 10.1086/ma.18.3585252
37. Askitas N., Zimmermann K.F. *Google econometrics and unemployment forecasting. 2009.* Available at: https://ssrn.com/abstract=1465341
38. Varian H.R. Big data: New tricks for econometrics. *Journal of Economic Perspectives*, 2014, vol. 28(2), pp. 3–28. DOI: 10.1257/jep.28.2.3.
39. Reimsbach-Kounatze C. The proliferation of "big data" and implications for official statistics and statistical agencies: A preliminary analysis. *OECD Digital Economy Papers*, no. 245. OECD Publishing, 2015. DOI: 10.1787/5js7t9wqzvg8-en
40. Della Penna N., Huang H. Constructing consumer sentiment index for US using Google searches. *Working Papers,* no. 26. University of Alberta, 2009. 22 p.

41. Benjamin D.J. Beyond happiness and satisfaction: Toward well-being indices based on stated preference. *American Economic Review*, 2014, vol. 104, no. 9, pp. 2698–2735. DOI: 10.1257/aer.104.9.2698
42. Baker S., Fradkin A. The impact of unemployment insurance on job search: Evidence from Google search data. *Review of Economics and Statistics*, 2017, vol. 99(5), pp. 756–768. DOI: 10.1162/REST_a_00674
43. Josselin R. *The Diary of Ralph Josselin, 1616–1683(vol.3)*. OUP Oxford, 1991. 707 p.
44. Crowley J.E. *The Invention of Comfort: Sensibilities and Design in Early Modern Britain and Early America*. JHU Press, 2003. 349 p.
45. Berens L.H. *The Digger Movement in the Days of the Commonwealth*, 2014. 315 p.
46. Smith A. *An Inquiry into the Nature and Causes of the Wealth of Nations*. JJ Tourneisen and JL Legrand, 1791. DOI: 10.1093/oseo/instance.00043218
47. Odile-Bernez M. Comfort, the acceptable face of luxury: An Eighteenth-century cultural etymology. *Journal for Early Modern Cultural Studies*, 2014, vol. 14(2), pp. 3–21. DOI: 10.1353/jem.2014.0015
48. Scitovsky T. *The Joyless Economy: The Psychology of Human Satisfaction*. Oxford University Press on Demand, 1992. 449 p.
49. Slater K. *Human Comfort*. Vol. 1. USA: CC Thomas Pub Ltd., 1985.
50. Kolcaba K. *Comfort Theory and Practice: A Vision for Holistic Health Care and Research*. Springer Publishing Company, 2003. 201 p.
51. Tetior A.N. *Ekologicheskaya garmoniya, krasota, komfortnost' goroda (na baze ekologicheskoi infrastruktury)* [Ecological Harmony, Beauty, Comfort of the City (based on Ecological Infrastructure)]. Moscow: FGOU VPO MGUP, 2010. 312 p.
52. Tetior A.N. *Ekologicheskaya infrastruktura i sreda zhizni* [Ecological Infrastructure and Living Environment]. Moscow: REFIA, 2002. 102 p.
53. Merinov Yu.N., Merinova Yu.Yu. Ecological and social comfort of the population in the southwestern part of the Rostov region. In: *Aktual'nye voprosy i innovatsionnye tekhnologii v razvitii geograficheskikh nauk* [Topical issues and innovative technologies in the development of geographical sciences], 2020. Pp. 328–331 (in Russian).
54. Cabanac M. Pleasure and joy, and their role in human life. In: *Creating the Productive Workplace*. D. Clements-Croome ed. London: E&FN Spon, 2006. Pp. 40–50.
55. Lyons A.C., Spicer J. A new measure of conversational experience: The speaking extent and comfort scale (SPEACS). *Assessment*, 1999, vol. 6(2), pp. 189–202. DOI: 10.1177/107319119900600206
56. Owens T.J., Stryker S., Goodman N. (ed.) *Extending Self-Esteem Theory and Research: Sociological and Psychological Currents*. UK: Cambridge University Press, 2001, pp. 198–222.
57. Spake D., Beatty S., Brockman B., & Crutchfield T. Consumer comfort in service relationships: Measurement and importance. *Journal of Service Research*, 2003, vol. 5(4), pp. 316–332. DOI: 10.1177/1094670503005004004
58. Cole R.J. Re-contextualizing the notion of comfort. *Building Research & Information*, 2008, vol. 36(4), pp. 323–336. DOI: 10.1080/09613210802076328
59. Shin J. Toward a theory of environmental satisfaction and human comfort: A process-oriented and contextually sensitive theoretical framework. *Journal of Environmental Psychology*, 2016, vol. 45, pp. 11–21. DOI: 10.1016/j.jenvp.2015.11.004
60. Stiglitz J., Sen A., Fitoussi J. *Report by the Commission on the Measurement of Economic Performance and Social Progress*, 2009.
61. McGregor A., Sumner A. Beyond business as usual: what might 3-D wellbeing contribute to MDG momentum? *IDS Bulletin*, 2010, vol. 41(1), pp. 104–112. DOI: 10.1111/j.1759-5436.2010.00111.x
62. Allin P., Hand D.J. *The Wellbeing of Nations: Meaning, Motive and Measurement*. UK: John Wiley & Sons, 2014. DOI: 10.1002/9781118917046
63. Leshchaikina M.V. Econometric cross-country analysis of the living population social comfort. *Prikladnaya ekonometrika=Applied Econometrics*, 2014, no. 36 (4), pp. 102–117 (in Russian).

64. Scitovsky T. *The Joyless Economy. An Inquiry into Human Satisfaction and Consumer Dissatisfaction*. London: Oxford University Press, 1976. 310 p.

65. Obraztsova O.I., Popovskaya E.V. An essay on the multidimensional statistical methods to characterize the entrepreneurial context in Russian regions. *Sotsiologicheskie issledovaniya=Sociological Studies*, 2017, no. 4, pp. 93–106 (in Russian).

66. Escoufier Y. L'analyse conjointe de plusieurs matrices de données. In: M. Jolivet (Ed.) *Biométrie et Temps*. Paris: Société Française de Biométrie, 1980. Pp. 59–76.

67. Lavit C., Escoufier Y., Sabatier R., Traissac P. The ACT (STATIS method). *Computational Statistics & Data Analysis*, 1994, v. 18, pp. 97–119. DOI: 10.1016/0167-9473(94)90134-1

68. Rivadeneira F.J., Figueiredo A.M.S., Figueiredo F.O.S., Carvajal S.M. and Rivadeneira R.A. Analysis of Well-being in OECD Countries through STATIS Methodology. *HOLOS*, 2016, vol. 7, pp. 335–351.

69. Nguyen L.H., Holmes S. Ten quick tips for effective dimensionality reduction. *PLoS Comput Biol 15(6)*, 2019, pp. 1006907. DOI: 10.1371/journal.pcbi.1006907.

70. Corrales D., Rodriguez O. Interstatis: The STATIS method for interval valued data. *Rev. Mat,* 2014, vol. 21(1), pp. 73–83.

71. Plato K. Two years after the report of the Stiglitz-Sen-Fitoussi Commission: What's new in statistical measurement of social welfare and sustainable development? *Voprosy statistiki=Voprosy Statistiki*, 2011, no. 11, pp. 3–11 (in Russian).

Information about the Authors

Marina V. Shakleina – Candidate of Sciences (Economics), Associate Professor, Moscow School of Economics at Lomonosov Moscow State University (build. 61, 1, Leninskie Gory, Moscow, 119991, Russian Federation; e-mail: shakleina@mse-msu.ru)

Maria I. Volkova – Candidate of Sciences (Economics), Senior Researcher, Central Economic Mathematical Institute of the Russian Academy of Sciences (47, Nakhimovsky Prospekt, Moscow, 117418, Russian Federation; e-mail: mvolkova@cemi.rssi.ru)

Konstantin I. Shaklein – PhD in Economic Sciences, Chief Specialist, OJSC "Russian Railways" (2, Novaya Basmannaya Street, Moscow, 107174, Russian Federation; e-mail: shakleinki@center.rzd.ru)

Stanislav R. Yakiro – Chief Specialist, JSC "SOGAZ" (10, Akademika Sakharova Avenue, Moscow, 107078, Russian Federation; e-mail: yakirosr@yandex.ru)

Received July 6, 2020.

DOI: 10.15838/esc.2020.5.71.9
UDC 334.021:332.012.3; LBC 65.24

Development of Social Innovations in Russia in Terms of Activities and Interaction of Government Bodies, Business Structures, and Civil Society*

Julia N.
MIERAU
Institute for East European Studies at the Freie Universität Berlin
Berlin, Germany, 55, Garystraße, room 115B, 14195
E-mail: julia.o.mierau@gmail.com

Tatiana S.
SOLOVEVA
Vologda Research Center of the Russian Academy of Sciences
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: solo_86@list.ru
ORCID: 0000-0003-1770-7566; ResearcherID: I-8418-2016

Andrei V.
POPOV
Vologda Research Center of the Russian Academy of Sciences
Vologda, Russian Federation, 56A, Gorky Street, 160014
E-mail: ai.popov@yahoo.com
ORCID: 0000-0002-4803-1354; ResearcherID: I-8785-2016

* The reported study was partially funded by RFBR within the scientific project no. 18-010-00717.

For citation: Mierau Ju.N., Soloveva T.S., Popov A.V. Development of social innovations in Russia in terms of activities and interaction of government bodies, business structures, and civil society. *Economic and Social Changes: Facts, Trends, Forecast,* 2020, vol. 13, no. 5, pp. 153–167. DOI: 10.15838/esc.2020.5.71.9

Abstract. Due to the growing global socio-economic and environmental challenges (population ageing, climate change, society polarization, etc.), there is a revaluation of a position and role of innovations in overcoming threats to social development in the modern world. Researchers note a shift in the innovation paradigm toward social innovation, since it is assumed that it is not possible to achieve a drastic improvement of the situation solely through technological innovations. At the same time, many existing problems cannot be solved with efforts of a single actor – intersectoral cooperation becomes a necessity. This aspect is of key importance for development of social innovation. The purpose of the study was to analyze development of social innovations in the Russian Federation based on an actor approach, which involves an overview of this phenomenon through the prism of activities of various entities and their interaction. General scientific methods were used in the study: discourse analysis, generalization, comparison, etc. Essential foundations and the role of social innovations in solving current society's problems are presented. Using the example of government structures, big business, and civil society, the authors explore the features of social innovation development in Russia. It is shown that development of social innovations depends on their interpretation in public discourse, involvement in strategies of various actors, and intersectoral cooperation in the innovation process. In conclusion, the prospects for development of studied phenomenon are determined within identified trends and the specifics of interconnections between designated actors. The results obtained may be used not only as an empirical basis for further research, but they may also represent practical significance in development of specific management decisions in this area.

Key words: social innovations, intersectoral interaction, civil society, social entrepreneurship, social policy.

Introduction

Growing global challenges of our time lead to a necessity to find new, more efficient tools to overcome them. In this regard, the concept of social innovation took a firm position among priority areas for development of the social economy of European countries: in particular, it is a core element of the "Europe 2020"[1] strategy aimed at ensuring reasonable, sustainable, and inclusive growth. Scientific community also actively started to study this phenomenon. Over the past decades, a significant number of research projects have been implemented to develop the theory and practice of social innovation (BENISI, CRESSI, SI-DRIVE, SIMPACT, TEPSIE, TRANSITION[2], etc.; for more information, see [1]). The view on social innovations as a driving force of social changes, which contribute to improving population's quality of life, has taken root in public discourse. The discussion about possibilities of involving various actors in the innovation process to overcome acute social challenges became widespread. In the course of this discussion, different options of cross-sectoral collaboration are considered: from pairwise linear models to large-scale network structures. At the same time, special attention is paid to the formation of a favorable environment for development of social innovations, which

[1] *Europe 2020: A European Strategy for Smart, Sustainable and Inclusive Growth*. European Commission. Available at: http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf

[2] In 2012–2016, the European Commission supported 30 projects that mentioned social innovation in its abstracts with a total amount of more than 90 million euros.

creates incentives for mutually beneficial cooperation similar to natural ecosystems [2, p. 11]. As a result of these processes, an extensive support infrastructure has been formed.

The innovative nature of proposed solutions often allows social projects to be successful in cases when the government and the market cannot demonstrate their efficiency[3]. There is a growing trend in activities of governments in developed countries to delegate part of their social obligations to external performers through social outsourcing mechanisms, public-private partnerships, etc. As a result, existing interconnections between the government and society deform within ensuring social guarantees. Increasing importance of social innovations and expectations, associated with them, lead to fundamental questions about an ability of various actors to counter modern challenges, need and opportunities for intersectoral interaction to overcome them, and the division of responsibilities between a team and an individual in this context [3].

Many researchers tend to believe that the concept of social innovation fits perfectly into the modern policy of a welfare state [4], revealing the potential of civil society to support vulnerable segments of population. At the same time, the most successful practices may be institutionalized by turning into formal rules and regulations. There are also opposite points of view – when development of social innovations is associated with the transition from the principles of a welfare state to individual and group responsibility for the future of society [5]. In this case, budget expenditures on social policy are optimized by shifting part of obligations to citizens.

These questions actualize the importance of accumulating empirical knowledge about development of social innovations to determine the prospects for the evolution of this phenomenon in the context of overcoming current threats and challenges. At the same time, development of social innovations largely depends on relevant national/regional context. For example, in Germany, in official strategic documents (in particular, the national High-Tech Strategy[4]), the innovation concept is presented in an expanded form and includes not only technological but also social innovations. In this case, the promotion of social innovations is embedded in the general innovation policy, the definition of this term is proposed, and a desire to support their development at the federal level is indicated. In contrast, no systematic vision of the studied phenomenon at the state level, which is reflected in a clear political orientation to development of technological innovations, and social innovations are only casually mentioned in several documents. Nevertheless, this type of practice is common.

The purpose of this article is the analysis of development of social innovations through activities and interaction of various actors using Russia as a model. According to Article 7 of the Constitution, the Russian Federation is a welfare state, which implies that the policy is aimed "at creating conditions that ensure a decent life and free development of a person"[5]. At the same time, experts note the absence of a "stable vector of movement toward a welfare state" [6, p. 24] and the dual orientation

[3] *Fostering Innovation to Address Social Challenges. Workshop proceedings.* OECD. Available at: https://www.oecd.org/sti/inno/47861327.pdf

[4] *Research and Innovation that Benefit the People. The High-Tech Strategy 2025.* Federal Ministry of Education and Research. Available at: https://www.bmbf.de/upload_filestore/pub/Research_and_innovation_that_benefit_the_people.pdf

[5] Constitution of the Russian Federation, adopted at the national vote on December 12, 1993. *ConsultantPlus.* Available at: http://www.consultant.ru/ (accessed: October 1, 2020).

of Russian social policy (on the one hand – neoliberalism, on the other – interventionism and paternalism) [7, p. 2]. There are still many acute social problems in the country [8] (issues of poverty reduction, quality and accessibility of education and healthcare, employment of socially vulnerable categories of citizens, etc.). At the same time, a welfare state should encourage public and private and non-profit sectors to participate in solving various social problems [9], since budget opportunities are significantly limited. Taking into account the potential of social innovations in eliminating/leveling identified problems and relatively recent focus of management and academic community on this topic in Russia, the study of intersectoral interaction within the support of social innovations in such conditions seems to be a very significant area of research and practice.

Essential foundations of social innovation

Active development of theory and practice of social innovation has been going on over the last thirty years, but its evolution has a longer history. Social innovations, designed to improve people's lives, were undertaken in different eras. However, the emergence of this term dates back to the beginning of the 18th century [1, p. 14]. Since then, social innovations have been overviewed from different angles, depending on existing political, social and economic context or scientific direction. For example, in the first half of the 20th century, they were interpreted as social inventions "not related to mechanical ones and not being discoveries in natural sciences" [10, pp. 859–860]. In the context of building a welfare state and in accordance with acceleration periods of emancipation movements, community development, social and solidarity economy, social innovations meant new models of participation, management, and self-government [1, p. 16].

In the modern world, social innovations are a separate area of public policy in many countries and the subject of research in various scientific approaches (for example, sustainable [11] or inclusive development [12]) and attempts to theoretically understand this phenomenon. In addition to expectations related to overcoming social challenges, interest in social innovations is caused by a fundamental shift in the innovation paradigm, which is manifested in the openness of the innovation process, its orientation toward social problems, and a deeper recognition of the importance of non-technological innovations [13, p. 15–19]. In relation to multidimensional nature of social innovations, various definitions of this term exist: from broad ("*changes in the cultural, normative, or regulative structures of the society, which enhance its collective power resources and its economic and social indicators*" [14, p. 74]) to more specific ones ("*new solutions (products, services, models, markets, processes, etc.) that simultaneously meet a social need (more effectively than existing solutions) and lead to new or improved capabilities and relationships and/or better use of assets and resources*"[6]). As a result, researchers not only attempt to systematize existing interpretations [15] but also present social innovations as a "quasi-concept" [16]. It is noted that, according to theory, it still remains underdeveloped, and understanding of the nature and prospects of social innovation is very limited, and it primarily depends on practice and reflections, based on it [17].

Issues related to social innovations were reflected in the works of Soviet researchers,

[6] Social Innovation Overview: A Deliverable of the Project: "The Theoretical, Empirical and Policy Foundations for Building Social Innovation in Europe" (TEPSIE). *The Young Foundation*. Available at: https://youngfoundation.org/wp-content/uploads/2012/12/TEPSIE.D1.1.Report.DefiningSocialInnovation.Part-1-defining-social-innovation.pdf

where they were understood as qualitatively new formations, structures, mechanisms of social production, society as a whole or its subsystems [18, p. 9]. Typical examples of such projects of that time were socialist competition, People's Volunteer Squads, public associations of disabled people, etc. Current focus on the topic of social innovation in Russia is associated with many unresolved systemic challenges and changes in the existing relationship between the government and society in the context of ensuring the implementation of social rights. The 2008 crisis worsened existing problems, which led to the increase of interest in this phenomenon in research and practice [19, p. 15–16].

With the existing variety of approaches in the academic literature, they all recognize the collaborative nature of social innovation which implies the interaction of various actors to achieve the greatest effect in overcoming acute social problems. Since many global challenges are complex and of social nature [12, p. 13], the search for efficient solutions is often at the intersection of activities of several actors, which determines the necessity and even inevitability of finding mutual interests.

Social innovations emerge in different sectors (public, private, non-profit, etc.) and may take diverse forms and scales: from micro-level innovative projects to systemic transformations in the socio-economic structure of states; from various products and services to business models, platforms, markets, etc. The range of impact of such initiatives is also quite wide: from new models of child, elderly, and disabled people care to addressing issues of sustainable consumption, access to education, environmental issues, energy conservation, etc. One of the most common ways of implementing social innovations is social entrepreneurship, which is aimed at meeting social needs by combining social and economic goals, where priority is given to the former. As a rule, such activities occur in non-commercial, private, and public sectors of the economy or at its intersection [20, p. 371]. Development of social innovations worldwide is different due to the regional characteristics [21, p. 172–173]. The regional context has a significant impact on the areas in which social innovations are developed, how they are interpreted by individual actors, and how intersectoral interaction is built in the process of solving social problems.

Materials and methods

The article analyzes development of social innovations in modern Russia using the actor approach, which is determined not only by the importance of intersectoral cooperation to unfold its potential but also by differences in the perception of this new phenomenon (from a tool for overcoming acute social problems to a fashion trend with questionable significance for society) [22]. In the Russian context, the key actors are the government, big business, and civil society, and they determine the development vector of social innovations in the country. At the same time, these actors may act as the initiators of such projects[7]. In this article, we focused on the "grassroots" practices of civil society being among main sources of social innovation [23].

The information basis of the research includes national and international studies, regulatory documents, public reports, and reports of specialized organizations (fund of regional social programs "Our Future",

[7] Examples of social innovations, initiated by the government, are the "Open Government" system, projects on participatory budgeting "People's budget", "I plan the budget", etc. Business often implements social innovations within its own structures: for example, by introducing new practices in the workplace to create a favorable production environment.

Social Innovation Support Center SOL, etc.). To achieve a set of goals, we primarily used general scientific research methods (discourse analysis, synthesis, generalization, comparison, induction, etc.). However, it is important to understand that available empirical data on development of social innovations in Russia are limited. On the one hand, the relative novelty and diversity of the studied phenomenon result in the absence of official statistical accounting, while the available sources are often based on the crowdsourcing technology, when a project is included into a catalog at the suggestion of an applicant, or information about initiatives that participated in various programs and competitions is used. As a result, many local practices remain outside the broad public attention. On the other hand, most observations, which may-be applied to the analysis of social innovations, cover exclusively social entrepreneurs leaving aside other actors (government, business, civil society, etc.). All of it makes it difficult to draw a complete picture of social innovation sector in modern Russia. As a result, the study does not claim to be exhaustive, but it seeks to show the existing variety of interpretations of the studied phenomenon.

Social innovations within the Russian federal government policy

In Russia, the government plays a major role in solving social problems, and it is an important actor in development of social innovations. Russia inherited the extensive social security system from the USSR with its paternalistic welfare state model. In the 1990s, the government of the Russian Federation started a liberalization course, taking significant steps toward delegating social provision to the market and wider society, individualizing social risks and marketization of services that had previously been free [24; 25]. In the 2000s, the trend related to the revision of social sphere administration principles continued: priority gradually shifted from production to the regulation and mediation on the social services market. An active search for non-state actors capable of implementing social security formats began. In 2016, the government formulated a goal to outsource 10% of the social service provision to non-state suppliers – socially oriented non-profit organizations (SO NPOs) or businesses[8] – by 2018 in order to improve quality, accessibility, and to increase competition in this area. The government policy of social innovation support reflects these processes, fitting into the existing trend of a welfare state transformation and the growing presence of non-state institutions in the social sphere.

For the first time, social innovations were mentioned in official documents in 2008 (Concept for Long-Term Socio-economic Development of the Russian Federation for the Period until 2020[9]). Despite major focus on development of technological innovations, the Concept considers social innovation production as an additional source of economic growth.

The next mention is contained in the section "Innovations in the public sector, infrastructure, and the social sphere" of the Innovative Development Strategy of the Russian Federation until 2020[10]. The Strategy does not define this term, but suggests developing innovative solutions in education, health, culture, social services, etc. In 2015, the Council for the Development of Social Innovations in the

[8] On the approval of the "roadmap" "Support for access of non-profit organizations to provision of services in the social sphere": Decree of the RF Government no. 1144-p, dated June 8, 2016.

[9] Concept for Long-Term Socio-Economic Development of the Russian Federation for the Period until 2020: Decree of the RF Government no. 1662-p, dated November 17, 2008.

[10] Innovative Development Strategy until 2020: Decree of the RF Government no. 2227-p, dated December 8, 2011.

Subjects of the Russian Federation under the Federation Council was established. Currently, half of Russian regions host centers for innovations in the social sphere (CISS). However, this term has not yet been officially defined. Moreover, the aforementioned documents remain the only references to social innovation in federal legal acts.

The concept of social entrepreneurship became much more common in Russia. This term was first used in the federal regulatory documents in 2011 (order of the Ministry of Economic Development of the Russian Federation no. 227 on competitive selection of entities of the Russian Federation for granting subsidies within providing government support for small- and medium-sized enterprises (SMEs)[11]). It should be noted that the terms of "social innovation" and "social entrepreneurship" are often used synonymously in the Russian public discourse. Thus, activities of the aforementioned organizations that have the term "social innovations" in their names focus on two categories of actors – SO NPOs and social entrepreneurs[12]. These actors are supposed to step in for the social provision in the course of the social sphere denationalization. The interchangeable usage of two terms is explained by a common perception of social entrepreneurship as a carrier of social innovations and a tool for its implementation. Social enterprises are perceived as having an in-built element of innovation [26, p. 145], since they provide adapted and flexible services as compared to the government standardized offers aimed at an average consumer. Another point of view on the source of social entrepreneurship innovativeness suggests that a competition with traditional businesses and government structures forces social entrepreneurs to use the best technologies to increase productivity and quality of products or services[13].

The Russian Ministry of Economic Development had a great influence on the content of the social entrepreneurship concept, including by acting as a driving force in determining its legal status in the Russian legal field, preparing a bill in the form of amendments to the Federal Law-209 "On the development of small and medium enterprises in the Russian Federation" in 2016. On July 26, 2019, the law came into force, formally enshrining the concepts of "social entrepreneurship" and "social enterprise" and outlining the types of state support[14] for this new form of entrepreneurship. The law was developed as part of the implementation of the "Strategy for Development of Small and Medium Entrepreneurship in Russia until 2030" and the Roadmap for Supporting the Access of Non-Governmental Organizations to the Provision of Social Services[15]. It illustrates the dual focus of government support in the area of social

[11] On organizing carrying out of competitive selection of entities of the Russian Federation, budgets of which receive subsidies for financing events conducted within providing government support for small- and medium-sized businesses in entities of the Russian Federation in 2011: Order of the RF Ministry of Economic Development no. 227, dated May 20, 2011.

[12] Information on the work of Council for Development of Social Innovations in Entities of the Russian Federation under the Federation Council of the RF Federal Assembly in 2016. Available at: http://council.gov.ru/media/files/kGAif4xJTY1AFfhZiJAxRud29osHyIHr.pdf (accessed: April 24, 2020); Ivanushkin G. Artem Shadrin on the roadmap for NPOs' access to the social services market. ASI. Available at: https://www.asi.org.ru/article/2016/06/29/chernovik-artem-shadrin/ (accessed: April 24, 2020).

[13] Kazantsev V. Social services on outsourcing. *Nezavisimaya Gazeta*. Available at: http://www.ng.ru/ng_politics/2016-10-04/9_social.html (accessed: April 24, 2020).

[14] On amending the Federal Law "On development of small and medium entrepreneurship in the Russian Federation" in terms of consolidating concepts "social entrepreneurship", "social enterprise": Federal Law no. 245-FZ, dated July 26, 2019.

[15] On the approval of the "roadmap" "Support for access of non-profit organizations to provision of services in the social sphere": Decree of the RF Government no. 1144-p., dated June 8, 2016.

entrepreneurship: on the one hand – small- and medium-sized businesses, on the other – socially oriented non-profit sector. However, the legislative definition is primarily focused on SMEs, offering a narrow interpretation of social entrepreneurship and excluding non-profit organizations from the official status. The provisions of the law, as well as the forms of provided support, can be applied to NPOs only if they carry out their activities in a "mixed" form, combining non-profit and commercial structures. Thus, the new legislation reinforces the interpretation of social entrepreneurship as profitable business.

The studied law also defines the areas of social entrepreneurship, the options for profit sharing, the composition of employees, etc. Such a narrow framework restricts the entrepreneurial freedom and, thus, the development of innovative solutions. In addition, the text of the law does not mention innovation as a necessary criterion for social entrepreneurship. This may be caused by prevailing technological understanding of innovation and a lack of discussion about the content of the concept of social innovation in the Russian public discourse [27, p. 37]. At the same time, the law allows expanding the range of social entrepreneurship areas depending on local conditions. This approach gives the authorities an opportunity to regulate activities of social entrepreneurs at the regional and municipal levels and address the most pressing issues in a targeted manner. Thus, by clearly articulating a demand for specific services and specifying the modalities of doing business, the government directs the efforts of social entrepreneurs to implement specific tasks in the social sphere, but to change approaches to solving social problems and overcoming the causes of their occurrence.

Social innovations within corporate social responsibility of large businesses

The appearance of the term "social innovations" in a broad discourse, or the concept of social entrepreneurship as one of its most widespread forms, is associated with activities of the fund for regional social programs "Our future", established in 2007 on the initiative of V. Y. Alekperov – the President of PJSC "LUKOIL". It is worth noting that the fund significantly influenced the formation of the "social entrepreneurship" definition [28] as a self-sufficient and sustainable "business aimed at mitigating or solving social problems"[16]. This vision broadly corresponds to the interpretation given in the federal legislation. At the same time, the fund does not impose any restrictions on social entrepreneurs' possible activity areas.

Granting support to social initiatives, the fund is guided by additional criteria of social impact, replicability, and innovativeness[17]. At the same time, the innovation of projects is interpreted very broadly as "a certain degree of novelty in the approach to solving social problems" or more narrow as an innovative component confirmed by a patent. Social impact is a quantitative indicator for the fund: social entrepreneurial activities should cover at least 1.000 people annually. Thus, support is mainly received by applicants who offer solutions at the level of concrete quantifiable services or products rather than new concepts and ideas. The focus of a large number of Russian social entrepreneurs on overcoming acute problems is also confirmed by the results of a study by the Zircon group. According

[16] Social Entrepreneurship: Features, Characteristics, History. *FRSP "Our Future"*. Available at: http://konkurs.nb-fund.ru/social-entrepreneurship/ (accessed: April 24, 2020).

[17] Conditions for financing social projects. *FRSP "Our Future"*. Available at: http://konkurs.nb-fund.ru/conditions/ (accessed: April 24, 2020).

to these data, 54% of social entrepreneurs who participated in the survey launched the production of goods or services a lack of which they, or their families, felt in the past [27, p. 9].

NPOs and entrepreneurs can apply for interest-free loans – the main tool for supporting social entrepreneurship of the "Our future" fund, however, based on the description of supported projects, this opportunity is mostly used by commercial entities. The decision to support social entrepreneurship rather than invest in charitable projects results from a discussion about the efficiency of a company's corporate social responsibility (CSR). From this point of view, the efficiency of investments in social entrepreneurship is higher, since, after receiving support, initiatives become financially independent, and free resources may be invested in other projects, while charitable organizations require constant financial investments, which can lead to an organization's dependence on the sponsors[18].

In addition to PJSC "LUKOIL", many large Russian companies (PJSC "MMC "Norilsk Nickel", JSC "OMK", OK "RUSAL", JSC "SUEK", JSC "ARMZ", PAO "SIBUR", etc.) also implemented social measures for entrepreneurs into their CSR concepts. In this area, large businesses cooperate with authorities at various levels. For example, experts of the "Our future" fund actively participated in development of the "Roadmap for Supporting the Access of Non-Governmental Organizations' to the Provision of Social Services" and later – the draft law on social entrepreneurship. Since 2014, the Fund has been a member of the Council for Development of Social Innovations in the Subjects of the Russian Federation under the Federation Council. OK "RUSAL" and JSC "Severstal" are co-founders of a regional CISS. At this place, it should be noted that CSR of big Russian businesses is considered by many analysts as a response to the request formulated by the government. This explains the high similarity of approaches of these actors to the studied phenomenon.

In addition to financial support in the form of interest-free loans, grants, and equity participation, the business contributes to the promotion and dissemination of successful social entrepreneurship practices by organizing training events, incubation programs, and conferences. However, with the exception of the Fund "Our Future" that operates in 57 Russian regions, big manufacturers support social entrepreneurship mostly in a few regions of their presence.

Social innovations in the context of civil society

Russian civil society is one of the key actors initiating and producing social innovations in the country despite being characterized as relatively weak and underdeveloped [29; 30]. There are various ideas about social innovation and social entrepreneurship in the civil society, which are manifested through activities of respective organizations. In the context of social security, many SONPOs and social entrepreneurs work within the directions defined by the government policy. They act as executors of the state priorities in addressing specific acute social issues and convey the understanding of social entrepreneurship that is close to the one adopted at the government level. However, even in this context, there are organizations that represent a systematic approach to social protection issues and most often do not meet the criteria of the official definition of social entrepreneurship. These

[18] Nataliya Zvereva (FRSP "Our Future"): "In social entrepreneurship, we set a trend". *Bankovskoe Obozrenie*. Available at: https://bosfera.ru/bo/nataliya-zvereva-fond-nashe-budushchee-v-socialnom-predprinimatelstve-my-zadaem-trend?_utl_t=fb (accessed: April 24, 2020).

include the charity fund for disabled and elderly people "Old Age in Joy", the project "Mama Works" of the charity fund for social support and protection of citizens "Road to Life", the hospices fund "Vera", etc.

Existing support infrastructure contributes to development of social innovations in areas that are outside of the state priorities. In addition to aforementioned assistance from big business structures and authorities, there are alternative sources of financial and non-financial support in Russia. These include general narrow-focused educational and incubation programs (social entrepreneurship schools for NPOs[19] or programs for elderly social entrepreneurs[20], schools of environmental entrepreneurship[21], etc.), contests and awards (Social Impact Award for young social innovators, "Contest of Social Innovation Leaders", etc.), attraction of experts from business community on the basis of pro bono volunteering, etc.

Some civil society organizations act as mediators and place their accents in the interpretation of the studied phenomenon. For example, Impact Hub Moscow[22] shares the vision of social entrepreneurship adopted by the Global Community of Impact Hubs, which it is a part of. According to it, social entrepreneurship is a way to solve social problems based on a financially sustainable business model of innovative entities. At the same time, Impact Hub adds some distinctive features to this definition, focusing on the innovation of business activities and achievement of the Global Sustainable Development Goals. Another organization-mediator is the Social Innovation Support Center "SOL" which was created to support innovative social entrepreneurship, and it is more flexible in its approach to sources of financial stability. Revenue from business activities is considered to be the most reliable one, but an ability to find and combine different resources can also ensure the long-term stability of a project. According to "SOL", the defining features of social entrepreneurship are innovativeness, social impact, systematic character of the aspired changes, and sustainability of suggested solutions. According to the report of the "SOL" Center within the "Map of Social Changemakers" project, most social innovators in Russia are focused on overcoming consequences of social problems rather than on the systematic change of approaches to solving it. In this regard, activities of mediating organizations that support a systematic approach are important for the future development of social innovations.

In the past few years, social innovation has also spread in the less formalized environment of the grassroots civic activism. Here, they are often revealed in the form of civil technologies, which are aimed at overcoming information asymmetry and involving people in the public life. A number of innovative projects, based on IT technologies, have emerged in Russia since 2010. With its assistance, citizens, for example, may attract volunteers to overcome consequences of natural disasters[23] and search for missing people[24], to monitor air pollution[25],

[19] Social Accelerator. *CRNO*. Available at: http://spclub.crno.ru/sotsialnyiy-akselerator (accessed: April 24, 2020).

[20] Ready to Start. *Impact Hub Moscow*. URL: http://www.impacthubmoscow.net/zayavka-na-uchasti-v-programme-ready-to-start/ (accessed: April 24, 2020).

[21] School of Environmental Entrepreneurship. *SHEPR*. URL: http://shepr.ru/ (accessed: April 24, 2020).

[22] Map of leaders of social changes. *SocChain*. Available at: http://soc-chain.ru/ (accessed: April 24, 2020).

[23] The project "Russian Fires". Available at: http://russian-fires.ru/ (accessed: April 24, 2020).

[24] Search and rescue team "Liza Alert". Available at: https://lizaalert.org/ (accessed: April 24, 2020).

[25] *Breathe.Moscow*. Available at: https://breathe.moscow/ (accessed: April 24, 2020).

tax returns of officials[26], public procurements[27], to communicate more transparently and efficiently with authorities and public institutions[28], to address city infrastructure problems[29], etc. All these initiatives are created by civic society activists or citizens' volunteer associations. Efficient solution of tasks in this case often does not imply the existence of a business model, commercialization of activities, or profit generation. Although many projects are aimed at solving a specific problem, the crowdsourcing technology has an additional effect: it helps to bring transparency to relations between people and public institutions and strengthen citizens' voice in public decision-making. In this area, there is also an organization-mediator – "Teplitsa ("Greenhouse"). Technologies for Social Good". It supports the creation of civil online applications and aggregates information about existing projects, so it plays an important role in broadcasting its vision of social innovations, based on civic technologies and having a systemic nature[30].

Thus, the analysis showed the co-existence of different interpretations of social innovations by public authorities, business structures, and civil society. Social innovations may be considered a tool for overcoming micro-level problems, institutional solution to systemic challenges, financially sustainable social business, projects based on volunteerism; having a "certain degree of novelty" and unique ways of solving problems, including the usage of information technologies. The choice of a particular interpretation is related to the goals and context of an actor's activity.

Prerequisites for intersectoral cooperation in the context of social innovation development in Russia

It is impossible to fulfill the potential of social innovations without forming close links between its actors. It is reflected in the concept of ecosystems becomes popular in the academic literature, focusing not only on the framework conditions for development of social innovations but on the importance of intersectoral interaction [2]. The prerequisites for such cooperation are largely determined by the parameters of external environment, as well as differences in the understanding of social innovations and interests of actors involved.

Analyzing the relations between the government and civil society in modern Russia, first of all, it is worth noting that they are characterized by control and selective approach of the authorities to non-profit structures, which manifests itself, for example, in restricted access to international funding and a clear division into socially oriented and other NPOs [31; 32]. In recent years, the government has made a lot of efforts to involve "constructive" civil society in the process of making and implementing political decisions [33]. However, the interaction between these two actors is asymmetric, formed by a clear hierarchy, and it clearly works in favor of authorities [34]. The government interacts with civil society, defining partners, areas, and boundaries of cooperation [33].

Within the state policy on social entrepreneurship, interaction is also built in the "top-down" or "customer – service provider" manner. Main support is aimed at those who help solve urgent problems in the area of social provision determined by the authorities (for

[26] Declarator. Available at: https://declarator.org/ (accessed: April 24, 2020).

[27] *Government expenditures*. Available at: https://clearspending.ru/ (accessed: April 24, 2020).

[28] *Open ZKH*. Available at: http://openzkh.svobodainfo.org (accessed: April 24, 2020).

[29] *Krasivyi Irkutsk*. Available at: http://www.красивый-иркутск.рф (accessed: April 24, 2020); *RosYama*. Available at: https://rosyama.ru/ (accessed: April 24, 2020).

[30] Sidorenko A. Civic tech – technologies that were supposed to awaken a civic culture in us. *Teplitsa. Technologies for Social Good*. Available at: https://te-st.ru/2020/02/07/the-main-thing-about-civic-tech/ (accessed: April 24, 2020).

example, a lack or absence of kindergartens, hospitals, rehabilitation institutions, homes for elderly people, etc.), determined by authorities. These objectives also explain the focus on businesses that respond faster to demand changes and have necessary competencies to conduct commercial activities, while the creation of SONPOs, even despite the growing professionalization of the non-profit sector, is a longer process, which includes the self-organization of citizens around a specific problem building up a membership base, and attraction of volunteers.

Some Russian SONPOs, especially ones that are used to relying on direct government funding and other forms of support under the Soviet model of social security (trade unions, organizations of veterans, pensioners, people with disabilities, etc., as well as ones representing the interests of large population groups), try to resist the liberalization of the social sphere and maintain direct support and preferential conditions for recipients of their services [35]. In turn, regional and local administrations try to reduce social dissatisfaction and continue to directly subsidize certain categories of citizens, reproducing the mechanisms of redistribution characteristic of the paternalistic model of social security. This situation increases the inequality between different third sector organizations and reduces their incentives to innovate.

Civil society organizations working in areas outside of the state priorities of social entrepreneurship policy are able to effectively operate. To achieve these goals, close cooperation with the government is not always necessary. As a source of support, social innovators can rely on developed infrastructure that includes offers from large businesses, private foundations, or beneficiaries of the services. Researchers note an improvement of NPOs' capabilities to mobilize financial resources through crowdfunding or donor contributions [37]. At the same time, according to a study by the Zircon group, 43% of respondents did not hear anything about government measures to support social entrepreneurship in 2018, which may indicate its inefficiency, unavailability, or inaccessibility [27, p. 24]. In addition, some social entrepreneurs deliberately avoid interaction with the government, because they do not trust its structures or afraid of excessive requirements and bureaucratic procedures associated with such relationships.

As for social innovation within civic activism, intersectoral interaction is often unavoidable. For example, previously mentioned online applications for improving urban infrastructure do not fix the problem but only indicate its presence. By attracting a large number of users and public attention, such initiatives create a situation when authorities, most often municipal ones, must respond to it. The results of field research, conducted by the authors, show that, in case of civil technologies, the forms of interaction vary from cooperation to conflict[31]. However, it should be noted that practices of interaction between government structures and civic society may significantly differ at the regional and local levels, which underlines the relevance of localizing the research focus.

Big Russian businesses, as a rule, take positions close to the government, including that related to the development of social entrepreneurship. These actors cooperate within the formation of infrastructure to support it: for example, when creating regional centers for social innovation. The interaction of business with civil society is mainly limited

[31] The study was based on qualitative methods (case study) and conducted in 2017 at the municipal level in Moscow, Irkutsk, Omsk, and Yekaterinburg in the form of 64 in-depth semi-structured interviews with social innovators, government representatives, and experts.

to financing of individual projects within the framework of corporate social responsibility of companies in places of their presence. Often, these places are single-industry towns, where large industrial companies are the only employer, and they are forced to take responsibility for the welfare and social stability in these localities. Business interests in diversifying employment, expanding a range of social services, and solving acute social problems create prerequisites for cooperation with local civil society. However, the weakness of the latter hinders "equal" interaction and development of solutions to overcome social challenges. At the same time, there are some cases of closer cooperation between business and civil society within joint programs for development of social entrepreneurship: for example, a joint program of Impact Hub Moscow and Rosbank "Start Differently" ("Nachni Inache") for inclusive social and entrepreneurial projects.

Thus, intersectoral cooperation in the area of social innovations largely reflects the characteristics of environment, in which they are implemented. Clarification of current trends in relationships between main actors and identification of differences in the perception of the studied phenomenon allow revealing the existence of a number of restrictions that hinder the development of such practices in Russia.

Within this study, it is primarily the lack of real prerequisites for active cooperation, which is associated with the interpretation of social innovation by most actors as a tool for overcoming the consequences of social problems. As a result, each stakeholder solves this task from the perspective of its own interests (improving the efficiency of public administration, implementing the principles of corporate social responsibility, meeting local demand for social services, etc.) without establishing close ties with each other. Sociological data for certain regions also demonstrate the lack of cooperation between the actors involved [22], which makes it difficult to develop systematic approaches toward overcoming many social challenges. The prospects for the future of the concept of social innovation in Russia include the preservation of a multi-faceted understanding of its role in social development, embodied in various, often non-overlapping, contexts and the low level of intersectoral cooperation.

The contribution of the research to the development of theoretical science consists in the accumulation of empirical material on the development of social innovations in a specific environment, which brings clarity in understanding the essence of the studied phenomenon from perspective of different actors and their relationships. The findings may also be used by public authorities while developing specific management decisions aimed at creating an enabling environment for unfolding the potential of intersectoral cooperation.

References

1. Moulaert F., Mehmood A., MacCallum D., Leubolt B. (eds.) *Social Innovation as a Trigger for Transformations – The Role of Research*. Luxembourg: Publications Office of the European Union, 2017. 108 p.
2. Domanski D., Howaldt J., Kaletka C. A comprehensive concept of social innovation and its implications for the local context – on the growing importance of social innovation ecosystems and infrastructures. *European Planning Studies,* 2020, vol. 28 (3), pp. 454–474. DOI: 10.1080/09654313.2019.1639397
3. Baglioni S., Sinclair S. *Social Innovation and Social Policy: Theory, Policy and Practice*. Bristol: Policy Press, 2018. 136 p.

4. Pel B., Bauler T. The Institutionalization of social innovation between transformation and capture. *TRANSIT Working Paper*, 2014, no. 2. Available at: http://www.transitsocialinnovation.eu/content/original/Book%20covers/Local%20PDFs/179%20TRANSIT_WorkingPaper2_Governance_Pel141015.pdf
5. Fougère M., Meriläinen E. Exposing three dark sides of social innovation through critical perspectives on resilience. *Industry and Innovation*, 2019. Available at: https://www.tandfonline.com/doi/abs/10.1080/13662716.2019.1709420. DOI: 10.1080/13662716.2019.1709420
6. Ilyin V.A., Morev M.V. "Russian Federation – a welfare state?": Assessing the results of 25 years of implementation of Article 7 of the Russian Constitution. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2018, vol. 11, no. 6, pp. 9–25. DOI: 10.15838/esc.2018.6.60.1 (in Russian).
7. Tarasenko A.V. *Diversifikatsiya sfery sotsial'nykh uslug v Rossii: faktory regional'nykh razlichii* [Diversification of the Social Services Sector in Russia: Factors of Regional Differences]. St. Petersburg: Izdatel'stvo Evropeiskogo universiteta v Sankt-Peterburge, 2017. 28 p.
8. Soboleva I.V., Chubarova T.V. *Sotsial'naya politika v Rossii – kontury novoi modeli* [Social Policy in Modern Russia – Contours of a New Model]. Moscow: Institut ekonomiki RAN, 2017. 45 p.
9. Okhotskii E.V., Bogucharskaya V.A. The social state and social policy of modern Russia: Orientation to the result. *Trud i sotsial'nye otnosheniya=Labour and Social Relations*, 2012, no. 5 (95), pp. 30–44 (in Russian).
10. Ogburn W.F., Nimkoff M.F. *Sociology.* Boston: Houghton Mifflin Co, 1940. 953 p.
11. Millard J. How social innovation underpins sustainable development. In: J. Howaldt, C. Kaletka, A. Schröder (eds.). *Atlas of Social Innovation*. Dortmund: Sozialforschungsstelle, 2018. Pp. 40–43.
12. Bogdan N.I. Socialization of innovation policy: World trends and challenges for Belarus. *Belorusskii ekonomicheskii zhurnal=Belarusian Economic Journal*, 2015, no. 3, pp. 4–22 (in Russian).
13. Howaldt J., Schwarz M. *Social Innovation: Concepts, Research Fields and International Trends.* Dortmund: TU-Dortmund, 2010. 83 p.
14. Heiskala R. Social innovations: Structural and power perspectives. In: T.J. Hämäläinen, R. Heiskala (eds.). *Social Innovations, Institutional Change and Economic Performance. Making Sense of Structural Adjustment Processes in Industrial Sectors, Regions and Societies.* Cheltenham: Edward Elgar, 2007. Pp. 52–79.
15. Rüede D., Lurtz K. *Mapping the Various Meanings of Social Innovation: Towards a Differentiated Understanding of an Emerging Concept.* Oestrich-Winkel: EBS Business School, 2012. 51 p.
16. Jenson J. Social innovation: Redesigning the welfare diamond. In: A. Nicholls, J. Simon, M. Gabriel, C. Whelan (eds.). *New Frontiers in Social Innovation Research*. Palgrave Macmillan: Basingstoke, 2015. Pp. 89–106.
17. Mulgan G. Social innovation theories: Can theory catch up with practice? In: H.-W. Franz, J. Hochgerner, J. Howaldt (eds.). *Challenge Social Innovation*. Berlin: Springer-Verlag, 2012. Pp. 19–42.
18. Lapin N.I., Prigozhin A.I., Sazonov B.V., Tolstoi V.S. Innovations in organizations (the general part of the research program). In: *Struktura innovatsionnogo protsessa* [The Structure of the Innovation Process]. Moscow, 1981. Pp. 5–21.
19. Popov A.V., Soloveva T.S. Social innovation in Russian scientific discourse. *European Public & Social Innovation Review*, 2018, vol. 3 (2), pp. 14–22. DOI: https://doi.org/10.31637/epsir.18-2.2
20. Austin J., Stevenson H., Wei-Skillern J. Social and commercial entrepreneurship: Same, different, or both? *Entrepreneurship Theory and Practice*, 2006, vol. 30(1), pp. 1–22. DOI: 10.1111/j.1540-6520.2006.00107.x
21. Popov A.V., Solov'eva T.S. The development potential of social innovations in Russia and the EU. *Sovremennaya Evropa=Contemporary Europe*, 2020, no. 1, pp. 170–181. DOI 10.15211/soveurope12020170181 (in Russian).
22. Soloveva T.S., Popov A.V. Assessment of intersectoral coordination in the development of social innovation at the regional level. *Sotsial'noe prostranstvo=Social Area*, 2019, no. 4 (21). Available at: http://socialarea-journal.ru/article/28314. DOI: 10.15838/sa.2019.4.21.2
23. Krasnopolskaya I.I., Mersiyanova I.V. Civil society as an environment for production and diffusion of social innovation. *Forsait=Foresight and STI Governance*, 2014, vol. 8, no. 4, pp. 40–53 (in Russian).

24. Cook L. *Postcommunist Welfare States: Reform Politics in Russia and Eastern Europe*. London: Cornell University Press, 2007. 288 p.
25. Danilova E.N. Transformations in the welfare regime and discourse on social justice in Russia. *Mir Rossii= Universe of Russia*, 2018, vol. 27, no. 2, pp. 36–61. DOI: 10.17323/1811-038X-2018-27-2-36-61 (in Russian).
26. Neshachadin A.A., Kashin V.K., Tulchinskij G.L. About forms of social entrepreneurship. *Obshchestvo i ekonomika=Society and Economy*, 2014, no. 9, pp. 143–161 (in Russian).
27. *Sotsial'nyi predprinimatel'-2018. Avtoportret: kratkii analiticheskii otchet po rezul'tatam issledovaniya* [Social Entrepreneur–2018. Self-portrait: A short analytical report on the research results]. Moscow: TsIRKON, 2018. 37 p.
28. Nefedova A.I. Social entrepreneurship in Russia: Key players and development potentiality. *WP BRP,* 2015, vol. 51/STI/2015. 27 p. DOI: 10.13140/RG.2.2.32653.44009
29. Evans A.B., Henry L.A., Sundstrom L.M. (eds.) *Russian Civil Society: A Critical Assessment.* New York: Routledge. 2005. 348 p.
30. Yakobson L.I., Mersiyanova I.V., Kononykhina O.N. et al. *Grazhdanskoe obshchestvo v moderniziruyushcheisya Rossii: analiticheskii doklad Tsentra issledovanii grazhdanskogo obshchestva i nekommercheskogo sektora Natsional'nogo issledovatel'skogo universiteta «Vysshaya shkola ekonomiki» po itogam realizatsii proekta «Indeks grazhdanskogo obshchestva – CIVICUS»* [Civil society in modernizing Russia: Analytical report of the Centre for Studies of Civil Society and the Nonprofit Sector National Research University Higher School of Economics (HSE) following the results of the project "Civil Society Index - CIVICUS"]. Moscow: NIU VShE, 2011. 60 p.
31. Chebankova E. The Evolution of Russia's civil society under Vladimir Putin: A cause for concern or ground for optimism? *Perspectives of European Politics and Society,* 2009, vol. 10 (3), pp. 394–415. DOI: 10.1080/15705850903105819
32. Rozhdestvenskaya N.V., Boguslavskaya S.B., Bobrova O.S. *Otsenka effektivnosti proektov nekommercheskikh organizatsii, sotsial'nogo predprinimatel'stva i grazhdanskikh initsiativ* [Evaluation of the Effectiveness of Projects of Non-Profit Organizations, Social Entrepreneurship and Civil Initiatives]. St. Petersburg: Izdatel'stvo Politekhnicheskogo universiteta, 2016. 168 p.
33. Aasland A., Mikkel B.-N., Bogdanova E. Encouraged but controlled: Governance networks in Russian regions. *East European Politics*, 2016, vol. 32 (2), pp. 148–169. DOI: 10.1080/21599165.2016.1167042
34. Kropp S. Preface. In: S. Kropp, A. Aasland, B.-N. Mikkel, H.-H. Jørn, J. Schuhmann (eds.). *Governance in Russian Regions. A Policy Comparison*. Cham: Palgrave Macmillan, 2017. Pp. 73–104. DOI: 10.1007/978-3-319-61702-2
35. Tarasenko A. Russian welfare reform and social NGOs: Strategies for claim-making and service provision in the case of Saint Petersburg. *East European Politics,* 2015, vol. 31 (3), pp. 294–313. DOI: 10.1080/21599165.2015.1023895
36. Tullock G. *Rent Seeking.* Cambridge: Edward Elgar Publishing Limited, Cambridge University Press, 1993. 98 p.
37. Sobolev A., Zakharov A. Civic and Political Activism in Russia. In: D. Treisman (ed.). *The New Autocracy: Information, Politics, and Policy in Putin's Russia*. Washington, D.C.: Brookings Institution Press, 2018. Pp. 249–276.

Information about the Authors

Julia N. Mierau – Postgraduate Student, Institute for East European Studies at the Freie Universität Berlin (room 115B, 55, Garystraße, Berlin, 14195, Germany; e-mail: julia.o.mierau@gmail.com)

Tatiana S. Soloveva – Researcher, Vologda Research Center of the Russian Academy of Sciences (56A, Gorky Street, Vologda, 160014, Russian Federation; e-mail: solo_86@list.ru)

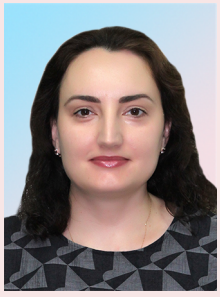
Andrei V. Popov – Candidate of Sciences (Economics), Senior Researcher, Vologda Research Center of the Russian Academy of Sciences (56A, Gorky Street, Vologda, 160014, Russian Federation; e-mail: ai.popov@yahoo.com)

Received May 20, 2020.

DOI: 10.15838/esc.2020.5.71.10
UDC 331.5, 330.59; LBC 65

Low Level and Quality of Life among Economically Active Population: Identification Criteria and Assessment of Occurrence*

Vyacheslav N.
BOBKOV
Institute of Socio-Economic Studies of Population of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences
Moscow, Russian Federation, 32, Nakhimovsky Avenue, 117218
E-mail: bobkovvn@mail.ru
ORCID: 0000-0001-7364-5297; ResearcherID: U-6527-2019



Elena V.
ODINTSOVA
Institute of Socio-Economic Studies of Population of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences
Moscow, Russian Federation, 32, Nakhimovsky Avenue, 117218
E-mail: odin_ev@mail.ru
ORCID: 0000-0002-7906-8520; ResearcherID: U-7061-2019

Abstract. The article presents the results of identification of groups with low level and quality of life among Russian economically active population. Its relevance is determined by the clarification of national goals and targets for Russia's development until 2030, as well as the reduction of population's level and quality of life considering socio-economic consequences associated with measures to counter the spread of COVID-19. The results of the research complement other publications devoted to the study of multidimensional poverty and the social structure of society, offering criteria and social standards for identifying the lower groups by the level and quality of life among economically active population. Social standards for assessing the employment situation, education, material and property provision of

* The study is conducted within the state assignment "Components, social standards, and indicators of the level and quality of life of population in modern Russia: Qualitative identification and quantitative assessment in the context of socio-economic inequality" (no. 0137-2019-0032).

For citation: Bobkov V.N., Odintsova E.V. Low level and quality of life among economically active population: identification criteria and assessment of occurrence. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 168–181. DOI: 10.15838/esc.2020.5.71.10

households (monetary income, savings, and real estate), as well as social standards taking into account self-assessments of the level and quality of life, are overviewed. When identifying the employment situation, it is proposed to identify key and additional features of precarious employment with the identification of the most vulnerable groups among the employed. Based on the analysis of RLMS data, we obtained estimates of the scale of groups with low level and quality of life in Russia for 2018, which include more than 40% of economically active population. Among them, precariously employed people are the most widely represented, while a significant part of them is characterized by a concentration of signs of precarious employment. The structure of groups with a low level and quality of life is determined, and the core, extended core, and periphery are identified in their composition. The proposed methodology makes it possible to develop targeted social policy measures taking into account typical problems in the area of employment, material and property provision, etc. Further research may be linked to development of a methodology for multi-criteria identification of groups that are characterized by a more prosperous situation in terms of the level and quality of life, including the study of the prevalence of precarious employment among them.

Key words: low level of life, low quality of life, employment situation, precarious employment, education, monetary income, savings, real estate provision, self-evaluation of the level and quality of life.

Introduction

Target indicators related to the reduction of the poverty level and provision of the rate of population's sustainable income growth are defined in the Executive Order no. 474 "On the National Development Goals of the Russian Federation through 2030", dated July 21, 2020[1]. Its relevance, given the socio-economic consequences of COVID-19, only increases.

As the official poverty threshold for implementing state socio-economic policy in Russia, the subsistence minimum is used as an indicator of an absolute monetary poverty. Foreign and Russian practices also offer other criteria borders of material and property provision for identifying poverty or low level and quality of life (hereinafter – LaQL) defined by: 1) monetary (absolute or relative) method, on the basis of fixed values of income (expenses) too, which is reflected in practices of Eurostat[2], OECD[3], World Bank[4], Rosstat[5]; 2) non-monetary method, on the basis of, deprivations too [1; 2, etc.]. These methods are commonly used to solve specific research and practical goals[6], but, with such a one-dimensional "cut" of the problem, other characteristics of population' low LaQL remain beyond the analysis.

[1] On the National Development Goals of the Russian Federation through 2030: Executive Order of the President of the Russian Federation no. 474, dated July 21, 2020. Available at: http://publication.pravo.gov.ru/Document/View/0001202007210012 (accessed: August 19, 2020).

[2] *Living Conditions in Europe*. 2018 edition. Statistical books. Eurostat. European Union, 2018. 143 p.; et al.

[3] *Poverty Rate*. OECDiLibrary. Available at: https://www.oecd-ilibrary.org/social-issues-migration-health/poverty-rate/indicator/english_0fe1315den?parentId=http%3A%2F%2Finstance.metastore.ingenta.com%2Fcontent%2Fthematicgrouping%2F7f420b4b-en (accessed: June 19, 2020); et al.

[4] *Poverty and Equity Data Portal*. The World Bank. Available at: http://povertydata.worldbank.org/poverty/home/ (accessed: June 19, 2020); et al.

[5] Share of population with per capita monetary income below limits set on the basis of actual level of population's monetary income (per capita, median, and modal), for Russia in general and for entities of the Russian Federation. Available at: https://www.gks.ru/folder/13723 (accessed: June 19, 2020); Share of population with incomes below the poverty threshold, established at the international level, taking into account purchasing power parity. Available at: https://www.gks.ru/folder/13723 (accessed: June 19, 2020).

[6] See, for example: *Guide on Poverty Measurement*. United Nations Economic Commission for Europe. UN, 2017. 197 p.

The article presents the results of a study based on the author's methodology for multi-criteria identification of groups with low LaQL in relation to Russian conditions. Subject of research is LaQL of employed, unemployed people and their households, which are determined through evaluation of the employment situation, level of education, characteristics of material and property provision (level of income, savings, real estate), and self-evaluations.

Low LaQL in our work is reviewed within characteristics that identify poverty among economically active population (hereinafter – EAP) through its multi-criteria (multidimensional) assessment according to aforementioned parameters. Health characteristics are not included in the assessment at this stage, but they can be taken into account in the following stages of the study. The analysis also excludes components of LaQL related to the "living environment" of population: its safety, quality of social infrastructure and environment.

The purpose of the study is the identification of multi-criteria groups of employed and unemployed people with low LaQL among EAP, determination of groups' size and structure. The results obtained may add new data to the necessary basis for development of social policy to address the problems of low LaQL, focusing on target groups characterized by a different combination of characteristics that lie in the area of employment, material and property provision, etc. Modern research practice actively develops a comprehensive approach to identifying low LaQL, or so-called *multidimensional poverty*, and offers indicators based on various analyzed LaQL parameters. Thus, for example, an indicator recording the share of people at risk of poverty or social exclusion (*AROPE*) allows identifying low LaQL with relative monetary poverty, severe material deprivation, or very low work intensity[7]. It was tested by researchers for Russian conditions too [3; 4, etc.]. Another indicator – *The Global Multidimensional Poverty Index* – is based on LaQL assessment of indicators for three dimensions: health, education, and living standards[8]. The methodology of this indicator allows modifying it to meet national characteristics and needs, apply it not only for monitoring purposes but also for social policy[9] [4, p. 25–30]. The methodology for identifying multidimensional poverty measurement for *EU-SILC countries* covers a broader list of dimensions – six[10], including employment with the assessment of the ratio of an actual and potential number of work months[11].

[7] *People at Risk of Poverty or Social Exclusion*. Eurostat. Available at: http://ec.europa.eu/eurostat/cache/metadata/en/sdg_01_10_esmsip2.htm (accessed: June 24, 2020); Glossary: At Risk of Poverty or Social Exclusion (AROPE). Eurostat. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:At_risk_of_poverty_or_social_exclusion_(AROPE) (accessed: June 24, 2020).

[8] Alkire S., Kanagaratnam U., Suppa N. The Global Multidimensional Poverty Index (MPI) 2019. *OPHI MPI Methodological Note 47*. The Oxford Poverty and Human Development Initiative (OPHI). Oxford Department of International Development, University of Oxford. 2019. 28 p.; et al.

[9] *Guide on Poverty Measurement*. United Nations Economic Commission for Europe. UN, 2017. Pp. 138–142.

[10] Other measurements that are taken into account in the methodology of this indicator are: 1) the income (60% threshold of median income is used, equivalised disposable income is taken into account during estimation); 2) severe material deprivation (at least 6 out of 9 deprivation signs); 3) education (estimated level of education); 4) environment (estimated by noise, pollution, crime, housing parameters); 5) health (subjective health assessments, the presence of chronic or long-term diseases, restrictions due to health problems, unmet medical needs). See: Alkire S., Apablaza M. *Multidimensional Poverty in Europe 2006–2012: Illustrating a Methodology*. OPHI Working Paper no. 74. University of Oxford, 2016. 20 p.

[11] Alkire S., Apablaza M. *Multidimensional Poverty in Europe 2006–2012: Illustrating a Methodology*. OPHI Working Paper no. 74. University of Oxford, 2016. 20 p.

However, the methodology for measuring multidimensional poverty, based on these indicators, either does not consider the employment component, or, if it exists, does not imply an assessment of the quality of employment, which, in our opinion, is one of the most important aspects of the LaQL study.

We adhere to the research approach which is methodologically closer not to the concept of so-called multidimensional poverty but the concept of multi-criteria identification of the social structure of society and its separate groups [5, p. 286–312; 6; 7 etc.]. It is based on a combination of objective and subjective parameters, material and immaterial LaQL characteristics used to define social structures and particular groups (layers) in it.

The research approach, proposed for identifying the lower groups by LaQL, is distinguished by the basis on the following main provisions. When using criteria that take into account a set of LaQL characteristics – objective and subjective, material and immaterial – the criteria for identifying EAP groups that differ in LaQL are defined in a normative manner, which implies the application and definition of social standards that specify the criteria and allow them to be quantified. While identifying EAP groups, the key characteristics of LaQL are ones that allow assessing the employment situation and affect all other economic and social EAP characteristics [8, p. 12–16].

In the analysis the employment situation, we pay special attention to identification of signs of precarious employment (PE). The presence (absence) of its signs not only characterizes LaQL according to the studied criterion but also, in turn, determines their other parameters: in particular, the financial situation of employed people's households. Studies on PE, interconnections between PE and various aspects of LaQL [9–20, etc.] show that PE leads to a significant reduction of income among employed people and households. Precariously employed people, tend to earn less in comparison with a stable, protected employment, and they live in low-income households [10; 13; 18, etc.].

Main theoretical and methodological provisions of the study

To conduct multi-criteria identification of EAP groups with low LaQL, the following normative criteria and social standards are proposed.

Normative criteria for employment situation and education. The first group of normative criteria involves the analysis of the characteristics of the employment situation, including the presence of PE signs, as well as the assessment of the existing level of education.

The social standard within normative *education criterion* takes into account minimum requirements for the level of education that corresponds to basic or secondary general education. This level of education is the basis of the first (lowest), out of four, accepted qualification levels used for the classification of occupations, according to the Russian Classification of Occupations (hereinafter – OKZ)[12].

The requirements of the social standard of the *employment situation criterion* allow assessing the presence (absence) of employment, and, if there is employment, analyzing its characteristics, first of all, in terms of the existing PE characteristics for all employed people and the largest group of them – hired workers.

[12] OK 010-2014 (MSKZ-08). Russian Classification of Occupations (adopted and put into effect by the Order of Rosstandart no. 2020-st, dated December 12, 2014). Available at: http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=LAW&n=177953&fld=134&dst=1000000001,0&rnd=0.3014865504820005 7#07080117216285722 (accessed: June 5, 2020).

This standard is defined by the following requirements:

1) availability of employment;

2) absence of precarious employment;

3) if there is employment for hiring – employment that requires basic or secondary general education (employment as unskilled workers or military enlisted personnel).

PE features were defined according to the results of previously conducted studies with the participation of authors [20, etc.]. Taking into account commonness of PE in Russia, among formal sector employees too [18; 20, etc.], within this research, *differentiation of PE features into key and additional ones in order to identify the most vulnerable groups among employed population, taking into account the concentration of PE features,* was used for multi-criteria identification of groups with low LaQL.

Thus, we defined:

1. Key PE features: 1) lack of official employment registration; 2) unofficial (partial or full) employment income; 3) employment income, which, in relation to amount of the subsistence minimum of able-bodied population (hereinafter – SMab), does not achieve 4.1 SMab.

2. Additional PE features: 4) working hours that deviate from the standard (excessive or insufficient working hours); 5) existence of salary arrears; 6) reduction of salary or working hours not initiated by an employee; 7) forced unpaid leave initiated by the administration; 8) dissatisfaction with employment conditions.

The first two features, highlighted as key ones, identify the PE part that is "in the shadow. Such employment is, first, vulnerable from a position of official guarantees for employed people, and, second, it is associated with avoiding the payment for relevant insurance premiums and taxes. The third feature, identified as a key one for determining PE, characterizes a part of it that does not allow a household of employed people to reach the lower limit of average income standards that determine a safe (stable) financial situation. The border for employment income (4.1 SMab) was defined on the basis of the results of a study conducted by the authors and devoted to the analysis of PE impact on the material security of households [20].

The most vulnerable EAP groups, considering concentration of PE features, were ones with two or all three key features. They may also be accompanied by other additional PE features.

When analyzing the employment situation and identifying groups with low LaQL, hired employees were additionally required to be employed as unskilled workers or enlisted military personnel. For these occupations, according to OKZ, the first (lowest) level of qualification is required, which corresponds to basic and secondary general education[13]. In relation to hired employees, it ensures that the requirements for employment and education are interrelated, which corresponds to the general methodological approach, developed for multi-criteria identification of population groups according to LaQL and previously tested while identifying groups characterized by average LaQL, or so-called middle classes [8, etc.].

The following groups were overviewed in the multi-criteria identification of groups with low LaQL on the basis of the requirements for the employment situation and education in EAP.

1. *Unemployed*. This group among EAP is characterized by an extreme form of PE – temporary lack of employment and, as a result, lack of employment income.

[13] OK 010-2014 (MSKZ-08). Russian Classification of Occupations (adopted and put into effect by the Order of Rosstandart no. 2020-st, dated December 12, 2014). Available at: http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=LAW&n=177953&fld=134&dst=1000000001,0&rnd=0.3014865504820005 7#07080117216285722 (accessed: June 5, 2020).

2. Self-employed people who have two or three key features of PE (which may also be followed by one or more PE additional features). Among self-employed workers, we consider only a group that is characterized by the most vulnerable employment situation in terms of PE features. The rest self-employed people, taking into account other identification criteria, may belong to other groups according to LaQL.

3. Hired employees who have general secondary education at best, and they are employed as unskilled workers or enlisted military personnel. This group consists of hired employees who meet the minimum requirements according to two studied criteria – their employment situation and level of education. They can only be assigned to groups with low LaQL, based on low educational and qualification potential.

4. Hired employees without a professional education who are not employed as unskilled workers or enlisted military personnel, but who are vulnerable from the point of view of PE, i. e. having two or three key PE features (which may also be followed by one or more PE additional features).

5. Hired employees with a professional education who have two or three PE key features (may also be followed by one or more PE additional features). As in case of self-employed people, employees with a professional education, considering multi-criteria assessment, may be represented in all LaQL groups, but, if the employment situation differs in the presence of, at least, two or more, out of three, key features of PE, they are reviewed as part of the lower EAP groups according to LaQL.

Normative criteria for material and property provision. As part of the study, for purposes of multi-criteria identification of the lower LaQL groups, we defined the basic criteria of material and property provision, which we have already tested while identifying groups characterized by average LaQL (so-called middle classes) [8, etc.] – per capita monetary income, savings, and real estate provision – to ensure the continuity of the methodology.

The following requirements are the minimum ones (social standards) for the characteristics of material and property provision, which are formed at the household level:

1) *by the criterion of per capita monetary income (hereinafter – PMI):* PMI in a household corresponds to one regional average per capita subsistence minimum (hereinafter – SMreg);

2) *by the criterion of savings:* a household has savings to maintain the usual level of consumption when all sources of income are lost for several months;

3) *by the criterion of real estate provision:* a dwelling (main one) in a household meets the following requirements: size of the living area of a dwelling is at least 6 sq.m/person; availability of centralized water supply, central heating, and centralized sewerage. At the same time, a household does not have other real estate (other apartments/houses, part of an apartment/part of a house, cottages, etc.).

Failure to meet these requirements identifies *low LaQL in relation to 1) income poverty; 2) housing poverty; 3) lack or insufficiency of financial reserves*.

The requirements for the per capita monetary income criterion correspond to the official poverty threshold, and the methodological basis for forming the requirements for the standards of other two criteria was previously developed with the participation of the authors. Thus, the standards for the criterion of the

real estate provision are based on a previously developed system of social standards for identifying provision with real estate (housing) [8, p. 100–117; and others]. While determining the requirements for the savings criterion, the standards for forming a socially acceptable market basket, which provides a financial reserve that allows maintaining the minimum basic level of consumption for several months in cases of adverse life situations, are taken into account[14].

Based on the considered criteria of material and property provision with multi-criteria identification of the lower groups according to LaQL in EAP, groups can be distinguished based on a number of criteria requirements of which are not met in households of employed and unemployed people, i.e., according to which these people could be considered disadvantaged: 1) all three criteria, 2) two out of three criteria, 3) one out of three criteria.

If the material and property provision parameters are not lower than the minimum requirements for all three criteria, then EAP is identified as belonging to other LaQL groups based on material and property provision.

Subjective criterion. The usage of this criterion allows supplementing the objective criteria for evaluating LaQL through subjective assessments. To form requirements within the subjective criterion, a "poor – rich" self-assessment scale was used, which is also common for identifying groups with average LaQL (so-called middle classes) [8, p. 117–124]. It is proposed to identify affiliation with the lower LaQL groups when self-assessments on a 9-point "poor-rich" scale do not exceed 2 points.

[14] For details see: Bobkov V.N., Gulyugina A.A., Odintsova E.V., Safronova A.M. Socially acceptable market basket. *Living Standards of the Population in the Regions of Russia*, 2019, no. 2 (212), pp. 8–26. DOI: 10.24411/1999-9836-2019-10060

Data, methods, and research results

The proposed criteria for identifying groups with low LaQL among EAP were tested on the basis of data from the 27th round of the Russia Longitudinal Monitoring Survey conducted by Higher School of Economics (RLMS), collected in October 2018 – January 2019. The sample of RLMS is representative (by gender, age, and type of settlement) for Russian population[15].

To reveal groups among EAP considering accordance with requirements of criteria of the employment situation, education, material and property provision, and subjective criteria and conducting multi-criteria identification of groups with low LaQL on the basis of data of the 27th round of RLMS, data array was acquired which includes: 1) data from an array containing representative data on individuals; 2) data from an array containing representative data on households; 3) data of the Federal State Statistic Service on a value of subsistence minimum for able-bodied population and an average value for population in entities of the Russian Federation, which were in demand while assessing the level of income from employment and monetary income in households of employed and unemployed people.

For quantitative assessments, a sample, which includes people aged 15 years and older who are unemployed or employed (for hire and not for hire – for main employment) (total – 5683 people), was obtained.

[15] «Russia Longitudinal Monitoring survey, RLMS-HSE», conducted by National Research University "Higher School of Economics" and OOO "Demoscope" together with Carolina Population Center, University of North Carolina at Chapel Hill and the Institute of Sociology of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences (RLMS-HSE web sites: http://www.cpc.unc.edu/projects/rlms-hse, http://www.hse.ru/org/hse/rlms).

To identify groups with low LaQL in EAP, a two-dimensional distribution of employed and unemployed people was obtained based on data processing of the 27th round of the RLMS: 1) according to the criteria of the employment situation and education; 2) according to the criteria of material and property provision (monetary income, savings, and provision of real estate): on the basis of it, groups with low LaQL are identified, determined by objective characteristics – core, extended core, and periphery (*Table*).

Thus, the lower groups according to LaQL, defined on the basis of objective characteristics, according to acquired assessments based on RLMS data, cover **42.7%** of EAP number (2018).

The *core of the lower groups* (7.8% of EAP; 18.2% in the structure of the lower groups) includes those people among employed and unemployed who are characterized by low LaQL in relation to the employment situation, education, and material and property provision. The core includes unemployed,

Groups with a low level and quality of life identified among economically active population by their the employment situation, education, material and property provision (2018)

Normative criteria	Characteristics of groups according to the level and quality of life
Group 1 – Core (7.8% from EAP number)	
Employment situation and education	1) Unemployed; 2) hired employees – unskilled workers or enlisted military personnel with no higher than general secondary education; 3) self-employed, as well as all other hired employees by the employment situation and education – with two or three PE features, out of three key ones, which may also be accompanied by one or more additional PE features
Material and property provision	Material and property provision does not meet minimum requirements for two or three criteria: monetary income, savings, and provision of real estate
Group 2 – Extended core (12.1% from EAP number)	
Employment situation and education	1) Unemployed; 2) hired employees – unskilled workers or enlisted military personnel with no higher than secondary general education; 3) self-employed, as well as all other hired employees by the employment situation and education – with two or three PE features, out of three key ones, which may also be accompanied by one or more additional PE features
Material and property provision	Material and property provision does not meet minimum requirements for one out of three criteria: monetary income, savings, and provision of real estate
Group 3 – Periphery (22.8% from EAP number)	
Sub-group 3.1	
Employment situation and education	1) Unemployed; 2) hired employees – unskilled workers or enlisted military personnel with no higher than secondary general education; 3) self-employed, as well as all other hired employees by the employment situation and education – with two or three PE features, out of three key ones, which may also be accompanied by one or more additional PE features
Material and property provision	Material and property provision reaches or exceeds minimum requirements for studied criteria: monetary income, savings, and provision of real estate
Sub-group 3.2	
Situation in employment and education	Self-employed, as well as all other hired employees according to the employment situation and education – without PE features, or with one or more PE features out of additional ones, or with one PE feature out of three key ones, which may also be accompanied by one or more additional PE features
Material and property provision	Material and property provision does not meet minimum requirements for two or three criteria: monetary income, savings, and provision of real estate
Source: own assessment on the basis of data of the 27th round of RLMS. Available at: http://www.hse.ru/rlms (accessed: October 14, 2019).	

hired employees with low educational and qualification potential (who meet minimum requirements for employment and education), as well as self-employed and those among the rest of employees who are most vulnerable in terms of the existing PE features. At the same time, material and property provision of households among selected groups of employed and unemployed does not reach minimum requirements for two or more studied criteria.

Extended core of groups with low LaQL (12.1% of EAP; 28.5% in the structure of the lower groups) is characterized by a transitional position between the core and the periphery. In terms of employment and education, it includes the same groups of employed and unemployed as the core. However, in this case, the material and property provision of groups does not meet minimum requirements only for one out of three criteria: monetary income, savings, or provision of real estate.

Periphery (22.8% from EAP; 53.3% in the structure of the lower groups) from EAP number includes those who are characterized by low LaQL, either in terms of employment and education, or in terms of material and property provision. They are "at the junction" with other LaQL groups, and a positive change in any of the studied parameters, according to which they are assigned to the lower groups, will allow them to move to more prosperous groups.

The rest of the employed (**57.3%** of EAP) in terms of employment and education, as well as material and property provision, can be attributed to more prosperous groups according to LaQL.

If we consider the composition and structure of *EAP groups with low LaQL* (core, extended core, and periphery) *by employment situation*, then we can distinguish the following characteristics.

10.6% of EAP representatives assigned to groups with low LaQL are unemployed, and 89.4% are employed (more than 40 groups of occupations by skill level and specialization). The largest share among them is occupied by drivers and operators of mobile equipment, sellers, middle special personnel for economic and administrative activities, employees in the area of individual services, cleaners, and servants.

Employees with low educational and qualification potential in the lower LaQL groups make up 12%. The basis of groups with low LaQL is formed by precarious employees. Thus, about 90% of those included in groups with low LaQL have some PE signs, and more than a third have the employment situation which, in relation to PE features, could be described as the most vulnerable: they have two or three key PE features (which may also be followed by additional PE features).

35.7% of those assigned to groups with low LaQL are in the "shadow" employment – they do not have official registration of employment and/or they receive unofficial (partially or completely) income from employment.

Almost all employed people (89.7%) among those who are included in groups with low LaQL do not have an employment income corresponding to the standard (not lower than 4.1 SMab) (the third key feature of PE), which would ensure a safe (stable) financial situation, which, taking into account the dependent load, determines their localization in the lower LaQL groups.

The composition and structure of groups with low LaQL in terms of material and property provision are characterized as follows. More than 90% of employed and unemployed people in the lower LaQL groups do not meet minimum requirements for one or more criteria: 64.3% – for two or three criteria, i.e. they and their households are poor in terms of income, housing poverty, and/or they do not have or

lack a financial reserve; another 28.5% – for one out of three criteria.

Assessment of groups with low LaQL (core, extended core, and periphery), selected in EAP, based on objective normative criteria for compliance with minimum requirements for *the subjective criterion* showed the following.

Among members of the core of the lower groups, only 27% rated their LaQL as unfavorable – no higher than 2 points (which corresponds to low LaQL), the rest indicated 3 points (25%; below average LaQL), 4–6 points (40%; average LaQL) and higher (4%; above average and high LaQL), or found it difficult to answer. At the same time, the core of groups with low LaQL includes those whose material and property provision does not reach minimum requirements for two (76% among representatives of the core) or three (24%) criteria: monetary income, savings, and/or real estate provision.

The discrepancy between objective characteristics of LaQL and self-assessments for members of the core, their "shift" toward below average (3 points) and average (4–6 points) LaQL may be related to the reluctance to classify themselves as "needy" and "poor" or to be determined by a desired higher status, for example with respect to their positions in the employment area (which may take place for the employed, related to the core, who are self-employed or hired workers not engaged in unskilled labor). It may also be determined by ideas about existing living standards (actually unfavorable in terms of basic parameters of material and property provision) as "typical", "common", which, given forced acquired skills on existence in such conditions, may be perceived as "normal" [20] and the build subjective structure of Russian society where so-called "lower middle class" is commonly represented [21].

In the extended core, only 18% meet the minimum requirement according to subjective criteria: self-evaluation not below 2 points on the "poor-rich" scale. Others marked 3 points and higher (81%), hesitated to respond, or refused to say. In this case, the discrepancy between objective and subjective evaluations can be attributed to the representatives of the extended core having only one criterion of material and property provision, which does not achieve minimum requirements that, if there are two other criteria, according to which material and property provision is more prosperous, is not perceived as a critical situation and allows providing more positive assessment of own situation.

Self-evaluations exceeding 2 points also prevail among periphery members. This is justified for one of the periphery groups, since low LaQL is only related to the employment situation and education. For another periphery group, low LaQL is determined by material and property provision: 2 or 3 criteria that do not meet minimum requirements (mainly 2 criteria, usually savings and real estate provision). In such circumstances, a more favorable situation with monetary income may be the basis for higher self-evaluations, while being localized mainly in the range of 3–6 points, i.e. corresponding to lower-average and average LaQL.

Discussion of the research results

The size of the lower groups according to LaQL, identified on the basis of proposed methodology of multi-criteria identification, in EAP composition, achieves nearly ***43% (2018), or 22.1%***[16] in population number. Taking into account a family burden among

[16] Assessment based on data from the 27th round of RLMS (http://www.hse.ru/rlms (accessed: October 14, 2019) and Rosstat (Number of population. Available at: https://rosstat.gov.ru/folder/12781 (accessed: August 20, 2020).

employed and unemployed people, who are in the lower groups, total population, characterized by low LaQL based on a set of normative criteria and social standards, significantly exceeds a number of poor people identified by an absolute monetary method (12.6%, 2018)[17].

Data obtained in other studies that identify the multi-dimensionally poor population using the alternative methodology (AROPE) show that the scale of the lower groups varies from less than 5 to less than 25% of population (2017) [3; 4, p.32–42], including the component identifying low employment intensity – 4.6% [3, p. 170]. At the same time, all three components of the AROPE index (relative poverty, severe material deprivation, and low employment intensity) affect only 2.3% of people who have at least one out of three signs of poverty or social exclusion (24.1%) [3, p. 171].

When using the AROPE methodology in relation to the conditions of Russia, the factor of employment quality remains underestimated, and outside the groups with low LaQL – employed people who have employment conditions that allow describing the quality of employment as low: "shadow" employment, formal (registered) employment with features of precarity, including low-paid employment, which also affects the level of material security of households.

The methodology of multi-criteria identification of the lower groups by LaQL, proposed by the authors, allows identifying not only unemployed but also employed people with PE features and grouping them with the most vulnerable groups based on the existing concentration of PE features, differentiated into key and additional ones.

Prevalence of PE among Russian workers [18; 20, etc.] requires further study, including the context of identifying groups that differ in LaQL to identify the localization of precarious employment in them, taking into account various employment forms – new non-standard forms of employment that may be accompanied by PE features too. It is necessary to expand data sources for the study of PE, to develop existing databases for more accurate identification of precarious employment. The RLMS database, unlike the Rosstat database, allows a comprehensive assessment of various LaQL components, taking into account signs of precarious working conditions. However, its capabilities are limited in studying the contract type, the reasons for its choice, and the necessity/voluntary nature of employment, which would improve the accuracy of assessments in PE studies.

Conclusion

The identification of groups with low LaQL among EAP was carried out based on the proposed criteria and social standards of the employment situation (including consideration of PE features presence), education, and material and property provision. We revealed that 42.7% of EAP (2018), or 32.5 million people, can be attributed to them[18]. In the lower LaQL groups, the core with the most difficult position according to the analyzed criteria reaches 18.2%, the extended core – 28.5%, and the periphery – 53.3%. The selected groups are distinguished by disadvantage in terms of employment, material and property provision.

[17] Number of population with average per capita monetary income below the subsistence minimum, and the deficit of monetary income, dynamic series. Available at: https://rosstat.gov.ru/folder/13397 (accessed: August 20, 2020).

[18] Assessmentis based on data from the 27th round of RLMS (http://www.hse.ru/rlms (accessed: October 14, 2019)) and Rosstat (Results of the sample labor force survey. 2019. Available at: https://www.gks.ru/folder/11110/document/13265 (accessed: March 24, 2020)).

Unfavorable employment situation of members of selected groups in EAP, which determines low LaQL, is associated with their exclusion from the sphere of sustainable employment. The lower LaQL groups are formed by unemployed (10.6% of representatives of the lower groups, or 3.4 million people) and the employed (89.4%, or 29.1 million people), nearly all of whom have some PE features. For more than a third (11.2 million people) of those classified as low LaQL groups, the concentration of available PE features defines their employment situation as the most vulnerable. It is manifested in the presence of "shadow" (full or partial) employment, income from employment (less than 4.1 SMab), which does not provide a stable financial situation for a household, and may also be folllowed by other PE manifestations[19].

In general, PE in the lower LaQL groups, as shown by the results of the study, is associated with "shadow" employment (lack of official registration of employment and/or the presence of unofficial (partially or completely) income from employment (41% of members of the lower groups with PE features)) and legal employment, but the conditions of which are precarious (59% of representatives of the lower groups with PE features)[20].

Unfavorable material security of groups with low LaQL is determined by the lack of income from employment, and if it is available – by its insufficient level. According to the results of the study, the vast majority of employed people (89.7%, or about 26 million people) in the lower groups do not have employment income (4.1 SMab), which would ensure the level of safe (stable) material security of households and would bring them to the level of per capita income of at least 3.2 SM. In general, the majority of members of the lower groups (64.3%, or about 21 million people) have problems with material and property provision according to two or three criteria: monetary income, savings, or provision with real estate. It manifests itself in monetary poverty of households, poverty in housing provision, as well as in the absence or insufficiency of financial reserves, which makes them particularly vulnerable to adverse material circumstances (for example, loss of employment income), and determines the unavailability of independent solutions to housing problems[21]. The proposed author's methodology for identifying groups with low LaQL develops the existing experience of multidimensional measurement of poverty and multi-criteria identification of society's social structure, including the methodology which was developed and tested earlier with the participation of the authors in relation to groups of employees with average LaQL, or so-called middle classes [8].

The practical significance of the research results is the obtainment of data on the scale, structure, and characteristics of groups among EAP with low LaQL, which complement the information base for developing evidence-based social policies, including the current adjustment of current national projects and programs.

The results are relevant for economic and social security of Russia and the decline of the scale of the lower groups among EAP with low LaQL, which depend on the exclusion from the sphere of sustainable employment, significant scales of precarious ("shadow" and legal) employment, poor material, and property provision, etc., and the findings may

[19] *Ibidem*.

[20] *Ibidem*.

[21] Based on data from the 27th round of RLMS (http://www.hse.ru/rlms (accessed: October 14, 2019)) and Rosstat (Results of the sample labor force survey. 2019. Available at: https://www.gks.ru/folder/11110/document/13265 (accessed: March 24, 2020)).

be in demand for purposes of social policy advancement and development of appropriate targeted measures. The relevance of developing and implementing measures to increase LaQL in these groups within socio-economic consequences associated with measures to counter the spread of a new coronavirus infection (COVID-19) only increases. Given the increase of a number of unemployed people (as of June 2020, 4.6 million people[22]), the decrease of labor income among many employed people[23], population's real income[24], etc., the lower groups according to LaQL, by the end of 2020, may show even greater scale than one which was recorded during the study (2018).

References

1. Ovcharova L.N. *Teoreticheskie i prakticheskie podkhody k otsenke urovnya, profilya i faktorov bednosti: rossiiskii i mezhdunarodnyi opyt* [Theoretical and Practical Approaches to the Assessment of the Level, Profile and Determinants of Poverty: Russian and International Experience]. Moscow: M-Studio, 2009. 268 p.
2. Grishina E.E. The material deprivation rate for households with children in Russia and European countries. *Finansovyi zhurnal=Financial Journal*, 2017, no. 4, pp. 47–55 (in Russian).
3. Korchagina I.I., Prokofieva L.M., Ter-Akopov S.A. European experience in measuring poverty and social exclusion: AROPE index. *Narodonaselenie=Population*, 2019, no. 3, pp. 162–175. DOI: 10.24411/1561-7785-2019-00034 (in Russian).
4. Maleva T.M., Grishina E.E., Tsatsura E.A. *Sotsial'naya politika v dolgosrochnoi perspektive: mnogomernaya bednost' i effektivnaya adresnost'* [Social Policy in the Long Term: Multidimensional Poverty and Effective Targeting]. Moscow: Izdatel'skii dom «Delo» RANKhiGS, 2019. 52 p.
5. Gorshkov M.K., Anikin V.A., Byzov L.G., Drobizheva L.M., Karavai A.V., Latova N.V., Lezhnina Yu.P., Mareeva S.V., Mchedlova M.M., Petukhov V.V., Petukhov R.V., Sedova N.N., Slobodenyuk E.D., Tikhonova N.E., Shevchenko A.G. *Rossiiskoe obshchestvo i vyzovy vremeni* [Russian Society and Challenges of the Time]. Book three. Ed. by M.K. Gorshkov, N.E. Tikhonova. Moscow: Ves' Mir, 2016. 424 p.
6. Shastitko A.E., Avdasheva S.B., Ovchinnikov M.A., Maleva T.M., Ovcharova L.N. *Rossiiskie srednie klassy nakanune i na pike ekonomicheskogo rosta* [The Russian Middle Classes on the Eve and at the Peak of Economic Growth]. Moscow: Ekon-Inform, 2008. 200 p.
7. Maleva T.M., Burdyak A.Ya., Tyndik A.O. Middle classes at different stages of life course. *Zhurnal Novoi ekonomicheskoi assotsiatsii=Journal of the New Economic Association*, 2015, no. 3, pp. 109–138 (in Russian).
8. Bobkov V.N., Odintsova E.V., Kvachev V.G., Kolmakov I.B., Pavlova V.V., Yudina M.A. *Srednie klassy v kapitalisticheskoi Rossii: nauchnaya monografiya* [The Middle Classes in Capitalist Russia: A Scientific Monograph]. Head scientific editorship by V.N. Bobkov. Second edition, ster. Moscow: KNORUS, 2019. 208 p.
9. Benach J., Vives A., Amable M., Vanroelen C., Tarafa G., Muntaner C. Precarious employment: Understanding an emerging social determinant of health. *Annual Review of Public Health*, 2014, vol. 35, pp. 229–253. DOI: 10.1146/annurev-publhealth-032013-182500
10. Lewchuk W., Lafleche M., Dyson D., Goldring L., Meisner A., Procyk S., Rosen D., Shields J., Viducis P., Vrankulj S. *It's more than Poverty. Employment Precarity and Household Well-being.* Toronto: PEPSO, McMaster University, United Way Toronto, 2013. 115 p.

[22] Employment and unemployment in June 2020. Available at: https://rosstat.gov.ru/labour_force (accessed: August 20, 2020).

[23] Sberbank recorded a drop in wages for half of working Russians. *RBK*. Available at: https://www.rbc.ru/economics/10/07/2020/5f085bc89a794796d50c3017?from=from_main_5 (accessed: July 13, 2020).

[24] The Ministry of Economic Development expects the decrease of a real disposable income of Russians. *RIA Novosti*. Available at: https://ria.ru/20200521/1571810701.html (accessed: July 13, 2020).

11. Lewchuk W., Procyk S., Laflèche M., Rosen D., Dyson D., Shields J., Goldring L., Viducis P., Meisner A., Vrankulj S. Is precarious employment low income employment? The changing labour market in Southern Ontario. *Just Labour,* 2014, vol. 22, pp. 51–73.
12. Lewchuk W., Laflèche M., Procyk S., Cook Ch., Dyson D., Goldring L., Lior K., Meisner A., Shields J., Tambureno A., Viducis P. *The Precarity Penalty: The Impact of Precarious Employment on Individuals, Households and Communities – And What to Do About It*. Toronto: PEPSO, McMaster University, United Way Toronto, 2015. 196 p.
13. Lewchuk W., Laflèche M., Procyk S., Cook Ch., Dyson D., Goldring L., Lior K., Meisner A., Shields J., Tambureno A., Viducis P. The precarity penalty: How insecure employment disadvantages workers and their families. *Alternate Routes*, 2016, vol. 27, pp. 87–108.
14. Pembroke S. *Precarious Work Precarious Lives: How Policy Can Create more Security*. Dublin: TASC, 2018. 117 p.
15. Preoteasa A.M.D., Sieber R., Budowski M., Suter Ch. Household role in coping with precarious work. Evidence from qualitative research in urban Romania and Switzerland. *Social Change Review*, 2016, vol. 14(2), pp. 177–201. DOI: 10.1515/scr-2016-0027
16. Procyk S., Lewchuk W., Shields J. (eds.) *Precarious Employment. Causes, Consequences and Remedies*. Winnipeg: Fernwood Publishing, 2017. 200 p.
17. Veredyuk O.V. Instability of Employment: Theoretical concept and assessment of its scale in Russia. *Vestnik SPbGU. Ekonomika=St Petersburg University Journal of Economic Studies*, 2013, no. 1, pp. 25–32 (in Russian).
18. Kuchenkova A.V., Kolosova E.A. Differentiation of workers by features of precarious employment. *Monitoring obshchestvennogo mneniya: Ekonomicheskie i sotsial'nye peremeny=Monitoring of Public Opinion: Economic and Social Changes Journal*, 2018, no. 3, pp. 288–305. DOI: 10.14515/monitoring.2018.3.15 (in Russian).
19. Popov A.V., Solov'eva T.S. Analyzing and classifying the implications of employment precarization: Individual, organizational and social levels. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2019, vol. 12, no. 6, pp. 182–196. DOI: 10.15838/esc.2019.6.66.10 (in Russian).
20. Bobkov V.N., Odintsova E.V. Influence of precarious employment on household well-being. *Sotsial'no-trudovye issledovaniya=Social & Labour Research*, 2020, no. 39(2), pp. 30–41. DOI: 10.34022/2658-3712-2020-39-2-30-41(in Russian).
21. Tikhonova N. Subjective stratification of Russian society model and its dynamic. *Vestnik obshchestvennogo mneniya=Sociological Research*, 2018, no. 1–2 (126), pp. 17–29 (in Russian).

Information about the Authors

Vyacheslav N. Bobkov – Doctor of Sciences (Economics), Professor, Head of Laboratory, Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences, Institute of Socio-Economic Studies of Population (32, Nakhimovsky Avenue, Moscow, 117218, Russian Federation; e-mail: bobkovvn@mail.ru)

Elena V. Odintsova – Candidate of Sciences (Economics), Leading Researcher, Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences, Institute of Socio-Economic Studies of Population (32, Nakhimovsky Avenue, Moscow, 117218, Russian Federation; e-mail: odin_ev@mail.ru)

Received August 24, 2020.

DOI: 10.15838/esc.2020.5.71.11
UDC 30(075.4); LBC 67

Human Health in the Arctic: Socio-Spatial Discourse (Case Study of the Yamalo-Nenets Autonomous Okrug)*

Valerii V. MARKIN
Institute of Sociology of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences
Moscow, Russian Federation, 24/35, build. 5, Krzhizhanovsky Street, 117218
E-mail: markin@isras.ru
ResearcherID: B-5161-2016

Anatolii N. SILIN
Tyumen Industrial University
Tyumen, Russian Federation, 38, Volodarsky Street, 625000
West Siberian Branch of the Institute of Sociology of the Russian Academy of Sciences
Tyumen, Russian Federation, 16, Lenin Street, 625003
E-mail: Sm-2004@rambler.ru
ResearcherID: S-4074-2018

Ivan S. VERSHININ
Legislative Assembly of the Yamalo-Nenets Autonomous Okrug
Salekhard, Russian Federation, 72, Respubliki Street, 629000
E-mail: filosof-888@mail.ru

* The paper was supported by Russian Foundation for Basic Research (Project no. 19-29-07355 "Human capital of the Arctic region in the concept of spatial development of Russia").

For citation: Markin V.V., Silin A.N., Vershinin I.S. Human health in the Arctic: socio-spatial discourse (case study of the Yamalo-Nenets Autonomous Okrug). *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 182–199. DOI: 10.15838/esc.2020.5.71.11

Abstract. The purpose of the research presented in the article is to study the attitude of various social groups of residents of the Far North – the Arctic zone of the Russian Federation to health, taking into account extreme natural and climatic conditions. Geospatial conditions are imposed by the socio-spatial vector of development of the Russian Arctic, which should coordinate neo-industrial development of certain parts of this territory, the formation of a new transport and logistics system, and the reproduction of the agro-industrial complex. There are groups of actors in each of the identified areas, who carry out their activities in the Arctic territories on a permanent or temporary basis, which makes the northerners' health issues highly specific and requiring a comprehensive analysis, including the sociological one. The scientific novelty of the research and its results presented in the article consists in a combination of geo- and socio-spatial approaches to studying the attitude to health among various social groups of northerners, and analysis of their specifics in Arctic conditions. The Yamalo-Nenets Autonomous Okrug is the base region of the study. Its health care system has both positive results and unresolved issues in the field of population health. The authors reveal the possibilities of its further improvement based on sociological and interdisciplinary research from a systemic perspective, taking into account the fact that the main resources of health saving are lifestyle, nutrition, quality medical care, and the environment. The authors note that the situation significantly differs in large and small cities of the Arctic, villages and shift settlements, and among nomads in the tundra. The materials of statistics, mass representative surveys, and comparative expert assessments are analyzed. The research findings illustrate the identified opportunities for improving the health of different groups of the Arctic population and indicate the need to significantly strengthen the comprehensive scientific support of Arctic projects, including sociological monitoring. The materials and results of the work are particularly relevant due to the upcoming Russia's presidency in the international Arctic Council.

Key words: Arctic, health, social space, health-saving factors, sociological research.

Introduction

The successful implementation of the ongoing and planned investment mega-projects on neo-industrial exploitation of the Arctic zone of the Russian Federation (the Russian Arctic) largely depends on the effective use of the accumulated and continuing to increase high quality human potential, relevant education, and training of direct participants of the projects and other groups, including representatives of indigenous minorities of the North (imn), as we previously mentioned in articles on Arctic subjects [1–3]. No less important are the problems related to health of people who live and come there to work, the reduction of mortality, and the increase of healthy life duration. The permanent population of the Russian Arctic was 2397.5 thousand people as of January 1, 2019. At the same time, there has been a steady decrease of this indicator in recent years, which was mainly caused by migration outflow, but, in some areas, it resulted from natural population loss[1].

[1] *Socio-Economic Situation of the Yamalo-Nenets Autonomous Okrug in January 2019: A Brief Stat. Report*. Department of the Federal State Statistics Service for the Tyumen Oblast, Khanty-Mansi Autonomous Okrug – Yugra and Yamalo-Nenets Autonomous Okrug. pp. 33–34. Available at: https://www.gks.ru/free_doc/new_site/rosstat/togs/1172/2019-01.pdf (accessed: October 13, 2019); *Socio-Economic Situation of the Yamalo-Nenets Autonomous Okrug in January 2018: A Brief Stat. Report*. Department of the Federal State Statistics Service for the Tyumen Oblast, Khanty-Mansi Autonomous Okrug – Yugra and Yamalo-Nenets Autonomous Okrug. pp. 33–34. Available at: https://www.gks.ru/free_doc/new_site/rosstat/togs/1172/2018-01.pdf (accessed: October 13, 2019).

In the Arctic regions, people (especially strangers living there for quite a long time) permanently feel a specific polar tension caused by the weakening of the body's resistance in harsh natural and climatic conditions. Studies, conducted in the 1990s, recorded the following fact: in high latitudes, the body's adaptive reserves are depleted, chronic diseases occur at a young age, and people experience premature ageing. The polar tension syndrome is a recognized sociobiopsychological phenomenon typical for the North. Its main characteristics are disorders of the metabolism, endocrine system, immune insufficiency, psychoemotional stress, and other health disorders. In practice, there are people who were caught in extreme weather conditions and then suffering from long-term mental disorders[2]. It is no accident that the legislative, legal, and normative control provides special regimes and certain preferences for people working and living in the Arctic territories.

On the other hand, the increase of average annual temperatures observed in the Arctic and subarctic regions will lead, according to prognostic studies, to the increase in the epidemiological consequences of the degradation of permafrost spaces, to the expansion of traditional areas of activity of vectors and pathogens of parasitic and infectious diseases. Considering current experience in dealing with pandemic situations, special attention should be paid to these factors.

It can be reasonably argued that, in the context of large-scale new development challenges, health care of the Arctic regions' socio-territorial communities, including development of measures for its protection and strengthening, has become a fundamental spatial-societal problem. The importance of its solution is indicated in the "Spatial Development Strategy of the Russian Federation until 2025"[3], the Decree of the President of the Russian Federation no. 204 "On National Goals and Strategic Objectives of the Russian Federation through to 2024"[4] dated May 7, 2018, the corresponding national priority project "Health", the Executive Order of the President of the Russian Federation "Basic Principles of Russian Federation State Policy in the Arctic to 2035"[5] dated March 15, 2020, the Executive Order of the President of the Russian Federation "On the National Development Goals of the Russian Federation through 2030"[6] dated July 21, 2020.

Since Soviet times, a new scientific direction has been formed in Russian medical science – polar medicine[7]. Research projects, recognized as the largest in the world, have been implemented in the field of Russian polar medicine. This work was conducted by researchers of the Institute of Clinical and Experimental Medicine, the Institute of Physiology (Novosibirsk), the Institute of Medical Problems of the North, the Institute of the Far North (Krasnoyarsk, Nadym) and other research organizations of the Siberian

[2] Khasnulin V.I. *Introduction to Polar Medicine*. Novosibirsk: SO RAMS, 1998. 337 p.; Kaznacheev V.P. *Clinical Aspects of Polar Medicine*. Moscow: Medicine, 1986. 208 p.

[3] Order of the Government of the Russian Federation no. 207-p, dated February 13, 2019. Available at: http://static.government.ru/media/files/UVAlqUtT08o60RktoOXl22JjAe7irNxc.pdf (accessed: July 20, 2020).

[4] On National Goals and Strategic Objectives of the Russian Federation through to 2024: Decree of the President of the Russian Federation no. 204, dated May 7, 2018. Available at: http://www.kremlin.ru/acts/bank/43027 (accessed: July 20, 2020).

[5] Basic Principles of Russian Federation State Policy in the Arctic to 2035: Executive Order of the President of the Russian Federation no. 164, dated March 5, 2020. Available at: https://www.garant.ru/products/ipo/prime/doc/73606526/ (accessed: July 20, 2020).

[6] On the National Development Goals of the Russian Federation through 2030: Executive Order of the President of the Russian Federation, dated July 21, 2020 no. 474. *Rossiyskaya Gazeta*, 2020, July 22, fed. issue no. 159 (8213).

[7] Khasnulin V.I. *Introduction to Polar Medicine*. Novosibirsk: SO RAMS, 1998. 337 p.; Kaznacheev V.P. *Clinical Aspects of Polar Medicine*. Moscow: Medicine, 1986. 208 p.

branch of the Russian Academy of Sciences, medical institutions and universities, and now it is continued in the studies in the new socio-economic and organizational conditions. Representatives of many other scientific fields are engaged in the studies of the northerners' health problems together with medical workers. It is difficult to name any field of knowledge that would not somehow address the health problems of the people of the North. These issues have also become popular in foreign studies [4–8].

In research, for which a consistent methodology and conceptual framework, especially the key fundamental category of health, are essential, an interdisciplinary approach is increasingly being adopted[8]. WHO Constitution states: "Health is a state of complete physical, mental, and social well-being, not just the absence of disease or infirmity"[9]. This definition, in addition to an extended and idealized interpretation of this most important human and social phenomenon, practically does not take into account the geosociospatial content, which is highly necessary for significantly different natural and climatic conditions, especially such extreme ones for humans as the Arctic. In this regard, we are faced with the task of assessing the impact of various factors on the health of people carrying out their life activities in high-latitude territories, and the possibility of neutralizing the most toxic of them. Taking into account the limited availability of sources of state and medical statistics that reflect subject-object relations, the study conducted mass surveys of various population groups and in-depth interviews with health experts, emphasizing subject-subject relations, including the subjective attitude of various groups of people to their health, self-assessment of their condition, satisfaction with health care organization, medicine, sports, and health-promoting work, etc.

The current health situation is very ambiguous and differentiated across the territories of the Russian Arctic. It is significantly influenced by socio-economic factors. The new stage of socio-economic development of the Arctic space is primarily caused by development of open hydrocarbon and other natural resources in a number of regions, the prospects for facilitating the availability of land and sea communication routes in the polar latitudes, which contributes to a significant reduction of the cost of their operation compared to earlier periods of time. The regular commercial operation of the restored Northern sea route, which almost halves the route of ships and goods from Europe to the far East and the Asia-Pacific region and back, on the one hand, opens up enormous opportunities for optimizing and intensifying trade relations between these parts of the world, and, on the other hand, makes it necessary to recreate and develop the appropriate infrastructure along the route, attracting a large number of qualified specialists to work at sea and on land.

The purpose of the research presented in the article is to study the attitude to health of various social groups of residents of the Far North – the Arctic zone of the Russian Federation – taking into account extreme natural and climatic conditions. The main research area is the territory of the Yamalo-Nenets Autonomous Okrug (YNAO), which is in fact the main oil and gas production base of the country, both at present and in the future, where new investment megaprojects are being

[8] Lebedeva-Nesevrya N.A., Gordeev S.S. *Sociology of Health: Course Book for University Students.* Perm State National Research Institute. Perm, 2011. 238 p.; Lisitsyn Yu.P. *Public Health and Healthcare*. Moscow: Geotar-media 2009. 512 p.; Annandale E. *The Sociology of Healthand Medicine: A Critical Introduction*. Cambridge: PolityPress, 1998. P. 212.

[9] WHO Constitution. Available at: https://www.who.int/ru/about/who-we-are/constitution (accessed: July 20, 2020).

developed for the extraction of hydrocarbons, liquefaction, and transportation of natural gas, etc.; grand projects are being implemented: development of oil and gas fields in the Kara Shelf, the Gulf of Ob, the commissioning of the full capacity of the largest plant for the liquefaction of natural gas in Bovanenkovo settlement, transportation routes, airport and sea port in Sabetta settlement ("Gate of the Arctic"), etc. New plants are being built in other parts of the Yamal Peninsula. In this regard, not only special technical and technological difficulties arise and being overcome, but also social problems that are characteristic of the polar region, in particular, the alignment of the neo-industrial mainstream with the traditional life of the indigenous minorities of the North – the Nenets, Khanty, Selkups, etc.

There are both positive and negative trends in the region's healthcare system. Thus, as of 2018, life expectancy of those born in the YNAO was the highest among population of the Russian Arctic and reached 74.4 years. The overall mortality rate is the lowest here in comparison with other territories of the Russian Arctic making up 4.7 cases per 1 thousand people[10]. In the YNAO, the largest natural population growth is observed (8.6 per 1 thousand people), while there is a natural decline (-12.8 per 1 thousand people in 2018) in the European regions of the Russian Arctic. At the same time, the YNAO is the territory of the highest risk for primary morbidity of the adult population (over 18 years of age) for all classes of diseases. The Arctic regions of the Arkhangelsk Oblast are at the top only in terms of malignant neoplasms (559.9 cases per 100 thousand people); the Chukotka Autonomous Okrug (CHAO) and the Republic of Sakha (Yakutia) rank the first according to chronic alcoholism criterion[11].

In the Russian Arctic, the incidence of infectious and parasitic diseases is significantly higher than in Russia as a whole. Thus, the highest level of acute intestinal infections in 2018 was observed in the YNAO (234.7 cases per 100 thousand people, which is almost three times higher than the Russian indicator). The Okrug is also poor in the incidence of opisthorchiasis, where the incidence rate was 155.6 cases per 100 thousand (13.0 in the Russian Federation). Meanwhile, according to expert surveys, the actual incidence is significantly higher than the official registration indicators[12].

The combination of geo- and socio-spatial approaches in the study of attitudes to the health of various social groups of northerners and the analysis of their specifics related to extreme natural and climatic conditions ensure the scientific novelty of the proposed findings. Studying people's health in the Arctic in an interdisciplinary geosociospatial discourse, we used the conceptual approaches of regional sociology, in particular, the sociological diagnostics of the problems considered in individual regions. At the same time, sociological diagnostics of human health, which is one of the most significant elements of human capital (along with the level of education and professional training) and which is being implemented for the Arctic region of Russia, required studying the factors determining the northerners' health (including climatic and

[10] *Socio-Economic Situation of the Yamalo-Nenets Autonomous Okrug in January 2019: A Brief Stat. Report.* Department of the Federal State Statistics Service for the Tyumen Oblast, Khanty-Mansi Autonomous Okrug – Yugra and Yamalo-Nenets Autonomous Okrug. Pp. 33–34. Available at: https://www.gks.ru/free_doc/new_site/rosstat/togs/1172/2019-01.pdf (accessed: October 13, 2019*); Socio-Economic Situation of the Yamalo-Nenets Autonomous Okrug in January 2018: A brief Stat. Report*. Department of the Federal State Statistics Service for the Tyumen Oblast, Khanty-Mansi Autonomous Okrug – Yugra and Yamalo-Nenets Autonomous Okrug. Pp. 33–34. Available at: https://www.gks.ru/free_doc/new_site/rosstat/togs/1172/2018-01.pdf (accessed: October 13, 2019).

[11] *Ibidem*.

[12] *Ibidem*.

environmental factors caused by anthropogenic activities, conditions, nutrition, medical care, etc.), the dynamics of changes of the situation in different social groups of the Arctic population (old-timers and newcomers, indigenous ethnic minorities of the North, shift personnel), and the possibilities of implementing innovative health-saving technologies.

Approaches and methodology

In modern social science, there are two general methodological foundations for regional structures and certain societal phenomena in them, in this case, health. One of them is the geospatial approach, the subject of which is the physical space as the basis of the territorial way of existence of geo objects associated with various spheres of human life. The geospatial approach proper has a huge heuristic potential, which makes it possible to study health in the regional aspect as a geospatial segment of social reality, considering it from certain angles. A special scientific direction of medical geography even appeared [9].

Another approach is based on the sociological theory of space, the foundations of which were laid at the beginning of the last century by Georg Simmel. The theory emphases the social differentiation of space and the subject-subject relations in its segments (cities and regions) [10]. The modern classic of the sociological theory of space is most pronounced in the concept of social space by P. Bourdieu (actions of actors (agents) on various social fields, positions, dispositions, habitus, etc.), although the actual regional (socio-territorial) content is not deployed in it [11].

Russian science has also developed a wide variety of ideas that have geo-and socio-spatial contexts that are closely related to regional issues, in which geographers, economists, sociologists, political scientists, lawyers, psychologists, historians, and cultural scientists have empirically interacted, cooperating with representatives of specialized technical and natural science branches of knowledge. Regarding the interdisciplinary study of health problems, almost every industry has developed links with medical science, forming a special direction, for example, the sociology of medicine.

Integration of these approaches was the focus of two fundamental research programs of RAS Presidium: "Fundamental issues of spatial development of the Russian Federation: interdisciplinary synthesis" (2009–2011) [12] and "Role of space in modernization of Russia: natural and socio-economic potential" (2012–2014) [13]. There are prospects for an interdisciplinary synthesis of geo- and socio-spatial approaches to territorial entities, including macroregions, regions, cities, and other settlements [14]. Such an umbrella approach covers the growing field of spatial studies, localizes them empirically in the synthesis of individual substantive aspects (economic, political, cultural, etc.), temporary taking into account the globalization and virtualization trends in the external circuit, and focusing on the social subjectivity of human individuals and their groups in the internal boundary.

The geosociospatial approach is directly related to the study of modern transformations, including those in the field of health, both at the national-societal and regional levels[13] [15–18]. At the same time, certain issues of public health in the Northern (Arctic and subarctic) territories were covered in special publications, mainly of a medical and environmental nature [19–26]. Psychological [27] and legal aspects [28] are also investigated.

[13] Lisitsyn Yu.P. *Public Health and Healthcare*. Moscow: Geotar-media 2009. 512 p.; Medik V.A., Yuriev V.K. *Public Health and Healthcare*. Moscow: Professional, 2009. 432 p.

Along with the above-mentioned fundamental works[14] [15; 16; 17, etc.], we should highlight the works containing a deep analysis of empirical research [29; 30; 31, etc.] in the sociological literature. In interdisciplinary terms, a monograph on health protection of the participants of the new stage of Arctic development has been prepared on a sociological basis [32]. On the one hand, there is complicating of the entire complex of relations regarding saving and improving health of people in the North, the possibilities of developing regional health structures, which is significantly affected by the uncertainty of social situations developing in and around them, their multi-factor and multi-vector nature. On the other hand, it is argued that, in the social fields of the Arctic space, people's health is influenced by various stakeholders, actors and agents from government institutions, business and civil society, who have their own specific interests in the use of space (territory, subsurface resources, air, water and land, accumulated socio – economic and socio-cultural potential) along with the general ones, which, in one way or another, imply the issues of health and health care of various social groups.

The socio-spatial discourse of studying the situation concerning people's health in the Arctic region involves identifying and sociologically measuring the positions of various social groups of the northerners (old-timers, including representatives of aboriginal ethnic groups, newcomers who have lived in the Arctic for less than three years, shift workers who come to work from other regions) operating in different spatial positions (European – Asian sectors of the Russian Arctic, regions, city – village, city – town, center – periphery of the Okrug, etc.).

Achievement of the main purpose of the study, required to identify a set of problems related to the need to preserve the health of people living in the Arctic and newly arrived, assess their significance from a systemic perspective, establish relationships, alternative solutions, and risks. The empirical research, which has become monitoring since 2005, used traditional sociological tools: mass surveys of representatives of different social groups of the northerners, in-depth experts' interviews, focus groups, content analysis of the media, including social networks, etc. Materials from health care institutions and individual data from state and medical statistics were used.

Sampling for mass surveys was based on spatial and social criteria for selecting observation units and consisted of two stages. Initially, the localities were selected based on their status and type of settlement. Then the respondents were selected according to the social structure of a settlement. We used both selection criteria, traditional ones (gender and age) and those which were significant for our study (ethnicity and Northern experience). At the same time, specific conditions of the Arctic (uncertainty due to climatic conditions, production mobility, etc.) greatly complicated the preliminary planning and selection of respondents, therefore the sampling representativeness required its mandatory adjustments.

In February – September 2019, in order to study public health, the factors affecting it and its preservation possibilities in the conditions of neo-industrial development of oil and gas resources of the Russian Arctic, we organized and implemented a new public and expert opinion poll, the results of which are analyzed in this article.

[14] Lisitsyn Yu.P. *Public Health and Healthcare*. M.: Geotar-media 2009. 512 p.; Annandale E. *The Sociology of Health and Medicine*: *A Critical Introduction*. Cambridge: PolityPress, 1998. P. 212.

The sample of the mass survey on the questionnaire is multi-staged, representing the Yamal population taking into account gender and age factors, Northern experience, ethnicity, and field of activity with an error on one attribute not exceeding 3.5%. In total, 1.554 respondents were interviewed in the Priuralsky and Shuryshkarsky districts, the towns of Salekhard, Nadym, N. Urengoy, and Noyabrsk of the Yamal-Nenets Autonomous Okrug in 2019. 16.1% of the respondents are employed in the oil and gas industry, 61.7% – in other sectors of the economy and social sphere, 6.7% are engaged in traditional activities of aboriginal ethnic groups, and 15.5% do not work.

In addition to the mass questionnaire survey of the YNAO population in 2019, we conducted an in-depth survey of 146 experts. Most of them (58.8%) represented the health care sector (chief doctors and their deputies in medical institutions), 28.1% – oil and gas companies, and the remaining 13.1% – state and municipal authorities. The majority of experts have an extensive Northern background: 61.5% have been working in the Russian Arctic from 16 to 30 years, 23% – from 6 to 15 years, 5.1% for more than 30 years, and only 10.3% for less than 5 years. They estimated their own health as follows: satisfactory – 57.9%, good – 21.1%, poor – 21%.

Research results

The northerners' attitude to health was clarified in the structure of other vital issues. In the questionnaire, the respondents were asked to rate their importance on a 10-point scale in ascending order. In the hierarchy, financial problems came first, followed immediately by the issues related to their own health and the health of their relatives, the quality of medical care, and only then the problems of housing, education, ecology, leisure, etc. (*Tab. 1*). This correlation and connection of personal (family) finances and health is quite natural in modern conditions, since even with insurance medicine, people have to pay for a number of services supporting the therapeutic effect, medicines and auxiliary means. At the same time, the majority of respondents ranked the importance of health within the first five positions. Although, it should be noted that almost a third of men and more than a quarter of women ranked these problems 6^{th}–8^{th}, and 15.4% of men and 12.8% of women – 9^{th}–10^{th}. Of course, this distribution is directly related to the respondents' age: the older they are, the more significant health is. However, these data indicate that there are reserves of preventive work among the population, especially among young people.

In general, 12.5% of the respondents consider themselves perfectly healthy; 58.2% assess their health as satisfactory; 11.1% of the respondents are often sick, but do not have chronic diseases; 15.5% have poor health and chronic diseases; 2.7% of the respondents are disabled.

As far as the Northern experience increases, the respondents' self-reported health deteriorates (*Tab. 2*).

It is known that satisfaction (or, on the contrary, dissatisfaction) with one's work significantly affects physical and mental health. It turned out that most of the northerners surveyed liked their work to some degree (14.5% like their work very much, 56.3% like their work), almost a quarter (23.7%) rated it as "so – so", and only 5.5% "do not like it at all". Most of the latter have less than 3 years of experience in the North, and they are unlikely to stay there. The highest level of satisfaction is among older members of indigenous minorities of the North and young shift workers.

Leisure is no less important for maintaining health than work. The relationship between physical activity and health is obvious (*Tab. 3*). The survey of northerners showed that only

Table 1. The northerners' most urgent problems (gender aspect), % of a number of respondents

Rank of significance	Lack of financial resources, family income	Growth of expenses	Unemployment, possibility of losing a job	Lack of housing, opportunities to improve housing conditions	Increasing housing and utility rates	Own and relatives' health, poor quality of medical care	Education and upbringing of children	Security, criminal situation, corruption	Deterioration of the environment	Inability of interesting and healthy leisure activities	Other	Total
Men												
1	12.5	15.5	12.3	10.6	14.1	10.8	6.5	3.8	6.8	6.3	0.7	100
2	7.8	11.2	9.0	11.6	6.7	8.2	12.3	10.4	12.7	10.1	0.0	100
3	15.5	7.2	10.5	8.8	9.4	10.5	9.4	6.6	13.8	8.3	0.0	100
4	10.4	9.6	11.9	10.4	7.4	8.1	11.9	13.3	8.1	8.9	0.0	100
5	12.6	2.2	9.6	10.4	11.9	11.1	12.6	11.1	9.6	8.9	0.0	100
6	4.0	4.0	9.3	10.7	4.0	13.3	16.0	13.3	17.3	8.0	0.0	100
7	4.3	5.8	8.7	8.7	8.7	10.1	15.9	11.6	17.4	8.7	0.0	100
8	5.4	6.5	4.3	16.3	5.4	9.8	8.7	22.8	8.7	12.0	0.0	100
9	0.0	0.0	14.8	6.6	9.8	8.2	11.5	16.4	11.5	21.3	0.0	100
10	8.8	9.6	4.8	6.4	9.6	7.2	8.0	16.8	7.2	21.6	0.0	100
Women												
1	13.2	15.3	10.1	8.4	13.7	11.9	7.7	4.7	7.4	6.9	0.8	100
2	9.7	7.2	10.2	10.9	9.0	7.7	13.2	10.2	12.7	9.2	0.0	100
3	10.5	7.0	11.2	12.6	9.4	8.7	10.1	11.2	10.1	9.1	0.0	100
4	8.7	5.2	8.7	11.4	10.0	11.8	9.6	10.0	14.0	10.5	0.0	100
5	4.9	8.0	12.0	12.9	6.7	7.6	8.9	15.6	12.0	11.6	0.0	100
6	4.3	6.1	11.3	16.5	5.2	13.0	11.3	11.3	12.2	8.7	0.0	100
7	5.6	6.5	6.5	12.1	1.9	6.5	20.6	15.0	13.1	12.1	0.0	100
8	3.8	4.8	6.7	8.6	3.8	8.6	16.2	19.0	17.1	11.4	0.0	100
9	7.5	1.1	5.4	7.5	1.1	4.3	6.5	23.7	19.4	23.7	0.0	100
10	8.5	8.5	8.9	8.1	9.8	8.5	9.4	15.7	5.5	17.0	0.0	100

Source: data of the 2019 survey.

Table 2. Self-reported health depending on the Northern experience, % of a number of respondents

Health status	Living in the North		Shift worker from another region
	Less than 5 years	More than 5 years	
Perfectly healthy	14.8	11.7	34.0
Satisfactory health	70.4	57.3	32.3
Often sick, but have no chronic diseases	3.7	12.0	12.5
Poor health, have chronic diseases	11.1	15.9	21.2
Disabled people	0.0	3.1	0.0
Total	100.0	100.0	100.0

Source: data of the 2019 survey.

Table 3. Self-reported health status depending on leisure activities, % of a number of respondents

Health status	Spending leisure time			
	Physically active	Passively	In different ways	Alsmost no leisure
Perfectly healthy	33.3	8.8	9.4	6.5
Satisfactory health	46.7	55.9	62.1	54.8
Often sick, but have no chronic diseases	10.7	9.8	11.5	12.9
Poor health, have chronic diseases	8.0	20.6	14.4	25.8
Disabled people	1.3	4.9	2.6	0.0
Total	100.0	100.0	100.0	100.0

Source: data of the 2019 survey.

13.6% of them are physically active in their free time, play sports, run, regularly perform gymnastic exercises, etc. 86.6% of the respondents consider their rest to be quite complete, but 18.5% mostly rest passively: lie, read, watch TV, sit at the computer. However, 61.1% still answered that they spent their leisure time "in different ways". 5.8% of the respondents say that they have "no leisure time" at all. While 13.4% of the respondents have circumstances preventing them from relaxing at home, which, of course, affects their health.

Attention is drawn to the significant proportion of those respondents who consider their health to be satisfactory during passive leisure activities. This group requires to be studied additionally, as it has the potential to get problems in the future. The group of "workaholics" who have "almost no leisure" also deserves a deeper analysis.

In terms of gender, men traditionally rate their health higher than women (*Tab. 4*).

However, this self-assessment requires critical analysis. Of course, it is affected by the mental characteristics of the "stronger" or "weaker" sex, the disparity in the gender and age structure of the population of the Okrug, and so on. However, it is important to take into account the difference in self-assessment in demographic policy, especially in relation to the most fertile ages.

Naturally, the differences in self-assessment of health in different age cohorts are the most noticeable (*Tab. 5*).

High self-assessment in the youth and middle-aged groups is understandable with some nuances. But at least three indicators in the older groups are of interest. The first is a sharp rise in self-assessment ("perfectly healthy") among the respondents over 60 (up to 12.5%), compared with the group from 51 to 60 years old (5.4%). Does it really gain a "second breath", or is it a desire to maintain achieved positions? The second and third points relate to the ratio of "chronics" in the same groups: a sharp increase in the proportion (from 7.1 to 16.7%) of people who are often sick but having no chronic diseases, and, at the same time, a

Table 4. Self-assessment of health, gender differences, % of a number of respondents

Health assessment	Gender	
	Men	Women
Practically healthy	18.8	9.2
Health is satisfactory, but sometimes get sick	59.9	57.5
Often sick, but have no chronic diseases	10.7	11.3
Poor health, have chronic diseases	7.6	19.7
Disabled people	3.0	2.3
Total	100.0	100.0
Source: data of the 2019 survey.		

Table 5. Self-assessment of health, age differences, % of a number of respondents

Health assessment	Age, years			
	From 21 to 30	From 31 to 50	From 51 to 60	60 and older
Practically healthy	23.7	9.4	5.4	12.5
Health is satisfactory, but sometimes get sick	59.3	59.0	60.7	37.5
Often sick, but have no chronic diseases	5.9	13.4	7.1	16.7
Poor health, have chronic diseases	11.1	15.5	23.2	16.7
Disabled people	0.0	2.7	3.6	16.7
Total	100.0	100.0	100.0	100.0
Source: data of the 2019 survey.				

significant decrease in the proportion (from 23.2 to 16.7%) among those having chronic diseases. The authors plan to get responds to these questions in further research, taking into account the conditions of the ongoing pension reform.

In general, a comparison of the results of the Yamal residents' health self-assessment in 2019 with the results of surveys conducted in previous years [2] confirmed a clear trend toward a sharp decrease of positive ratings (*Tab. 6*).

Over nearly the last 5 years, there have been really serious changes in the country's health care system, which, of course, have also affected the state of medical care in the Okrug. Only 16.9% of the northerners surveyed are currently satisfied with the quality of medical care. 72.3% of the respondents rated it negatively, while 10.8% said they had never applied to a medical institution. The main drawback of the Northern health care is the lack of modern diagnostic and medical equipment, followed by the difficulty of getting an appointment with a doctor. Next in the rating is the lack or high cost of necessary medicines.

We also discussed the quality of medical care in the Arctic region with experts. It turned out that, according to most experts, the difficulty of getting an appointment with a doctor due to the optimization of medical institutions was the most significant drawback of the Northern health care. Further, as the relevance decreases, there is a lack of modern diagnostic and medical equipment in local medical institutions, the lack or high cost of necessary medicines, and the need to develop preventive and therapeutic technologies that take into account the specifics of the Arctic region. Experts working in the field of health care have highlighted the lack of modern equipment and high-tech assistance; the representatives of government agencies do not consider it problematic to get an appointment with a doctor.

Talking about the impact of environmental problems on health, respondents primarily named pollution of reservoirs and deterioration of the quality of water and fish consumed (48%), soil pollution and garbage dumps (31%), alienation of land for industrial facilities and communications (18%). City dwellers are particularly concerned about industrial and household garbage dumps. Northerly winds carry toxic substances that accumulate in them over a large area, causing serious harm to human health and the environment. The representatives of aboriginal ethnic groups pay attention to the fact that less and less land in the tundra remains for grazing deer and recreation of people.

Experts' opinion on this issue almost coincided with the population's estimates. Among the environmental problems typical for the Arctic region, the most significant impact on the northerners' health, experts say, is caused by water pollution, deterioration of the quality of water consumed, and the impact of

Table 6. Self-assessment of health in dynamics, % of a number of respondents

Health assessment	Year			
	2006	2010	2015	2019
Practically healthy	37	40	38	13
Health is satisfactory, but sometimes get sick	40	36	35	58
Often sick, but have no chronic diseases	8	10	12	11
Poor health, have chronic diseases	8	8	8	15
Disabled people	1	3	2	3
Found it hard to say	5	3	5	-
Total	100	100	100	100
Source: data of the 2019 survey compared to data of author surveys of 2006, 2010, and 2015.				

pollution on fish and the ecosystem as a whole. The second position is occupied by pollution of the soil cover and air basin, garbage dumps that are sources of various toxins. This is followed by an increasing alienation of land for industrial facilities and communications, and a reduction in the area for recreational purposes.

Medical and biological studies conducted by the Arctic Research Center (Salekhard, Nadym) have shown that the most effective method of people's health-saving in the Russian Arctic is regular consumption of local wild plants, raw fish stroganina, blood and internal organs of deer[15].

This is, to a certain degree, confirmed by the results of our survey (*Tab. 7*). Unfortunately, in recent years, such opportunities are becoming increasingly inaccessible for many northerners for a number of socio-economic and environmental reasons, and, at the time of the last survey in 2019, only 17.9% of respondents could constantly consume these products; 30.2% consumed them, but not often; 24.9% consumed them very rarely, and 27.1% of the Yamal residents surveyed had almost no opportunities to do this.

However, it is necessary to keep in mind the possible negative impact of the local food mass consumption. Currently, these products become the main source of persistent organic pollutants entering the northerners' body [33]. In addition, consuming traditional food without proper heat treatment (stroganina) is fraught with the risk of parasitic diseases (opisthorchiasis, trichinosis, etc.).

Of course, the indigenous peoples have much more opportunities to eat traditional Northern food than the rest of the residents of the Yamal-Nenets Autonomous Okrug; it is more typical for peoples nomadizing in the tundra and forest settlements than in cities (*Tab. 8*).

Table 7. Correlation of health self-assessment with the frequency of traditional food consumption, % of a number of respondents

Health assessment	Consuming traditional food			
	Constantly	Not often	Rarely	Never
Perfectly healthy	17.9	14.4	10.1	9.7
Satisfactory health	61.1	58.2	59.6	53.8
Often sick, but have no chronic diseases	10.5	14.0	8.1	11.7
Poor health, have chronic diseases	8.4	12.8	17.0	21.4
Disabled people	2.1	0.6	5.2	3.4
Total	100.0	100.0	100.0	100.0
Source: data of the 2019 survey.				

Table 8. Frequency of traditional Northern food consumption, % of respondents

Frequency of consumption	Nationality		
	Indigenous minorities of the North	Russian	Other
Constantly	59.3	9.7	13.1
Not often	32.1	29.5	32.1
Very rare	7.4	28.4	27.4
Almost never	1.2	32.4	27.4
Total	100.0	100.0	100.0
Source: data of the 2019 survey.			

[15] *Sanitary and Epidemiological Welfare of the Population Living on the Territory of the Russian Arctic in 2018: Information Bulletin*. Saint-Petersburg: North-West Public Health Research Center, 2019. 39 p.

According to the studies of the Arctic Research Center, the protein-fat component in the diet of Yamal reindeer herders makes up about 70%. However, regular consumption of food with a high content of animal fats is not always suitable for people who came to the Arctic from other regions. For them, a different food structure is more optimal: protein – 16%, fat – 40%, carbohydrates – 44% (for aborigines, respectively, 20:50:30, in the Central regions of Russia – 10:26:64) [34].

This research is analytical and project-based in its nature. In the course of mass and expert surveys, we have clarified the attitude not only to the existing problems, but also to the ways to solve them strategically. Thus, the mass survey included a special section which was devoted to assessing factors for preserving people's health (health saving) in the North. Here, as well as in problem analysis, the ethnic and gender aspects were singled out as the most socially significant, especially for the Arctic. In *tables 9* and *10* the rank values (on a 10-point scale) of the respondents' preferences regarding certain factors, their significance in the overall structure (by line) and point proportions are reflected.

First of all, you can see a wide variation (even wider than when evaluating the problems) in the scores. Even if we take into account respondents' indecision when making quantitative estimates and avoiding extreme values, the priority of ecology, accessibility of health care, health resort treatment, etc. is obvious.

Table 9. Factors contributing to health saving (ethnic aspect), % of respondents

Rank of importance	Good ecology	Housing and clothing	Healthy food	Accessibility of health care	Health resort treatment	Doing sports	Breaking bad habits	Other	Total
Indigenous minorities of the North									
1	19.2	12.5	18.8	15.4	10.8	9.2	12.1	2.1	100.0
2	17.6	19.1	16.2	11.8	14.7	11.8	8.8	0.0	100.0
3	17.8	13.3	20.0	20,0	13.3	11.1	4.4	0.0	100.0
4	5.7	11.4	14.3	14.3	17.1	20.0	17.1	0.0	100.0
5	15.8	21.1	2.6	13.2	21.1	13.2	13.2	0.0	100.0
6	4.0	4.0	8.0	12.0	16.0	40.0	16.0	0.0	100.0
7	0.0	30.0	0.0	0.0	15.0	15.0	40.0	0.0	100.0
8	33.3	0.0	0.0	33.3	0.0	33.3	0.0	0.0	100.0
9	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0	100.0
10	12.9	12.9	16.1	12.9	12.9	16.1	16.1	0.0	100.0
Russians									
1	18.2	11.1	15.6	19.1	13.0	8.7	12.0	2.3	100.0
2	10.0	17.1	12.5	8.4	15.2	19.8	17.1	0.0	100.0
3	13.4	15.3	17.1	13.4	13.0	16.2	11.6	0.0	100.0
4	8.7	18.0	16.0	9.3	16.7	20.0	11.3	0.0	100.0
5	9.6	19.8	12.4	6.2	18.1	20.9	13.0	0.0	100.0
6	8.9	16.8	9.9	5.0	17.8	20.8	20.8	0.0	100.0
7	5.5	21.9	4.1	2.7	9.6	26.0	30.1	0.0	100.0
8	12.5	17.5	12.5	15.0	12.5	17.5	12.5	0.0	100.0
9	13.3	23.3	3.3	13.3	20.0	16.7	10.0	0.0	100.0
10	14.2	11.1	15.4	16.7	14.2	13.0	15.4	0.0	100.0

End of Table 9

Rank of importance	Good ecology	Housing and clothing	Healthy food	Accessibility of health care	Health resort treatment	Doing sports	Breaking bad habits	Other	Total
Other ethnicity									
1	22.6	11.1	14.9	18.3	12.0	8.7	10.6	1.9	100.0
2	19.4	19.4	23.6	6.9	9.7	11.1	9.7	0.0	100.0
3	8.5	11.3	22.5	21.1	7.0	19.7	9.9	0.0	100.0
4	10.0	17.5	10.0	22.5	17.5	12.5	10.0	0.0	100.0
5	5.6	13.9	8.3	5.6	41.7	11.1	13.9	0.0	100.0
6	3.1	25.0	6.3	3.1	15.6	34.4	12.5	0.0	100.0
7	0.0	15.8	0.0	5.3	13.2	28.9	36.8	0.0	100.0
8	5.9	17.6	11.8	11.8	11.8	17.6	23.5	0.0	100.0
9	33.3	33.3	0.0	0.0	0.0	33.3	0.0	0.0	100.0
10	18.6	14.0	9.3	14.0	16.3	7.0	20.9	0.0	100.0
Source: data of the 2019 survey.									

Table 10. Factors contributing to health saving (gender aspect), % of the respondents

Rank of importance	Good ecology	Housing and clothing	Healthy food	Accessibility of health care	Health resort treatment	Doing sports	Breaking bad habits	Other	Total
Men									
1	17.8	11.1	15.9	19.5	11.8	9.4	11.8	2.6	100.0
2	14.2	18.3	12.2	8.6	16.8	17.8	12.2	0.0	100.0
3	17.0	14.2	21.3	12.8	9.9	14.9	9.9	0.0	100.0
4	8.7	19.6	14.1	9.8	23.9	12.0	12.0	0.0	100.0
5	12.2	20.0	12.2	8.9	14.4	18.9	13.3	0.0	100.0
6	7.5	11.9	10.4	6.0	16.4	25.4	22.4	0.0	100.0
7	5.7	22.6	0.0	7.5	13.2	18.9	32.1	0.0	100.0
8	0.0	16.7	11.1	22.2	11.1	22.2	16.7	0.0	100.0
9	21.4	28.6	0.0	0.0	14.3	21.4	14.3	0.0	100.0
10	16.7	9.5	15.5	16.7	14.3	10.7	16.7	0.0	100.0
Women									
1	19.4	11.4	15.8	18.0	12.9	8.6	11.8	100.0	100.0
2	10.9	17.7	16.1	8.4	12.9	17.4	16.7	0.0	100.0
3	9.9	14.1	16.7	18.2	13.5	17.2	10.4	0.0	100.0
4	8.3	15.0	15.8	13.5	12.0	23.3	12.0	0.0	100.0
5	8.8	18.8	9.4	6.3	25.0	18.8	13.1	0.0	100.0
6	6.7	20.0	7.8	5.6	17.8	26.7	15.6	0.0	100.0
7	1.3	20.8	3.9	0.0	10.4	29.9	33.8	0.0	100.0
8	16.2	16.2	13.5	10.8	13.5	13.5	16.2	0.0	100.0
9	13.0	17.4	8.7	17.4	21.7	13.0	8.7	0.0	100.0
10	13.7	13.1	13.7	15.0	14.4	13.1	17.0	0.0	100.0
Source: data of the 2019 survey.									

The indigenous peoples who also ranked ecology first, put healthy food and a possibility to eat traditional northerners' food second, and the accessibility of health care, especially in nomadic life – third.

The survey revealed that, when choosing the most significant health saving factors, Yamal residents generally consider good ecology and affordable, high-quality health care to be the most important. At the same time, men consider health care to be more important, while women pay more attention to the causes of diseases – the environment.

The majority of the expert pool believes that people's health in the Arctic is most affected by the quality of medical care and lifestyle. While the experts engaged in the health sector, attach particular importance to neutralizing the negative impact of changes in temperature and atmospheric pressure; government officials and oil and gas producers, on the other hand, believe that the quality of drinking water and environmental situation are the most significant factors here.

Discussion and conclusion

Summarizing the results obtained in the course of sociological research, we can state that the situation in the sphere of preserving health of the Arctic population gets worse every year according to most parameters. At the same time, it is significantly different in spatial and social discourses. The Yamal-Nenets Autonomous Okrug differs from the average indicators for the regions of the Russian Arctic for the better, although it also has its own acute "pain points" of problems common to all Northern territories. In particular, the highest risk of primary morbidity of adult population is recorded here (especially in shift settlements, which was once again recently expressed in the indicators of coronavirus infection in the context of a pandemic), the highest level of opisthorchiasis in the Russian Arctic associated with violations of health standards while cooking fish, and so on. At the same time, in comparison with other Northern regions of the Russian Federation, the Okrug has recorded such important achievements over the past decade as the highest life expectancy, the highest natural population growth, and other positive health-saving trends.

This determined the authors' interest in the health situation and factors affecting it in the region. In 2019, we conducted basic research in the Yamal-Nenets Autonomous Okrug. In 2020 and thereafter, we are going to continue working in the Yamal-Nenets Autonomous Okrug, as well as to conduct field research in other regions (the Arkhangelsk Oblast and the Chukotka Autonomous Okrug), implementing an interdisciplinary geosociospatial approach to the study of social problems in the Arctic.

This very approach, which is the scientific novelty of the research, makes it possible to better understand the specifics of almost all the main aspects of life: especially health and people in extreme natural and climatic conditions of the Far North. The methodological and instrumental expression of this approach is the mixed methodology of combining quantitative and qualitative methods for analyzing and estimating the studied phenomenon, measuring it in theoretical and practical terms.

During the mass population surveys and in-depth interviews with experts in the Yamal-Nenets Autonomous Okrug, we identified people's assessment of their health and the degree of factors affecting it: length of service in the North, leisure structure, quality of food, medicine, environment, etc. The respondents paid attention to the most effective, from their point of view, health-saving strategies and technologies that require additional interdisciplinary study and justification.

Answering the open questions of the survey, the respondents suggest a number of specific measures to preserve and improve the northerners' health: making sanatorium treatment available, providing medical institutions with specialized professionals and necessary equipment, improving environmental situation, introducing modern technologies for recycling garbage and cleaning the soil cover, water purification, improving drug supply radically, expanding local production of high-quality food, etc. Some of the respondents, however, were pessimistic: "The North destroys health, nothing can be done. The main thing is to earn money and leave on time". Nevertheless, most people are convinced that the northerners' health can be regulated if you pay serious attention to it, study it, propose and implement regional health-saving programs within the framework of a priority national project, including not only medical but also socio-economic, socio-cultural, and educational activities.

The analysis of the research data has shown a significant similarity of mass and expert opinions not only in assessing the problems associated with life in the Far North but also in terms of common positions for developing strategic solutions. The findings are brought to the attention of legislative and executive authorities of the Okrug, and they are used in their activities. It is even more important, because Russia is to assume the chairmanship of the international Arctic Council in 2021, where the coordination of its member countries' efforts can get an additional impetus for cooperation and scientific justification in addressing common problems.

References

1. Markin V.V. Circumpolar region amid socio-spatial transformation of a territory (case study of Yamal). *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2016, no. 6 (48), pp. 28–52. DOI: 10.15838/esc.2016.6.48.2 (in Russian).
2. Markin V.V., Silin A.N. Human and social potential of neo-industrial development of the Arctic: Sociological analysis, modeling, and regulation. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2017, vol. 10, no. 6, pp. 75–88. DOI: 10.15838/esc/2017.6.54.5 (in Russian).
3. Markin V.V., Silin A.N., Voronov V.V. Educational opportunities for young people of indigenous minorities of the North: Social and spatial discourse. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast,* 2019, vol. 12, no. 5, pp. 141–154. DOI: 10.15838/esc.2019.5.65.9 (in Russian).
4. Young K. Arctic health in Russia. *Int J Circumpolar Health*, 2013, 72: 20724.
5. Jensen P.E., Hennessy T.W, Kallenborn R. Water, sanitation, pollution, and health in the Arctic. *Environ SciPollut Res Int.*, 2018, 25(33): 32827–32830.
6. Donaldson S., Adlard B., Odland J.Ø. Overview of human health in the Arctic: conclusions and recommendations. *Int J Circumpolar Health*, 2016, 75: 33807.
7. Weihe P., Debes F., Halling J., Petersen M. S., Muckle G., Odland J.Ø., Dudarev A., Ayotte P., Dewailly É., Grandjean P., Bonefeld-Jørgensen E. Health effects associated with measured levels of contaminants in the Arctic. *Int J Circumpolar Health*, 2016, 75: 33805.
8. Weihe P., Bjerregaard P., Bonefeld-Jørgensen E., Dudarev A, Halling J., Hansen S., Muckle G., Nøst T., Odland J.Ø., Petersen M.S., Rautio A., Veyhe A.S., Wennberg M., Bergdahl I. Overview of ongoing cohort and dietary studies in the Arctic. *Int J Circumpolar Health*, 2016, 75: 33803.

9. Prokhorov B.B. *Meditsinskaya geografiya kak nauka* [Medical Geography as a Science]. Leningrad: Nauka. 1989. 198 p.
10. Simmel G. *Sotsiologiya prostranstva* [Sociology of space]. Selected works in two volumes. Moscow,1996. Vol. 2. 287 p.
11. Bourdieu P. *Sotsiologiya politiki* [Sociology of Politics]. Translated from French, compiled, edited and foreword by N.A. Shmatko. Moscow, 1993. 333 p.
12. *Fundamental'nye problemy prostranstvennogo razvitiya Rossiiskoi Federatsii: mezhdistsiplinarnyi sintez* [Fundamental Issues of the Spatial Development of the Russian Federation: An Interdisciplinary Synthesis]. Ed. by the Academician V.M. Kotlyakov. Moscow: Media-Press, 2012. 662 p.
13. *Regional'naya sotsiologiya: problemy konsolidatsii sotsial'nogo prostranstva Rossii* [Regional Sociology: Problems of Consolidating the Social Space of Russia]. Ed. by V.V. Markin. Moscow: Novyi khronograf**,** 2015. 600 p.
14. *Rossiiskoe obshchestvo: transformatsii v regional'nom diskurse (itogi 20-letnikh izmerenii)* [Russian Society: Transformation in the Regional Discourse (the Results of 20 Years of Measurements)]. Team of authors; under the scientific supervision of RAS Academician Doctor of Philosophy M.K. Gorshkov and Doctor of Economics Professor V.A. Ilyin. Vologda: ISERT RAN, 2015. 446 p.
15. Shabunova A.A. *Zdorov'e naseleniya v Rossii: sostoyanie i dinamika* [Public Health in Russia: State and Dynamics]. Vologda: ISERT RAN, 2010. 406 p.
16. *Zdorov'e i zdravookhranenie v gendernom izmerenii* [Health and Health Care in a Gender Dimension]. Ed. by N.M. Rimashevskoi. Moscow: Sotsial'nyi proekt, 2007. 204 p.
17. Zhuravleva I.V. *Otnoshenie k zdorov'yu individa i obshchestva* [Attitude to Health of the Individual and Society]. In-t sotsiologii RAN. Moscow: Nauka, 2006. 238 p.
18. Kovaleva A.A. Self-care behavior in the system of health affecting factors. *Zhurnal sotsiologii i sotsial'noi antropologii=The Journal of Sociology and Social Anthropology*, 2008, vol. 11, no. 2, pp. 179–191 (in Russian).
19. Agbalyan E.V., Shinkaruk E.V., Kobelev V.O. 25-year trend of the primary morbidity of the population of the Yamal-Nenets autonomous district. *Nauchnyi vestnik YaNAO=Scientific Bulletin of Yamalo-Nenets Autonomous District*, 2018, no. 4 (101), pp. 49–55 (in Russian).
20. Akimov A.M., Gafarov V.V., Silin A.N. Attitude to health of men in an unorganized population depending on their social status. *Profilakticheskaya meditsina=Russian Journal of Preventive Medicine and Public Health*, 2014, no. 2, pp. 5–11 (in Russian).
21. Ametistova L.E., Knizhnikov A.Yu. *Ekologicheskie aspekty SPG-proektov v arkticheskikh usloviyakh* [Environmental Aspects of Arctic LNG Projects Development]. Moscow: Vsemirnyi fond dikoi prirody (WWF), 2016. 48 p.
22. Gapon L.I., Shurkevich N.P., Vetoshkin A.S., Gubin D.G. *Arterial'naya gipertoniya v usloviyakh Tyumenskogo Severa. Disinkhronoz i giperreaktivnost' organizma kak faktory formirovaniya bolezni* [Arterial Hypertension in the Conditions of the Tyumen North. Desynchronosis and Hyperreactivity of the Body as Factors in the Formation of the Disease]. Moscow: Meditsinskaya kniga, 2009. 208 p.
23. Golubchikov S.N., Khimenkov N.A., Erokhin S.V. Medical and ecological problems of improving the living environment of northerners. *Energiya=Energy*, 2003, no. 4, pp. 54–57 (in Russian).
24. Kvashnina S.I. *Zdorov'e naseleniya na Severe Rossii (sotsial'no-gigienicheskie i ekologicheskie problemy): monografiya* [Health of the Population in the North of Russia (Social, Hygienic and Ecological Problems): Monograph]. Ukhta UGTU, 2001.
25. Polikarpov L.S., Yaskevich R.A., Derevyannykh E.V. et al. *Ishemicheskaya bolezn' serdtsa, osobennosti klinicheskogo techeniya v usloviyakh Krainego Severa* [Ischemic Heart Disease, Features of the Clinical Course in the Far North]. Krasnoyarsk: KrasGMU, 2011. 310 p.
26. Chashchin V.P. et al. Characteristics of the main risk factors for health disorders of the population living in the territory of active nature management in the Arctic. *Ekologiya cheloveka=Human Ecology*, 2014, no. 1, pp. 3–12 (in Russian).

27. Popova T.L., Popov A.I. Socio-psychological factors that determine health and way of life of the inhabitants of the Arctic region of Yamal. *Nauchnyi vestnik YaNAO=Scientific Bulletin of Yamalo-Nenets Autonomous District*, 2016, no. 4 (93), pp. 133–138 (in Russian).

28. Bogdanova E.N., Zadorin M.Yu., Lobanov A.A., Popov A.I. et al. The right to health protection of indigenous peoples of the Russian Arctic: "collision field" and search for new solutions. *Vestnik Tomskogo gosudarstvennogo universiteta=Tomsk State University Journal* , 2018, no. 432, pp. 210–217 (in Russian).

29. Kozyreva P. M., Smirnov A. I. Russian citizens' health self-assessment dynamics: Relevant trends of the Post-Soviet era. *Sotsiologicheskie issledovaniya=Sociological Studies*, 2020, no. 4, pp. 70–81. DOI: 1031857/SOI3216250009116-0 (in Russian).

30. Kaneva M.A., Baidin V.M. Heterogeneity in reporting self-assessed health of the Russians. *Prikladnaya ekonomometrika=Applied Econometrics*, 2018, vol. 51, pp. 102–125 (in Russian).

31. Morev M.V. Health and lifestyles of youth: gender aspect (after the results of the survey of students in Vologda and Lublin). *Narodonaselenie=Population*, 2012, no. 4, pp. 100–114 (in Russian).

32. Akimov A.M., Barbakov O.M., Belonozhko M.L. et al. *Zdorov'esberezhenie uchastnikov osvoeniya arkticheskogo neftegazovogo regiona: monografiya* [Health Preservation of Participants in the Development of the Arctic Oil and Gas Region: Monograph]. Ed. by A.N. Silin, V.V. Markin. Tyumen: TIU, 2019. 171 p.

33. Khurtsilava O.G., Chashchin V.P., Mel'tser A.V. et al. Pollution of the environment with persistent toxic substances and prevention of their harmful impact on the health of the indigenous population residing in the arctic zone of the Russian Federation. *Gigiena i sanitariya=Hygiene and sanitation*, 2017, vol. 96, no. 5, pp. 409–414 (in Russian).

34. Vloshchinsky P.E., Panin L.E. Dietary Patterns, State of Energy Metabolism and Endocrine Status in Organized Groups in the North. *Vestnik Ural'skoi meditsinskoi akademicheskoi nauki=Journal of Ural Medical Academic Science*, 2014, no. 2 (48), pp. 11–15 (in Russian).

Information about the Authors

Valerii V. Markin – Doctor of Sciences (Sociology), Professor, Head of the Center for Regional Sociology and Conflictology Studies, Leading Researcher, Institute of Sociology of the Federal Center of Theoretical and Applied Sociology of RAS (24/35, Krzhizhanovsky Street, building 5, Moscow, 117218, Russian Federation; e-mail: markin@isras.ru)

Anatolii N. Silin – Doctor of Sciences (Sociology), Professor, Leading Researcher, Tyumen Industrial University (38, Volodarsky Street, Tyumen, 625000, Russian Federation); West Siberian Branch of the Federal Center of Theoretical and Applied Sociology of RAS (16, Lenin Street, Tyumen, 625003, Russian Federation; e-mail: sm-2004@rambler.ru)

Ivan S. Vershinin – Deputy of the Legislative Assembly of the Yamalo-Nenets Autonomous Okrug (72, Respubliki Street, Salekhard, 629000, Russian Federation; e-mail: filosof-888@mail.ru)

Received July 27, 2020.

DOI: 10.15838/esc.2020.5.71.12
UDC 314; LBC 60.7

Maternal Age at First Birth: Dynamics, Regional Differences, Determination*

Vladimir N. ARKHANGEL'SKII
Institute for Demographic Research of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences
Moscow, Russian Federation, 6, Fotieva Street, building 1, 119333
Lomonosov Moscow State University
Moscow, Russian Federation, 1, Leninskie Gory, building 46, 119991
Research Institute of Healthcare Organization and Medical Management of the Moscow Healthcare Department
Moscow, Russian Federation, 30, Bolshaya Tatarskaya Street, 115184
E-mail: archangelsky@yandex.ru
ORCID: 0000-0002-7091-9632; ResearcherID: T-4845-2017

Ol'ga N. KALACHIKOVA
Institute for Demographic Research of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences
Moscow, Russian Federation, 6, Fotieva Street, building 1, 119333
Vologda Research Center of the Russian Academy of Sciences
Vologda, Russian Federation, Gorky Street, 56a, 160014
E-mail: onk82@yandex.ru
ORCID: 0000-0003-4681-4344; ResearcherID: I-9562-2016

Abstract. The article presents the research results of the age model at first birth in Russia for the period of 1960-2019 which is available for calculations. The authors demonstrate the compatibility of data on first births from different sources, and calculate the indicator of "mean maternal age at first birth" using the methods of longitudinal and transverse demographic analysis (for real and conditional generations). The researchers have revealed that mother's age at first birth in the period from the 1960s to 1994 was decreasing from 24.4 to 22.5 years, then it was growing and in 2019 it made up 25.9 years. The age at first

* The research was supported by the Russian Science Foundation (Project no. 20-18-00256 "Demographic behavior of the population in the context of Russia's national security").

For citation: Arkhangel'skii V.N., Kalachikova O.N. Maternal age at first birth: dynamics, regional differences, determination. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 200–217. DOI: 10.15838/esc.2020.5.71.12

birth in "young" real generations is lower than in conventional ones, in 2018–2019, it made up 25.9 years, but in none of real generations of women born in 2000 and older the total count value of this indicator reaches this level. This is evidence of timing shifts in the second half of the 1990s – early 2000s, after which, probably, the delayed births were realized, which caused an increase in the birth rate. The average maternal age at first birth has been calculated for all regions of Russia, showing variability from 23 to 28 years, in most of them the figure made up 25-26 years. The minimum values of the indicator are shown in the republics of Tyva (23.4 years), Dagestan (23.5), Chechnya (23.7), and Zabaykalsky Krai (23.9); the maximum values are revealed in Saint Petersburg (28.0) and Moscow (27.7). The main determinants of motherhood age are the level of education and marital behavior, which indicates the importance of socio-economic independence in the process of reproductive behavior formation. The novelty of the study lies in the use of the author's approach taking into account the strengths and weaknesses of longitudinal and transverse demographic analysis, which provides reliable data on mother's age at first birth. From a practical point of view, assessing motherhood age makes it possible to justify the importance of improving the effectiveness of youth and demographic policies.

Key words: maternal age at first birth, age model of birth rate, motherhood age.

Introduction

The current parameters of the demographic situation in Russia and its regions are largely due to the transformation of demographic behavior of the population. In particular, having few children is characteristic of reproductive behavior; families are focused on having one, maximum two children, which is supported by the prevailing psychological reproductive motives. Reproductive and marriage behavior have been evolving simultaneously [1] and by the beginning of the 21st century they have acquired a key feature – the freedom of choice concerning the partner, the age and time of marriage or de facto marital relations without getting married, the preservation of marriage or divorce, remarriage, the number and timing of children or refusal of their birth. The lengthening of the period of children's gaining socio-economic independence, due to an increase in the average duration of education, people's desire to "live for themselves" led to marriage and motherhood "aging": compared to the mid–1990s, the age of marriage increased from 19 to 25 years for women and from 23 to 27 years for men; maternal age at first birth increased from 19 to 25–27 years [2]. Motherhood age is one of the key aspects in solving the problem of increasing the birth rate, which is defined in the strategic documents of the Russian demographic policy. In the context of a prospective decline in the number of cohorts of women of reproductive age, rise in births can be achieved by increasing the number of children in families, and postponing the birth first is a significant risk in this case.

It is important to use reliable and accurate data when analyzing birth trends. The article aims to present the author's calculations of mother's age at first birth for conditional and real generations in dynamics and regional context, and to identify its determinants.

Experience in studying motherhood age and the methodological aspect of the research

First, we should clarify if the concept of "motherhood age" is applicable to the subject of our research. From the point of view of demography, the birth of a child is a demographic event that changes the status of a

woman, a man, or a family by the "number of children" criterion. Having given birth to their first child, they not only become one-child parents, but also acquire the socio-demographic status of "mother" / "father", "parent". We mean the time of acquiring this status, and since it is calculated by the mother's age, we are talking about motherhood and, in fact, it is synonymous with the maternal age at first birth, only focusing on its social content. The social context is necessary in assessing demographic dynamics, first of all, to identify its determination.

Maternal age at first birth is a marker not only of reproductive behavior properly, but also of contraception, self–preservation, and marriage behavior. The conceptual grounds for the significance of the study of all types of demographic behavior in their relationship are described in the work of A.A. Shabunova, T.K. Rostovskaya [3]. The parallel of the evolution of marriage and reproductive behavior was considered by us and the colleagues earlier [1]; it is indicative of "postponing" both first marriages and first births.

This trend is also reflected in the concepts of the second and third demographic transition [4; 5; 6]. They define the determining role of demographic behavior in the dynamics of the population at the present stage of development; take into account the transformation of people's life organization, including the shift of the period of social maturity and economic independence to older ages.

Motherhood aging is typical for a number of countries, and not only the developed ones that have entered the fourth stage of demographic transition. A comparative analysis of cohort indicators of maternal age at first birth for a number of economically developed countries is presented in the work of T. Frejka and J.-P. Sardon [7]. E.M. Shcherbakova notes: "The average age of a mother at her first child's birth has increased in all CIS countries except Azerbaijan" [8]. The increase in the average mother's age at first birth in Ukraine in comparison with other European countries is analyzed in detail in a number of articles by S.Yu. Aksenova [9-11].

Her works devoted to the analysis of the relationship between the average mother's age at first birth and the birth rate are of great interest [11]. We should also note the earlier publication of D.M. Ediev [12]. These studies confirm the relationship between the motherhood age and the birth rate, proving the importance of this issue in the development and implementation of demographic policy.

Using statistical and sociological data, R.T. Fakhrislamova [13] analyzes changes in the age of childbearing in Russia (comparing them with foreign countries). The level of education is one of the most important determinants of the motherhood age and the birth rate. A relatively high frequency of postponing the first child birth by women with a higher level of education was revealed by both us and our colleagues earlier [14; 15].

Methodology and empirical base of the study. We used the methods of longitudinal and cross population studies for the calculations in this paper. The average mother's age at first birth for conditional generations in Russia is calculated in the article on the basis of age-related birth rates, rather than absolute numbers of births, i.e. it does not depend on the age structure of women of reproductive age.

The information about maternal age at first birth in real generations in Russia can be obtained from three sources.

First, the 2010 census first asked about the date of the first child birth (month, year). However, in the census results published and presented on the Rosstat website, the

distribution of women by age of the first child birth is given mainly in the five-year age group (with the exception of only the age groups of 15–17 and 18–19 years). It is impractical to calculate the average maternal age at first birth on their basis. This could be done using the 2010 census microdata database, but it is currently unavailable.

Second, mother's age at first birth can be calculated on the basis of one-year age birth rates for first births, both for calendar years (these data are considered above) and for real generations of women. The Human Fertility Database presents the data on the average maternal age at first birth for the generations born in 1944-1964 (the restriction to the generation born in 1964 is due to the fact that the dynamic range of calendar birth rates for Russia in this database is yet limited to 2014). Using age-related birth rates for first births, calculated according to Rosstat, allows us to estimate the average mother's age at first birth for younger generations as well.

Third, the maternal age at first birth can be revealed by the results of sociological surveys.

In general, in Russia, the second source is most preferable for analyzing changes in mother's age at first birth in real generations, i.e., calculation based on one-year age birth rates for first births. It allows calculating both the average age and the distribution by age groups. In addition, in this case, these characteristics can be calculated for the post-census period. At the same time, this approach to assessing the characteristics of the maternal age at first birth has very significant limitations in relation to the constituent entities of the Russian Federation. If the dynamic series of annual birth rates by birth order for the country as a whole is available dated from the year of 1959, then for the regions it is available only dated from the year of 1989[1], therefore , birth rates for real generations in the regions can only be calculated starting from the generation born in 1974. At the beginning of 2020, these women were 46 years old and had not yet completed the childbearing process, although the number of those who will still have their first child is extremely small and cannot significantly affect the average and relative figures for first births. With a slightly greater degree of convention, this is probably also true for all generations of women born in the second half of the 1970s. A comparative inter-regional analysis is possible for younger generations, but only using the indicators calculated for women having reached a certain age, but they will not be final. In addition, it should be borne in mind that for most constituent entities of the Russian Federation, the dynamic series of one-year age birth rates by order of birth since 1989 will not be complete, as far as since 1998, in the records of birth certificates, due to the adoption of the new law "On Acts of Civil Status"[2], there is no information about what number child the mother has. However, in some regions, this information is continued to be collected, and for them it is possible to calculate the maternal age at first birth for women born in 1974 and younger.

Before using data from the 2010 census and/or basing on current statistics, it is necessary to assess the extent to which they match. If the degree of matching is high enough, both sources of information can be used. If the information differs significantly, then one of the sources

[1] Russian fertility and mortality database. The Centre for Demographic Research at the New Economic School, Moscow (Russia). Available at: http://demogr.nes.ru/index.php/ru/demogr_indicat/data

[2] On Acts of Civil Status: Federal Law no. 143-FZ, dated November 15, 1997. Available at: http://docs.cntd.ru/document/9052520

should be preferred, but both of them will be questionable. Since the average maternity age at first birth cannot be correctly calculated by the data of 2010 population census (there is no one-year age grouping necessary for this), we can compare the distribution of women of certain generations by maternity age at first birth. The published results of the 2010 census present this distribution in the following age grouping: under 15 years of age, 15–17, 18–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45 years and older. In the Human Fertility Database, age-related birth rates are presented starting from the age of 12. However, if we also use age-related birth rates of 12, 13, and 14 years to calculate birth rates in real generations, then, given that these data are available only since 1959, the indicators can be calculated exclusively for women starting from 1947, and not from 1944 birth year, as when using age-related birth rates starting from 15 years (this is how birth rates in real generations are given in the Human Fertility Database). With this in mind, and taking into account the fact that according to the 2010 census in Russia, the proportion of women who gave birth to their first child under the age of 15 was 0.08%, for comparison it is advisable to use the age distribution for women at first birth at the age of 15 and older.

The age groups of women for whom the data on the distribution by maternity age at first birth are presented are mainly five year periods (20–24, ..., 65–69), except for the youngest (15–17 and 18–19) and the oldest groups (over 70). In this case, there is no grouping of women by birth year in the published results, so it is only possible to use data on the distribution by maternal age at first birth in the generations of women allocated by birth year with a certain degree of conditionality.

When calculating birth rates in real generations based on age-related birth rates, they are applied in a one-year grouping. For comparison with the 2010 census data published in a larger grouping, the proportion of first births by maternal age groups for each generation group is calculated as the weighted average of these proportions for the one-year generations included in the group. As weigh-scales, it is possible to use the number of women who gave birth to at least one child, at one-year generations according to the 2010 census. Let us clarify that when calculating birth rates in real generations based on one-year age-related birth rates, these coefficients were taken not for the full year of 2010, but for the period before the population census (the annual values of the coefficients were multiplied by 0.79).

And, of course, it should be borne in mind that if, according to the 2010 census, the distribution by maternal age at first birth is based on the absolute number of women, then when calculating using age-related birth rates, it is actually based on these coefficients. However, given that the number of each generation of women (which is the denominator when calculating these coefficients) changes relatively little in reproductive age, the distributions are comparable (*Tab. 1*).

Comparing the data based on the distribution of women by age at first birth, obtained from the 2010 census, and on the results of calculations based on age-related birth rates, we may conclude that there are no fundamental differences between them. The only exceptions are women born in 1991–1992, where the differences are significant. For the remaining generations of women, there is no difference in the value of the indicator exceeding 3 percentage points, and only in

Table 1. Distribution by maternal age at first birth in real generations of women in Russia (according to the 2010 census results and estimates based on age-related birth rates), %

Women's birth year	Age according to the 2010 census (years)	Age at first birth (years):							
		15–17	18–19	20–24	25–29	30–-34	35–39	40–44	over 45
1991–1992	18–19								
according to the 2010 census		43.4	56.6	–	–	–	–	–	–
estimation by age-related birth rates		36.7	63.3	–	–	–	–	–	–
1986–1990	20–24								
according to the 2010 census		10.3	30.7	59.0	–	–	–	–	–
estimation by age-related birth rates		9.4	28.8	61.8	–	–	–	–	–
1981–1985	25–29								
according to the 2010 census		5.3	16.3	58.1	20.3	–	–	–	–
estimation by age-related birth rates		5.0	15.9	56.8	22.3	–	–	–	–
1976–1980	30–34								
according to the 2010 census		6.1	16.6	47.9	24.0	5.3	–	–	–
estimation by age-related birth rates		5.7	17.1	46.9	24.4	5.9	–	–	–
1971–1975	35–39								
according to the 2010 census		5.7	21.0	48.2	17.3	6.4	1.4	–	–
estimation by age-related birth rates		5.4	21.6	48.4	16.9	6.3	1.5	–	–
1966–1970	40–44								
according to the 2010 census		4.2	19.2	56.2	13.9	4.6	1.6	0.3	–
estimation by age-related birth rates		4.0	20.1	56.0	13.7	4.4	1.6	0.3	–
1961–1965	45–49								
according to the 2010 census		3.2	16.3	57.8	16.7	4.3	1.3	0.3	0.0
estimation by age-related birth rates		3.0	17.4	58.6	15.6	3.9	1.2	0.2	0.0
1956–1960	50–54								
according to the 2010 census		2.7	15.1	57.4	17.6	5.5	1.4	0.3	0.0
estimation by age-related birth rates		2.3	16.0	59.1	16.3	4.8	1.2	0.2	0.0
1951–1955	55–59								
according to the 2010 census		2.3	13.8	58.0	17.6	6.0	2.0	0.4	0.1
estimation by age-related birth rates		1.8	14.1	60.4	16.8	4.9	1.7	0.2	0.0
1946–1950	60–-64								
according to the 2010 census		2.4	12.5	57.9	18.9	5.7	2.1	0.5	0.1
estimation by age-related birth rates		1.8	12.5	59.8	19.0	4.9	1.7	0.3	0.0

Sources: *Results of the 2010 all-Russian population census. Vol. 10. Birth Rate*. Available at: https://gks.ru/free_doc/new_site/perepis2010/croc/perepis_itogi1612.htm; Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/main.php; Rosstat data.

two cases it exceeds 2 percentage points (the age group of 20–24 years at first birth among women born in 1951–1955 and 1986–1990) (see Tab. 1).

Therefore, both sources of information can be used simultaneously. The use of one-year age birth rates allows calculating the average maternal age at first birth and analyzing the dynamics in a one-year grouping by birth year. However, the ability to analyze regional differences is significantly limited. As noted above, regional estimates based on age-related birth rates can only be made for generations born in 1974 and younger. In addition, for a large number of the regions, the maternal age at first birth cannot be calculated at all due to the lack of data on the order of birth for several calendar years, starting from 1998. In this regard, it is advisable to use mainly the data from the results of the 2010 census to analyze regional differences in the maternal age at first birth in real generations.

The information base of the study was made up of Rosstat data, including a special Sample observation of the population's reproductive plans; data generated in the Human Fertility Database; results of the first wave of the all-Russian monitoring "Demographic Well-Being of the Russian Regions Population", in the development of the methodology and organization of which the authors were directly involved. In 2020, 5,616 people were interviewed in 10 regions of Russia (the republics of Bashkortostan and Tatarstan, Stavropol Territory, Volgograd, Vologda, Ivanovo, Moscow, Nizhny Novgorod and Sverdlovsk oblasts, the city of Moscow). A detailed description of the methodology is presented in the article by T.K. Rostovskaya and O.V. Kuchmaeva [16].

Results

The dynamics of the average maternal age at first birth reflects changes in the age model of the birth rate for first births. The average maternal age at first birth, calculated for conditional generations, in Russia in the 1960s and 1980s and the first half of the 1990s was steadily decreasing. In 1960, it was 24.40 years, in 1965 – 24.03, in 1970 – 23.64, in 1975 – 23.29, in 1980 – 22.99, in 1985 – 22.91, in 1990 – 22.65. In 1994, it reached the minimum value of 22.53 years[3].

In the following years, the average maternal age at first birth was steadily increasing, and the rate of increase was significantly higher than the rate of decrease in the previous period. In 1995, it was equal to 22.67 years, in 2000 – 23.54, in 2005 – 24.11. In 2008, its value exceeded the level of 1960, amounting to 24.44 years, in 2010 – 24.90, and in 2013 it exceeded the threshold of 25 years (25.14 years). In 2015, the average mother's age at first birth was 25.46 years, in 2018 – 25.91, in 2019 – 25.94[4].

Despite a significant increase, the average maternal age at first birth in Russia remains one of the lowest among economically developed countries. For comparison, in 2017 in the United States it was 27.24 years, in Lithuania – 27.47, in Estonia – 27.70 (in 2000, its value in Lithuania (23.90) and Estonia (23.95) was only 0.35–0.40 years more than in Russia, and in 2017 the difference was, respectively, 1.68 and 1.91 years), in Hungary – 28.04, in the Czech Republic – 28.23, in Croatia – 28.54, in Slovenia – 28.77, in Finland – 29.11, in Norway – 29.26, in Sweden – 29.31, in Austria – 29.32, in Germany – 29.56, in Japan – 30.12, in Italy – 31.05. For a number of countries, the latest data available on the Human Fertility Database website refers to the year of 2016: Poland – 27.15 years, Great Britain – 28.77, Denmark – 29.24, Canada – 29.25, the Netherlands – 29.76, Switzerland – 30.68, Spain – 30.80. The highest average maternal age at first birth is in South Korea (in 2018 – 31.60 years); it was the most significant increase in the 21 century: by 4 years compared to 2000 (27.55)[5].

In the first half of the 1960s, birth rates for first births in all age groups under 40 were declining in Russia. If at the age of 15–19 years, the decline stopped in 1963, and at 20–24 years – in 1965, then in the group of 25–29-year-old women it continued until 1969, of 30–34-year-olds – until 1974, in 35-39-year-olds – until 1979 (*Tab. 2*).

[3] Here and further, the average maternal age at first birth for conditional generations is calculated on the basis of age-related birth rates, rather than absolute numbers of births, i.e. it does not depend on the age structure of women of reproductive age.

[4] Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si; calculated according to Rosstat data.

[5] Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/main.php

Table 2. Age-related birth rates for first births in Russia, 1959-2019

Year	First born alive per 1000 women aged, years						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
1959	28.8	113.4	49.8	15.6	5.6	1.1	0.1
1965	23.5	98.4	43.9	12.2	4.4	1.2	0.1
1970	27.6	118.6	32.7	11.8	3.7	1.0	0.1
1975	33.0	115.4	36.7	8.5	3.0	0.7	0.0
1980	41.2	112.6	31.0	9.4	2.4	0.5	0.0
1985	43.4	105.4	30.5	9.1	3.2	0.4	0.0
1990	51.3	104,9	27.4	9.1	3.1	0.7	0.0
1995	41.9	83.5	25.0	6.8	2.2	0.4	0.0
2000	25.8	73.1	30.3	8.5	2.4	0.5	0.0
2005	24.9	68.8	38.8	11.1	2.8	0.4	0.0
2010	24.5	64.8	49.0	16.2	4.5	0.8	0.0
2015	21.0	58.7	50.6	19.9	6.1	1.1	0.1
2016	19.0	57.7	50.0	20.5	6.5	1.2	0.1
2017	15.9	52.5	44.7	19.2	6.2	1.2	0.1
2018	13.8	49.8	41.4	18.7	6.4	1.3	0.1
2019	12.7	48.1	39.8	17.7	6.3	1.3	0.1

Sources: Russian fertility and mortality database. The Centre for Demographic Research at the New Economic School, Moscow (Russia). Available at: http://demogr.nes.ru/index.php/ru/demogr_indicat/data (accessed: June 26, 2020); Rosstat data.

At the same time, in the 15–19 age group, the birth rate for first births was steadily increasing from 1964 to 1990 and in 1977–1998 it was higher than in the 25–29 age group. For 20–24-year-old women, the birth rate for first births was increasing in 1966–1971, and then it was decreasing almost annually until 1985. The decline in this indicator in the group of 25–29-year-olds in the 1960s was interrupted in 1970–1972 and continued again until 1984. In the 30–34 age group, the long-term decline in the birth rate for first births (until 1983) was interrupted only in 1975–1977.

A brief period of increase in the birth rate for first births in the early second half of the 1980s was followed by a continued decline after 1988. Only in the 15–19 age group did this figure increase until 1990.

As we have already noted, the average maternal age at first birth has been increasing since 1995. The age model of the birth rate for first births has been changing. If in the 15–19 age group, the decline in the birth rate for first births continued until 2001, and at the age of 20–24 years – until 1999, then in the 25–29 age group, this coefficient began to increase in 1994.

Further, in the 25–29 age group, the birth rate for first births continued to grow steadily until 2013. In the age groups of 30–34 years and 35–39 years, its increase continued until 2016. It has declined slightly in recent years, but in both of these age groups, as well as among 40–44-year-old women, the birth rate for first births is now higher than in 1959. We should note that in 2016–2019, the birth rate for first births among women aged 30–34 was higher than in the 15–19 age group. After some stabilization in 2000–2012, the birth rate for first births in the 15–19 age group has been significantly decreasing in recent years.

Among 25–29-year-old women, as well as among older women, the birth rate for first births in 2012–2016 was higher than in 1959.

In contrast to the 25–29 age group, the increase in the birth rate at the age of 20–24 occurred only in 2000–2003. In 2005–2009, it remained stable, and in the last decade it has significantly decreased (see Tab. 2).

Table 3. Average maternal age at first birth in generations of women born in 1944–1971 in Russia, years

Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth
1944	23.46	1951	23.35	1958	23.03	1965	22.76
1945	23.43	1952	23.32	1959	22.97	1966	22.71
1946	23.48	1953	23.26	1960	22.93	1967	22.69
1947	23.59	1954	23.20	1961	22.90	1968	22.69
1948	23.50	1955	23.17	1962	22.88	1969	22.69
1949	23.46	1956	23.13	1963	22.84	1970	22.74
1950	23.39	1957	23.09	1964	22.79	1971	22.84

Sources: Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si; Rosstat data.

The increase in the average maternal age at first birth takes place not only by calendar indicators for the so-called conditional generations, but also in real generations of women.

Our calculations show that in general, in Russia, as of the beginning of 2020, we can talk about the total value of the average maternal age at first birth for generations of women born in 1971 and older (*Tab. 3*).

Probably, starting from the generations of women born in the late 1940s, the average maternal age at first birth decreases (this could be estimated more precisely when having data for generations of women older than the birth year of 1944). If women born in 1947 have an average age at first birth of 23.59 years, then those who are 10 years younger (born in 1957), it is 0.5 years less (23.09 years), and women born 10 years later (born in 1967) it is less by another 0.4 years. In the generation of women born in 1967–1969 the minimum (after a decrease) value of the average mother's age at first birth was probably reached – 22.69 years (see Tab. 3). We have noted above that in the 1960s–1980s and the first half of the 1990s, the value of this indicator was decreasing by calendar years, i.e. for conditional generations. It is clear that its value is formed under the influence of age at first birth among women of different generations. But it should be noted that women born in 1967–1969, on average, gave birth to their first child in 1989–1992 and the average mother's age at first birth in 1989 was 22.78 years, in 1990 – 22.65, in 1991 – 22.60, in 1992 – 22.60[6]. These values are very close to the average maternal age at first birth among women born in 1967–1969 (22.69 years), which indirectly indicates the absence of timing shifts at the birth of the first child at that period. We should point this out as in subsequent years, as we will show below, the average maternal age at first birth significantly differed in real generations and in the corresponding calendar years.

Starting with the generation born in 1970, the average maternal age at first birth increases. This again corresponds quite well to the beginning of an increase in this indicator value by calendar years since 1995. We can now talk about the total value of the average maternal age at first birth only in relation to the generations born in 1970 and 1971. However, its further increase can also be traced in the case of younger generations (*Tab. 4*), bearing in mind that the value of this indicator will increase (it is clear that it can no longer decrease).

As of the beginning of 2020 (i.e., taking into account the age-related birth rates for first births up to and including 2019), the average maternal age at first birth in Russia increases

[6] Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si

Table 4. Average maternal age at first birth among women born in 1972–1985 in Russia (at the beginning of 2020), years

Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth
1972	22.97	1977	23.93	1982	24.53
1973	23.11	1978	24.13	1983	24.59
1974	23.28	1979	24.29	1984	24.57
1975	23.44	1980	24.36	1985	24.47
1976	23.67	1981	24.44		

Sources: Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si; Rosstat data.

to the value of the generation born in 1983, reaching the level of 24.59 years. At the beginning of 2020, these women were 36 years old, and up to the end of their reproductive period, their indicator is likely to increase significantly. If the age-related birth rates for first births are maintained at the level of 2019, the average age at first birth of women born in 1975 may be 23.46 years, born in 1980 – 24.50 years, born in 1985 – 25.07 years. In subsequent generations, under the specified calculation condition, the value of this indicator stabilizes and it begins to increase again only starting from the generation born in 1993 (25.14 years), reaching 25.23 years for women born in 1995 and 25.86 years for women born in 2000.

We have noted above that the average mother's age at first birth among women born in 1967–1969 was close to that which took place in Russia in the early 1990s. In the following years, the situation changed somewhat. The average maternal age at fist birth among women, starting from the generation born in 1978, exceeds 24 years (see Tab. 4). However, by calendar years (conditional generations), this milestone was surpassed only in 2005 (24.11 years). While in generations of women, starting from the birth year of 1980, the total average age at first birth is likely to be at least 24.50 years. By calendar years, this milestone was passed only in 2009 in the value of this indicator (24.61 years). Such differences in the value of the indicator by calendar years in real generations, apparently, may be evidence of timing shifts, manifested in the postponement of first births in the second half of the 1990s and early 2000s. It is clear that the current statistics take into account the age at first birth only in case of those women who gave birth to their firs child in a given year. Those who postponed the birth of their first child can't get into it. A significantly lower value of the average maternal age at first birth by calendar years compared to its value in real generations who were at the age of active child birth during this period may probably indicate first births postponement. This is indirectly evidenced by a significant decrease in the total birth rate for first births in the 1990s (in 1990 it made up 0.996, in 1995 – 0.803, in 1999 – 0.678[7]).

In recent years, on the contrary, the average mother's age at first birth by calendar years is higher than in real generations who were at the age of the highest birth rates for first births during this period. In 2013, it was 25.20 years, which is more than the calculated total value of the average maternal age at first birth in the real generations born in 1987–1994 (25.07–25.18; in older generations, it is even less). In 2015, the average mother's age at first birth was 25.46 years, and in real generations, the calculated total value of this indicator reaches this or higher level only in generations of women born in 1997 and younger. In 2018–

[7] Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si.

2019, the average maternal age at first birth was more than 25.9 years. In none of the real generations of women born in 2000 and older, the calculated total value of this indicator reaches this level (1990 year of birth – 25.06; 1993 – 25.14; 1996 – 25.37; 1998 – 25.59; 2000 – 25.86). If in the second half of the 1990s and early 2000s, it is highly likely that there were delays in the first births, then a higher value of the average maternal age at first birth in recent years compared to the corresponding real generations may be indicative of delayed births. For the time being, this can probably be put forward as a hypothesis, which requires additional, primarily sociological research to be confirmed or rejected.

Regional differences in the maternal age at first birth can be considered for conditional generations by calendar years and for real generations according to the 2010 census.

The average maternal age at first birth can be calculated by conditional generations for the regions. In 2019, the value of this indicator in Russia as a whole was 25.94 years.

The lowest average maternal age at first birth in 2019 was observed in the Republic of Tuva (23.44 years). In four other constituent entities of the Russian Federation, it was less than 24 years: the Republic of Dagestan (23.52; see articles by K.I. Kazenin and V.A. Kozlov [17; 18] for the possible factors of low average maternal age in this region) and the Chechen Republic (23.72), the Zabaykalsky Krai (23.97), and the Chukotka Autonomous Okrug (23.94).

The value of this indicator in the republics of Altai, Buryatia, Sakha (Yakutia) and Khakassia, Astrakhan and Kemerovo oblasts, the Jewish Autonomous Oblast and the Nenets Autonomous Okrug is in the range from 24 to 25 years.

The average maternal age at first birth in the republics of Adygea, Ingushetia, Kabardino-Balkar and Kalmykia, Altai, Primorsky and Stavropol territories, Amur, Vladimir, Volgograd, Irkutsk, Kurgan, Magadan, Orenburg and Tambov oblasts made up from 25 to 25.5 years in 2019.

37 out of 85 constituent entities of the Russian Federation are included in the group with the average maternal age at first birth from 25.5 to 26 years in 2019: the republics of Karachay-Cherkess, Komi, Crimea, Mari El, Mordovia, Udmurt and Chuvash, Kamchatka, Krasnodar, Krasnoyarsk, Perm and Khabarovsk territories, Belgorod, Bryansk, Vologda, Ivanovo, Kaluga, Kostroma, Kursk, Lipetsk, Novgorod, Novosibirsk, Omsk, Oryol, Penza, Pskov, Rostov, Saratov, Sakhalin, Smolensk, Tver, Tula, Tyumen, Ulyanovsk and Chelyabinsk oblasts, Khanty-Mansiysk – Yugra and Yamalo-Nenets Autonomous okrugs.

In 15 regions, the average maternal age at first birth in 2019 ranged from 26 to 26.5 years: the republics of Bashkortostan and Tatarstan, Arkhangelsk, Voronezh, Kaliningrad, Kirov, Leningrad, Moscow, Murmansk, Nizhny Novgorod, Ryazan, Samara, Sverdlovsk, Tomsk and Yaroslavl oblasts. In three other regions, it is slightly higher: the Republic of Karelia (26.67 years) and North Ossetia-Alania (26.57), Sevastopol (26.91).

The residents of Moscow (27.76 years) and Saint Petersburg (28.06) give birth to their first child the latest, on average[8].

The distribution by the maternal age at first birth in the constituent entities of the Russian Federation, according to the 2010 census, should be carried out for generations that have completed their reproductive period or are close to its completion. They are unlikely to have their first child.

[8] Source: Rosstat data.

The relatively earlier average age at first birth among women who were 40–44 years old at the time of the 2010 census was characteristic of most regions of Siberia and the Far East. And this is not related to the birth rate, as one might assume. The largest share of women who gave birth to their first child at the age of 25 years and older among the Siberian and far Eastern regions is in the republics of Sakha (Yakutia) and Tyva (where birth rates are among the highest in Russia). On the other hand, on average, a later birth of the first child among women of this generation occurred not only in Moscow and St. Petersburg, as expected, but also in all the republics of the North Caucasus, including those with a relatively high birth rate.

In the Zabaykalsky Krai, the Amur Oblast, and the Jewish Autonomous Oblast, more than a third of women aged 40–44 at the time of the 2010 census gave birth to their first child under the age of 20. Slightly less, but more than 30% of such cases were observed in the Kamchatka and Khabarovsk territories, the Magadan and Sakhalin Oblasts, and the Chukotka Autonomous Okrug. On the other hand, less than 20% of first births by women under 20 in this generation are in the republics of Bashkortostan, Dagestan, Ingushetia, Karachay-Cherkess, Mari El, Tatarstan and Chuvash, in Moscow and St. Petersburg, and less than 15% are in North Ossetia – Alania (14.2%).

Only in the Republic of Ingushetia, less than half of first births (44.1%) occurred in this generation at the age between 20 and 25. In all other regions, more than half of women had their first child at this age. The largest share of them was in the Vologda (60.3%), Kirov (60.3%) and Kostroma (61.3%) oblasts, the republics of Bashkortostan (60.9%), Chuvash (61.3%) and Mari El (61.9%).

The lowest proportion of women who gave birth to their first child at the age of 25 years and older in the generation of women aged 40-44 at the time of the 2010 census was observed in the Jewish Autonomous Oblast (12.1%), the Amur Oblast (12.9%), and the Zabaykalsky Krai (13.4%). On the other hand, more than a quarter of first births by women of this generation occurred at the age of 25 and older in the republics of Karachay-Cherkess and Chechen, in Moscow and St. Petersburg, and more than a third – in the republics of North Ossetia – Alania (33.8%) and Ingushetia (40.1%).

Determinants of maternal age. Most first births occur in a registered marriage. In recent years, their share in the total number of first births is over 75%: in 2014 – 75.5%, 2015 – 76.4%, 2016 – 77.1%, 2017 – 77.4%, 2018 – 76.8%, 2019 – 76.9%[9]. In this regard, the average mother's age at first birth in a registered marriage significantly influences on its value in general for all first births.

Average maternal age at first birth in wedlock is determined by two components: the average age of first marriage for women and the interval between marriage and first birth (protogenetic interval).

Between the 2002 and 2010 censuses, the average age of first marriage in Russia was increasing, as evidenced by the growth in the proportion of women aged 20 to 35 who have never been married (*Tab. 5*).

According to the 2010 census, the percentage of never-married women was 4.6 percentage points higher in the 20–24 age group, 4.5 percentage points higher in the 25–29 age group, and 3.8 percentage points higher in the 30–34 age group, compared to the 2002 census.

[9] Source: Rosstat data.

Table 5. Proportion of never-married women aged 20–34 in Russia, %

Age (years)	2002	2010	2015
20–24	52.6	57.2	53.9
25–29	21.8	26.3	24.1
30–34	10.9	14.7	13.6

Sources: *Results of the 2002 all-Russian population census. Vol. 2. Age and gender composition and marital status*. Available at: http://www.perepis2002.ru/index.html?id=31; *Results of the 2010 all-Russian population census. Vol. 2. Age and gender composition and marital status*. Pp. 294-295. Available at: https://gks.ru/free_doc/new_site/perepis2010/croc/Documents/Vol2/pub-02-01.pdf; *Results of the 2015 micro-census. Section 1. Age and gender composition of the population participated in the micro-census, and marital status*. Available at: https://gks.ru/free_doc/new_site/population/demo/micro-perepis/finish/micro-perepis.html

However, data from the 2015 micro–census showed a slightly lower proportion of women who have never been married in these age groups than in the 2010 census (see Tab. 5). This may indirectly indicate a slight decrease in the average age of first marriage among women at the period between 2010 and 2015. The 2015 micro-census also revealed a higher proportion of women who were in a registered marriage than at the time of the 2010 census: 20–24 years – by 1.4 percentage points; 25–29 years – by 1.5 percentage points; 30–34 years – by 2.3 percentage points[10]. It should be borne in mind of course, that we are talking here about those who were in a registered marriage in general, and not necessarily in the first one. However, the results of comparing the 2010 census and the 2015 micro-census should be interpreted with caution, bearing in mind that they are somewhat incompatible, since the micro-census covered only 1.5% of the population.

Current statistics show a slight increase in the average age of women registering their first marriage since the 2010 census. According to the calculations of S.V. Zakharov based on Rosstat data, the average age of women when registering their first marriage, among those who registered it under the age of 50, was 0.34 years higher in 2016 compared to 2011: in 2011 – 24.97 years; 2012 – 25.06; 2013 – 25.17; 2014 – 25.26; 2015 – 25.24; 2016 – 25.31 [19]. In 2017, the average age of first marriage for women was 25.44 years, in 2018 – 25.46, in 2019 – 25.55[11], which is significantly higher than, for example, in 1995 (21.99 years)[12].

The second component, determining the average age of mother at first birth in a registered marriage, is the interval between first marriage and first birth (protogenetic interval). Unfortunately, there are no statistics on this interval. Every year, the statistical form p246 "Number of marital births by duration of marriage" is developed, but only for all births without differentiation by order.

The protogenetic interval can be calculated based on micro-data of birth certificate records. The available databases of such micro-data for Moscow show a significant difference in the average interval between the registration of marriage and first child birth for women with different levels of education (*Tab. 6*).

[10] Sources: *Results of the 2002 all-Russian population census. Vol. 2. Age and gender composition and marital status*. Available at: http://www.perepis2002.ru/index.html?id=31; *Results of the 2010 all-Russian population census. Vol. 2. Age and gender composition and marital status*. Pp. 294–295. Available at: https://gks.ru/free_doc/new_site/perepis2010/croc/Documents/Vol2/pub-02-01.pdf; *Results of the 2015 micro-census. Section 1. Age and gender composition of the population participated in the micro-census, and marital status*. Available at: https://gks.ru/free_doc/new_site/population/demo/micro-perepis/finish/micro-perepis.html.

[11] Source: Rosstat data.

[12] From 1997 to 2010, Russia lacked the necessary statistical information to correctly calculate the average age of marriage registration.

Table 6. Average interval between marriage registration and first child birth (protogenetic interval) for women with different levels of education in Moscow, months

Level of education	2014	2015	2016	2017	2019
Higher professional	27.6	28.9	29.1	29.7	32.3
Incomplete higher professional	16.6	15.9	15.6	17.8	16.9
Secondary professional	19.9	21.1	20.3	20.5	20.8
General secondary (full)	16.3	17.9	17.7	18.2	18.6
Basic general	14.7	18.3	14.8	15.4	14.5

Table 7. Average interval between marriage registration and first child birth (protogenetic interval) depending on the age of marriage registration in Moscow, months

Age of marriage registration, years	2015	2016	2017	2019
under 18	19.9	23.2	21.7	21.4
18–19	30.6	29.7	31.2	30.8
20–21	35.9	33.5	33.7	34.6
22–23	33.7	34.5	34.7	36.0
24–25	28.4	29.5	31.7	35.2
26–27	24.0	25.3	26.7	31.0
28–29	21.2	21.8	22.8	26.4
30–34	18.6	18.9	19.3	21.2
35–39	14.9	15.2	16.4	16.8
40–44	12.3	10.8	14.8	12.4

Women with higher professional education are on average more likely to delay their first child birth for a longer period after marriage registration. The average interval between these two demographic events is significantly longer for them than for those with a lower level of education (see Tab. 6).

The protogenetic interval for women in Moscow also differs depending on the age of marriage registration[13] (*Tab. 7*).

For those women who registered marriage before the age of 18, the average interval between marriage registration and first child birth is relatively small (in 2019 – 21.4 months). For those who registered marriage at an older age, the average protogenetic interval is longer. In 2015, it was the highest among those who registered marriage at the age of 20–21, and in 2016–2017 and 2019 – at the age of 22–23. The older the age of marriage registration is, the smaller the average protogenetic interval. Those who registered marriage at the age over 30 have a shorter protogenetic interval than those who did it before the age of 18 (see Tab. 7).

The above-mentioned increase in the average maternal age at first birth for the generations of the 1970s – 1980s (see Tab. 4) is also proved by the results of sociological studies. For example, according to a sociological survey conducted by a research team supervised by Doctor of Sociological Sciences, Professor T.K. Rostovskaya, at the end of 2019 – the beginning of 2020 (hereinafter, the sociological survey 2019–2020)[14], this age is 23.75 years old among women born in 1970–1974, 24.07 – in 1975–1979, 24.38 – in 1980–1984. For women born in 1985–1989 it is still lower (23.85 years old), but at the time of the survey, they were

[13] In this case, we are not necessarily talking about the age of the first marriage registration. This refers to a marriage in which a woman has her first child.

[14] 5616 people were interviewed in 10 regions (the republics of Bashkortostan and Tatarstan, Stavropol Krai, Volgograd, Vologda, Ivanovo, Moscow, Nizhny Novgorod and Sverdlovsk oblasts, Moscow).

only 30–35 years old, and by the end of the reproductive period, the average age at first birth in this generation of women is to increase significantly.

The results of the study show a significantly higher average age at first birth among women with higher and postgraduate professional education (24.33 years). Among those having incomplete higher professional education, it is 23.08 years; secondary vocational education – 23.16; primary vocational, general secondary (full) and lower level of education – 21.81.

Similar differences in the average maternal age first birth were revealed by the results of the "Selective observation of reproductive plans of the population" conducted by Rosstat in 2012[15]. Among women with higher and postgraduate professional education, it is 24.05 years; incomplete higher professional education – 22.49; secondary professional education – 22.44; primary professional education – 22.16; general secondary (full) education – 21.41; basic general and lower – 20.49.

In 2014, the Laboratory of federal research methodology of the Ranepa Institute for Social Analysis and Forecasting under the President of the Russian Federation conducted a sociological study using semi-structured biographical interviews [20]. The interviewed women named getting education as one of the factors that affect postponing the birth of the first child.

According to 2019–2020 survey, women with higher and postgraduate professional education have higher average age at first marriage (23.32 years; incomplete higher professional education – 21,96 years; vocational education – 22,17 years; primary professional, general secondary (full) and lower level of education – 22,42). Their average interval between marriage and first birth is also slightly longer (19.6 months; higher professional education – 14.1; vocational – 19.5; primary vocational, general secondary (full) and lower level of education – 6.6)[16].

The results of the "2012 Selective observation of reproductive plans of the population" also revealed an older age of first marriage registration and a longer protogenetic interval in case of more educated women. Women with higher and postgraduate professional education registered their first marriage, on average, at the age of 22.79; with incomplete higher professional education – 22.17; secondary professional – 21.72; primary professional – 21.68; general secondary (full) – 21.29; general basic and lower – 20.15. The average interval between marriage and first birth among women having higher and postgraduate professional education is 17.2 months; incomplete higher professional – 9.1; vocational – 10.7; primary professional – 12.9; general secondary (full) – 8.8; general basic and lower – 2.4[17].

However, the interpretation of the relationship between the level of education and the age of motherhood and marriage requires a deeper understanding. This should probably involve not so much the significant difference in life goals and need for children, but rather an objective difference in the period of achieving economic independence which is due to the longer duration of training. Women who complete higher education usually spend two years longer at school and / or two more years in vocational training.

[15] For more information about this study, see https://gks.ru/free_doc/new_site/RPN/Publisher/index.html; the corresponding calculations based on the results of a similar survey in 2017 cannot be made, since at the time of writing the article, the database of its micro-data is closed.

[16] The indicators are calculated for those who are married for the first time and have children only from the current marriage.

[17] The indicators are calculated for those who are married for the first time and have children only from the current marriage.

Conclusions

Being one of the parameters of the population's demographic behavior motherhood age is a bright marker of the period of socio-economic maturity. Since the absolute majority of the Russians plan to have at least one child, the term of birth is determined by assessing the favorable conditions. Family nuclearization, the weakening of functional intergenerational ties [21], not always systematic social support for young families, high requirements for the conditions of child-rearing and its cost, and the availability of birth control method lead to the increased personal responsibility for the decision about giving birth to the first child. This is a generally positive trend, but it objectively entails a strict link with the achievement of economic independence of a young family. Motherhood age increases in parallel with the duration of education. And this is a global trend. The demographic risks of motherhood "aging" would not be so high if the Russians had stable orientations related to the average number of children. Theoretically, this would lead to a reduction in the intergenetic intervals. However, the confident majority is focused on 1-2 children, they believe that "there's no need to hurry" in becoming parents and first you need to "gain your foot". The calculation of the average maternal age at first birth for conditional and real generations showed that its value is growing during the last 20-30 years, but the situation is not so clear within the generations. In real generations of young women, it is lower, which means that demographic policy has contributed to the implementation of their reproductive plans. However, given the current low preferred number of children, this will not ensure further growth in the birth rate. Regional differentiation of motherhood age would seem to be able to give a hint about its determinants. The "youngest" regions in terms of conditional generations have relatively high birth rates. These are expected to be the republics of the Caucasus region, Tyva. However, the analysis of the situation in real generations, including by nationality, does not confirm this pattern unambiguously. Marriage (age of marriage) and the level of education remain to be the main factors determining motherhood age. These determinants reflect the potential parents' socio-economic maturity, their willingness to take responsibility for raising a child, and change their lives. In the conditions of mass higher education, the absence of which can significantly limit the employee's competitiveness in the labor market and career prospects, the focus on bachelor's and secondary vocational education, which can accelerate economic self-sufficiency, will give a positive result only in the case of providing well-paid jobs.

References

1. Kalachikova O.N., Korolenko A.V. Patterns of reproductive behavior of population (on the materials of Vologda Oblast). *Narodonaselenie=Population*, 2018, no. 4, pp. 110–122. DOI: 10.26653/1561-7785-2018-21-4-10 (in Russian).
2. Kalachikova O.N., Gruzdeva M.A. Changes in reproductive behavior and marriage patterns of the Russian population (based on analysis of Rosstat sample studies). *Sotsial'noe prostranstvo=Social Area*, 2018, no. 2 (14). DOI: 10.15838/sa.2018.2.14.1 (in Russian).
3. Shabunova A.A., Rostovskaya T.K. On the necessity to develop models of optimal conditions for the formation and implementation of demographic attitudes. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz=Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 4, pp. 38–57. DOI: 10.15838/esc.2020.4.70.2 (in Russian).

4. Lesthaeghe R, van de Kaa DJ. Twee demografische transities? In: *Bevolking: groei en krimp*. Deventer: Van Loghum Slaterus, 1986. Pp. 9–24.
5. Van de Kaa D. Europe's second demographic transition. *Population Bulletin*, 1993, vol. 42 (1). 55 p.
6. Coleman D., Rowthorn R. Who's afraid of population decline? A Critical examination of its consequences. *Population and Development Review,* 2011, vol. 37 (demographic transition and its consequences), pp. 217–248.
7. Frejka T., Sardon J.-P. First birth trends in developed countries: a cohort analysis. *Demographic Research*, 2006, vol. 15, article 6, pp. 147–180. Available at: https://www.demographic-research.org/volumes/vol15/6/15-6.pdf
8. Shcherbakova E.M. Youth of the CIS, demographic portrait. *Demoskop Weekly*, 2017, no. 711–712. Available at: http://demoscope.ru/weekly/2017/0711/barometer711.pdf (in Russian).
9. Aksyonova S.Y. Advanced maternal age: The case of Ukraine. *Демографія та соціальна економіка=Demography and Social Economy*, 2014, no. 2 (22), pp. 57–67. Available at: https://dse.org.ua/arhcive/22/2(22)_2014.pdf (in Russian).
10. Аксьонова С.Ю. Середній вік матері при народженні дитини: чи можлива реверсія? *Демографія та соціальна економіка*, 2018, no. 2 (33), pp. 53–66.
11. Аксьонова С.Ю. Взаємозв'язки середнього віку матері при народженні дитини і рівня народжуваності. *Демографія та соціальна економіка*, 2019, no. 2 (36), pp. 23–38. Available at: https://dse.org.ua/arhcive/36/2_(36)_2019.pdf.
12. Ediev D.M. On the role of mother's middle age at childbirth in long-term demographic dynamics. *Voprosy statistiki=Voprosy statistiki*, 2006, no. 11, pp. 23–31 (in Russian).
13. Fakhrislamova R.T. Postponing the birth of children (first-borns) in Russia and in the world. In: *Global'nye vyzovy i regional'noe razvitie v zerkale sotsiologicheskikh izmerenii: materialy III mezhdunarodnoi nauchno-prakticheskoi internet konferentsii, 26–30 marta 2018 g.: ch.2* [Global challenges and regional development in the mirror of sociological assessment: Proceedings of the Third international research-to-practice internet-conference, March 26-30, 2018: Part 2]. VolNTs RAN, 2018. Pp. 275–283 (in Russian).
14. Arkhangelskii V.N., Zinkina Yu.V., Shulgin S.G. Fertility differentiation according to female education levels in Russia: Current situation and forecast scenarios. *Narodonaselenie=Population*, 2019, no. 1, pp. 21–36 (in Russian).
15. Gordo L.R. Why are women delaying motherhood in Germany? *Feminist Economics*, 2009, no. 15:4, pp. 57–75. DOI: 10.1080/13545700903153955
16. Rostovskaya T.K., Kuchmaeva O.V. Conceptual approaches to conducting the All-Russian sociological study "Demographic Well-Being of Russia" as a tool for monitoring the effectiveness of demographic policy. *Vestnik YuRGTU (NPI)=Bulletin of the South-Russian state technical University (NPI)*, 2020, no. 3, pp. 89–99. DOI: 10.17213/2075-2067-2020-3-89-99 (in Russian).
17. Kazenin K., Kozlov V. Rejuvenation of the motherhood in Dagestan: A tendency or an artefact? (The preliminary results of the rural population survey). *Demograficheskoe obozrenie=Demographic Review*, 2016, no. 3, pp. 100–123 (in Russian).
18. Kazenin K.I., Kozlov V.A. Childbearing age in Dagestan: Significance of the ethnic factor under the conditions of modernization. *Narodonaselenie=Population*, 2017, no. 1, pp. 46–58 (in Russian).
19. *Naselenie Rossii 2016: dvadtsat' chetvertyi ezhegodnyi demograficheskii doklad* [Population of Russia 2016: Twenty-fourth annual demographic report]. Ed. by S.V. Zakharov. Moscow: Izd. dom Vysshei shkoly ekonomiki, 2018. Pp.134–136.
20. Ipatova A.A., Tyndik A.O. Reproductive age: 30 years old in preferences and biographies. *Mir Rossii=Universe of Russia*, 2015, vol. 24, no. 4, pp. 123–148 (in Russian).
21. Korolenko A.V. Some aspects of the state of a modern "institute of grandmothers": Experience of sociological research. *Sotsial'noe prostranstvo=Social Area*, 2018, no. 4 (16). DOI: 10.15838/sa. 2018.4.16.3 (in Russian).

Information about the Authors

Vladimir N. Arkhangel'skii – Candidate of Sciences (Economics), Leading Researcher, Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences, Institute for Demographic Research, (6 Fotieva Street, building 1, Moscow, 119333, Russian Federation); Head of Sector, Lomonosov Moscow State University, Faculty of Economics, Population Issues Research Centre (1 Leninskie Gory, building 46, Moscow, 119991, Russian Federation); Researcher, Moscow Healthcare Department, Research Institute of Healthcare Organization and Medical Management (30 Bolshaya Tatarskaya Street, Moscow, 115184, Russian Federation; e-mail: archangelsky@yandex.ru)

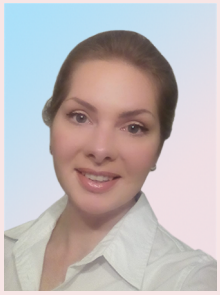
Ol'ga N. Kalachikova – Candidate of Sciences (Economics), Leading Researcher, Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences, Institute for Demographic Research, (6 Fotieva Street, building 1, Moscow, 119333, Russian Federation); Deputy Director, Head of Department, Vologda Research Center of RAS (56a Gorky Street, Vologda, 160014, Russian Federation; e-mail: onk82@yandex.ru)

Received September 14, 2020.

DOI: 10.15838/esc.2020.5.71.13
UDC 33.05:314.116; LBC 60.7(2)

Patterns of Birth Rate and Russian Female Reproductive Behavior of Population: Current Trends*

Olga A.
KOZLOVA
Institute of Economics of the Ural Branch of the Russian Academy of Sciences
Yekaterinburg, Russian Federation, 29, Moskovskaya Street, 620014
E-mail: Olga137@mail.ru
ORCID: 0000-0002-0448-3519; ResearcherID: M-4659-2016



Olga O.
SEKITSKI-PAVLENKO
Institute of Economics of the Ural Branch of the Russian Academy of Sciences
Yekaterinburg, Russian Federation, 29, Moskovskaya Street, 620014
E-mail: pavlenko_ola@mail.ru
ORCID: 0000-0002-1370-8724

Abstract. The article analyzes changes in the patterns of birth rate and female reproductive behavior in the period from 2000 to 2018. The object of the research is reproductive behavior, which is a system of actions and relationships aimed at giving birth to a certain number of children or refusing to give birth. The subject of the research is demographic and socio-economic aspects of the relationship between the need for children and the conditions of realization. The purpose of this paper is to consider current trends of birth rate and reproductive behavior, taking into account demographic, economic, and social factors that affect birth rate. The novelty of the study is the usage of an interdisciplinary approach based on the synthesis of demographic and economic theories that explain changes in reproductive behavior. The article analyzes the dynamics of demographic and socio-economic indicators, highlights the characteristic

* The publication was prepared in accordance with the research plan of the Institute of Economics of the Ural Branch of the RAS for 2019-2022.

For citation: Kozlova O.A., Sekitski-Pavlenko O.O. Patterns of birth rate and Russian female population reproductive behavior: current trends. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 218–231. DOI: 10.15838/esc.2020.5.71.13

features inherent in certain patterns of Russian female population reproductive behavior for the period from 2000 to 2018. The results obtained in the course of the study demonstrate fundamental restructuring of the system of values associated with the birth and upbringing of a child. The decline of crude and total birth rates, shifts in the age structure of birth rate, the focus on one- or two-child family pattern, the increase of an average maternal age at birth indicate a prevalence of economic and social benefits over the birth of more children. In practical terms, the results presented in the article can serve as a basis for future interdisciplinary research in birth rate area and be used as a methodological and informational base for developing demographic policy measures aimed at stimulating birth rate.

Key words: reproductive behavior, birth factors, changes, birth rate and reproductive behavior patterns.

Introduction

Key role in solving problems of demographic policy belongs to a formation of a set of measures to stabilize and increase the country population, as well as to create conditions that improve the quality of life[1]. In this context, the family is the basic source of socio-economic capital, and birth rate is the basic of its reproduction. For almost the entire history of mankind, it was the family who played the key role in the population reproduction. The demographic events of the last two decades in Russia are closely related to great changes in reproductive behavior. The growth of the birth rate is impossible without understanding society's spiritual and moral guidelines, increasing the importance of the family institute and its role. At this stage of Russian society development, the maintenance and preservations of traditional family comes into strong contradictions with socio-economic and cultural realities. Disregard for these contradictions has already led to a significant demographic resource depletion, which will take more than a decade to fill.

Simple extrapolation of current birth rate trends is insufficient for the effective compliance of demographic policy measures. Changes in birth rate are based on deep behavioral mechanisms predetermined by the historical, social, economic, cultural, and moral status of an individual and society as a whole.

The article attempts to link the socio-economic transformations taking place in society with changes in the reproductive behavior of Russian women over nearly the last 20 years. Due to the uneven dynamics of socio-economic processes, the impact of globalization and the decrease in dependence on the traditional way of women life, the population has developed adaptive mechanisms to adjust to the changed conditions. One of the results of adaptation to the ongoing changes became fundamental shift in reproductive behavior.

Issues related to the study of reproductive behavior affect the subject areas of many scientific disciplines: demography, sociology, economics, geography, psychology, etc. However, each of them focuses on its own subject area, in relation to its goals and research objectives.

In Russian demographic literature, reproductive behavior was considered in the context of birth rate as one of the main processes of population reproduction. Special place belongs to the works of such prominent writers of Soviet and later Russian demographic thought as B.Ts. Urlanis, D.I. Valentey, A.V. Borisov, A.Ya. Kvasha, A.G. Volkov, A.G.

[1] The concept of demographic policy of the Russian Federation for the period up to 2025: Decree of the President of the Russian Federation no. 1351, dated October 9, 2007. Available at: http://www.demoscope.ru/weekly/knigi/koncepciya/koncepciya25.html

Vishnevskiy. Among the sociologists who played a significant role in the study of reproductive, marital and family behavior, it is worth highlighting A.G. Kharchev, V.M. Medkov, A.B. Sinelnikov, A.I. Antonov. Economists, representatives of socio-economic geography, and historians made a significant contribution to development of the ideas about the population reproductive age. For example, the works of N.M. Rimashevskaya, V.A. Iontsev, A.A. Sagradov, M.A. Klupt, B.S. Khorev and others.

Of the latest research, the largest works devoted to the problems of reproductive, marital, and family behavior belong to the V.N. Arkhangel'skiy. Thus, in the monograph "Birth factors" [1], the scientist, after analyzing a lot of surveys, conducted in Russia, presented not only an overview of the factors that affect the birth rate but also devoted separate chapters to the value-motivational determination of reproductive behavior, living conditions as one of the leading factors of birth rate, ethnic and educational differentiation of birth rate and marital behavior. As a result, V.N. Arkhangel'skiy came to the conclusion about an almost complete loss of the norms of average number of children in Russian society. As a way out of this situation, within of demographic policy, he suggests not only creating conditions conducive to the creation of a family and the birth of children, but also directing all efforts to increasing the need for children. In our opinion, this approach can be described as civilized, as the increase of the need for children implies fundamental society restructuring, its cultural and moral norms. In the article "Reproductive and marital behavior" [2], based on the results of the research of demographic behavior of young people in 18 regions of Russia in 2010, V.N. Arkhangel'skiy considers relationship of reproductive orientations with the age of marriage, childbearing, and first birth, and he comes to the conclusion that changes in relation to marriage and childbearing are associated with negative changes in the family institute and decrease of a marriage value. Such conclusions can be seen in other works of the scientist [3; 4].

T.M. Maleva and O.V. Sinyavskaya made a tangible contribution to the consideration of the issues of reproductive behavior. Based on the international research program "Generation and gender" they made one of the largest socio-demographic surveys called "Parents and children, men and women in the family and society" (hereinafter – P&ChM&W)[2] in three stages: the first stage was in 2004, the second – in 2007 and the third – in 2011. The sampling size of each stage was about 11 thousand respondents. The uniqueness of P&ChM&W is that the same group of respondents was surveyed with an interval of three years. It made it possible to track the realization of their reproductive plans. A wide range of indicators in details described the level of income, size of households, marital status, respondents' health and their reproductive plans, and values. The survey provided a unique basis for studying reproductive and marital behavior.

Another significant project, studying reproductive behavior, is the research of Ya.M. Roschina and A.V. Boikov "Fertility factors in modern Russia" [5]. It was an empirical analysis of economic models of fertile behavior based on the Russian monitoring of economy and health (RLMS) for the period from 1994 to 2001. The authors analyzed models of probabilities of having a child in

[2] Maleva T.M., Sinyavskaya O.V. Socio-economic factors of birth rate in Russia: empirical measurements and challenges to social policy. *Demoscope Weekly*, 2007, no. 309–310. Available at: http://www.demoscope.ru/weekly/2007/0309/analit02.php (accessed: May 25, 2020).

the family, termination of pregnancy, and the desire to have a child in the future. In the process, the scientists concluded that demographic, cultural and value factors, such as age, parental status, alcohol consumption, and satisfaction with their financial situation, have the primary influence on reproductive behavior. Attention is also focused on significant differences in the birth rate between regions and urban and rural areas of respondents' residence. The significance of economic factors (employment, education level, work status, income level) in their influence on reproductive behavior was confirmed only in separate models of a sample of women. A few years later, based on G. Becker's approach, Ya.M. Roschina and A.G. Cherkasova tested patterns of fertile behavior for groups of women of various socio-economic categories[3]. The main conclusion of their research was a significant differentiation of the impact of socio-economic causes on birth rate. Thus, the authors draw attention to the fact that the decision to give birth to the first child is usually made regardless of housing availability, income level, and other socio-economic components, and the decision to give birth to the second and subsequent children is largely determined by whether the family has material resources and its amount.

The monograph by O.N. Kalachikova and A.A. Shabunova presents the results of group surveys conducted in the Vologda Oblast in 2005–2014 [6]. Long-term monitoring along with a broad statistical base let the authors trace the dynamics of changes in reproductive behavior and suggest mechanisms for regulating demographic policy in the field of increasing the birth rate. Among the characteristic features of transformation of reproductive behavior, the authors identified decrease in the need for children, which is especially evident in rural areas. On the other hand, a high value of parenthood and family remains. The main factors influencing the result of reproductive choice include reproductive orientations, marital status, housing conditions, access to medical care, and the ability to provide quality education for future offspring. The peculiarity of this research is a detailed analysis of the results of implementation of demographic policy measures and proposal of specific solutions to improve the situation.

All aforementioned works emphasize the relevance of studying reproductive behavior and identify the urgent need to implement efficient demographic policy measures aimed at increasing the birth rate.

Research methods and methodology

The theoretical basis of the research is an interdisciplinary approach based on a combination of scientific knowledge from the fields of demography, economics, sociology, and psychology. A distinctive feature of our work is an attempt to explain cause-and-effect links and features of reproductive behavior from the point of view of the synthesis of scientific approaches, not limited to the usage of a single concept. In our opinion, it is an interdisciplinary approach that allows us to examine more deeply the processes and phenomena of a demographic nature, to find the relationship between reproductive behavior and its economic, social, and psychological components in a particular historical period of society's development.

The study is based on the usage of four concepts, in which we explain the transformation of birth rate and reproductive behavior of female population of our country:

[3] Roschina Ya.M., Cherkasova A.G. Differentiation of birth factors for various socio-economic categories of Russian women. *Demoscope Weekly*, 2009, no. 401–402. Available at: http://www.demoscope.ru/weekly/2009/0401/analit02.php (accessed: May 25, 2020).

– theory of the second demographic transition;
– theory of rational choice;
– theory of consumer behavior;
– theory of child value.

Each of them belongs to a specific area of scientific knowledge. Thus, the theory of the second demographic transition is purely demographic in nature. The theory of rational choice and the theory of consumer behavior were developed in the framework of such disciplines as economics and sociology. The theory of child value is based on the usage of knowledge from the field of axiology and psychology.

Based on the interdisciplinary nature of our work and aforementioned theoretical concepts, we explain current behavior of population, on the one hand, through the mutual influence of socio-economic and value components and reproductive behavior of female population on the other.

To understand the demographic changes in Russia, we will consider the guidelines of each of the theories relative to the reproductive behavior of the population.

According to the theory of the second demographic transition, the changes taking place in Russian society over the last 20 years are similar to changes that began to appear in Western Europe in the 1960s and 1970s:

– decreasing the level of crude and specific birth rate;
– increasing the level of education and employment of female population;
– promoting the usage of contraception;
– increasing the number and percentage of cohabitations;
– raising the age of marriage;
– growing a number and percentage of single-parent families;
– spreading of extramarital births.

A distinctive feature of the second demographic transition is individualism, including broad opportunities for its realization in various spheres of life [8; 9]. Russia, like a number of European countries of the former communist bloc, entered the phase of the second demographic transition with some delay. Its characteristic trends began to appear in Russia in the late 1980s–early 1990s [10].

The theory of rational choice explains the transformation of reproductive behavior [11; 12]. It emerged in the 1960s and was based on the works of M. Weber. The theory offers to determine the rational behavior of an individual in terms of opportunities available to him/her and the conditions for its realization. In the context of reproductive behavior, offspring are considered goods, and an individual decides whether to choose them or not and in what quantity. In this case, an individual is assigned a right to take into account the costs that he/her may incur after having offspring and advantages of this process. These costs or advantages can be financial, social, or temporary, and, based on a balanced (rational) choice, an individual is inclined to make a decision about the absence or presence of offspring and their number [13; 14].

The theory of consumer behavior is derived from the theory of rational choice [15; 16]. From the point of view of the relationship between reproductive and consumer behavior, it is explained that the level and quality of consumption is higher in richer families, therefore, investment in children increases with the growth of the socio-economic status of a family. In families with low social status and income, the level of consumption is significantly lower, and children are considered not as objects for investment, but as an economic asset, which can be used to get various types of social support from the government.

The transformation of reproductive behavior models can also be explained using the theory of child value. Its essence lies in the fact that children help an individual to implement his or her internal needs, such as a sense of immortality, a sense of affection, a state of "adult life", social comparison, power and others [17; 18].

A proper synthesis of theories is important for an objective analysis of models of reproductive behavior transformation, without which it is impossible to pursue an effective demographic policy.

We selected the following parameters as the main criteria for transformations of reproductive behavior patterns:

1) number of births;
2) crude birth rate;
3) total birth rate;
4) number of women of fertile age;
5) age-specific birth rates;
6) average maternal age at birth;
7) average maternal age at first birth.

Choosing the criteria that determine the characteristics of reproductive behavior, we were guided by the availability of demographic data, their information completeness, and the ability to provide an idea of changes in reproductive behavior over an almost 20-year period. We considered it appropriate to use these very indicators, since their statistical accounting is carried out regularly on the basis of generally accepted methods, and it is optimal tools for studying the patterns of quantitative and qualitative demographic changes.

A number of births and a number of women of fertile age are the leading indicators in the study of fertile issues, thus, their inclusion as a criterion when considering models of transformation of birth rate and reproductive behavior, in our opinion, is necessary. Such a criterion as the crude birth rate allows not only determining the birth rate but also allows leveling the values of absolute numbers. The total birth rate is one of the most important parameters in considering reproductive behavior; it most fully reflects the intensity of the birth rate process. Age-specific birth rates allow us to assess changes of birth patterns in women's reproductive behavior. Average maternal age at birth and average maternal age at first birth help to explain the fullness of women's reproductive plans. The increase or decrease in these indicators is associated with time shifts at the birth of the first and subsequent children, reduction or increase in the interval between births, and, accordingly, with changes in the reproductive attitudes of female population. Usually, when an average maternal age at first birth increases, a number of subsequent children is often less than desired.

Results and discussion

Dynamics of the leading indicators reflecting reproductive behavior from 2000 to 2018 for five-year intervals is presented in *the table*.

In the first decade of the new Millennium, Russia entered a phase of increasing a number of births. In the period from 2000 to 2010, a number of births increased from 1.266 to 1.789 thousand people, i.e. by 41.3%. Crude birth rate increased from 8.7% to 12.6% and total birth rate increased from 1.19 to 1.56 births per a woman *(Fig. 1)*.

The increase in birth rate is explained by a relative stabilization of population's living standards after the crisis of the 1990s, the implementation of demographic policy measures, which began in 2007. However, the decisive importance belongs to the peculiarities of the age structure of female population of Russia, as, since the beginning of the 2000s, large in numbers generations of women, which were born in the early 1980s, have entered childbearing age.

Dynamics of indicators determining the reproductive behavior of the female population of the Russian Federation, 2000–2018

Indicator	Year				
	2000	2005	2010	2015	2018
Number of births, thousands of people	1 266	1 457	1 789	1 944	1 604
Birth rate per 1000 people, %	8.7	10.2	12.6	13.3	10.9
Total birth rate	1.19	1.29	1.56	1.77	1.58
Number of women aged 15–49 years, thousands of people	39 348	39 680	37 690	35 197	34 905
Average mother's age at birth, years	25.8	26.5	27.7	28.1	28.7
Average mother's age at first birth, years	23.5	24.1	24.9	25.5	25.9

Sources: public data of the Unified interdepartmental information and statistical system (UIISS) of the Federal State Statistics Service. Available at: https://www.fedstat.ru/indicator/31606 (accessed: June 5, 2020); https://www.fedstat.ru/indicator/31269 (accessed: June 5, 2020); https://www.fedstat.ru/indicator/31517 (accessed: June 5, 2020); Population of the Russian Federation by gender and age. Available at: https://gks.ru/bgd/regl/B18_111/Main.htm (accessed: June 5, 2020).

Figure 1. Dynamics of crude and total birth rate in the Russian Federation, 2000–2018

Source: public data of the Unified interdepartmental information and statistical system (UIISS) of the Federal State Statistics Service. Available at: https://www.fedstat.ru/indicator/31269;https://www.fedstat.ru/indicator/31517 (accessed: June 5, 2020).

In the second decade, up to 2015, the birth rate trends of the first decade continued. By 2015, the crude number of births increased by 8.6%, amounting to 1.944 thousand people. Since 2010, the crude birth rate increased from 12.62% to 13.3% in 2012 and passed into so-called five-year "plateau", and, after that, the indicator began declining to 10.9% which was recorded at the end of the studied period. The total birth rate increased from 1.56 to 1.77.

Short time period from 2014 to 2016 may be called some kind of an upper limit of Russia birth rate, when maximum birth numbers, crude and total birth rates were reached. Since

2016, despite the government efforts, the possibilities for increasing the birth rate have been almost exhausted. This is evidenced, first of all, by the decline of the total birth rate, which, even in the most favorable period, was insufficient for simple reproduction of generations. In addition, women born in the 1980s, who are responsible for increasing the birth rate due to their numbers, have been replaced by small generations of women born in the 1990s, which undoubtedly affects the decline of the birth rate at the present time.

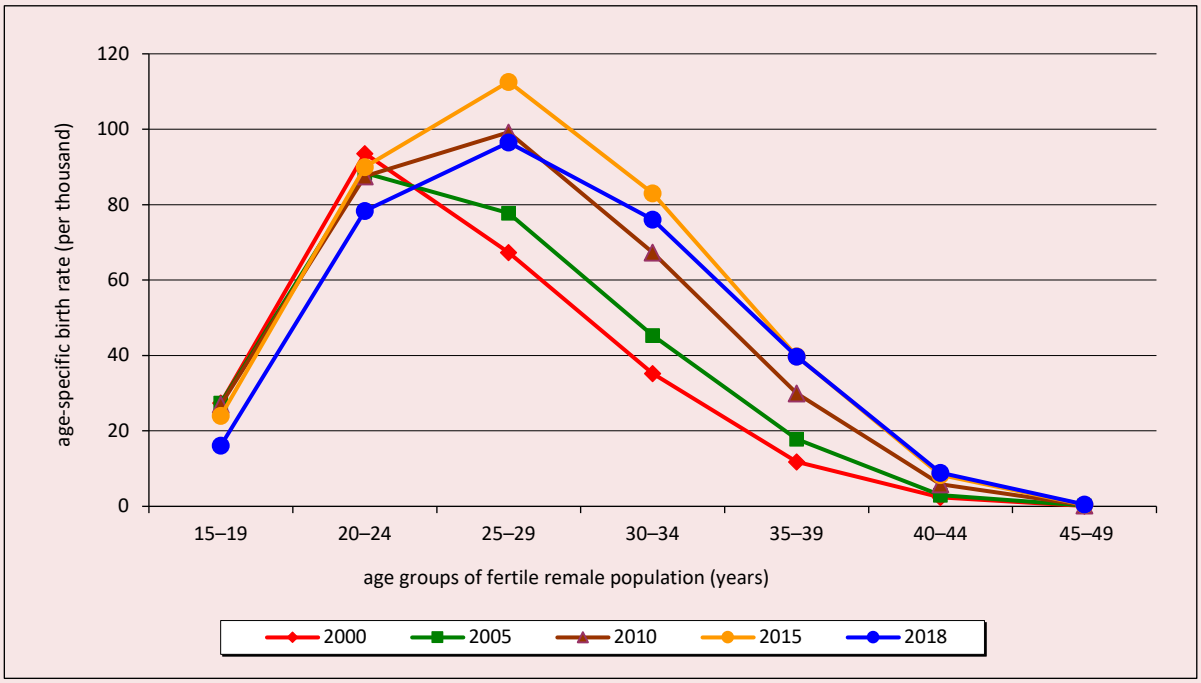
The leading factor in the transformation of the reproductive behavior of women in Russia is the changes of the age distribution of fertility *(Fig. 2)*.

If, in 2000, the highest birth rate differed in the most biologically productive group (20–24 years) amounting to 93.6 live births per 1000 women, then, by 2005, this indicator in this age group dropped to 88.4.

In 2010, there was a transition of the maximum birth rate from the group of women aged 20–24 years to the age of 25–29. The birth rate in initially leading age group of 20–24 years was 87.5‰, while it was 99.2‰ in the group of 25–29 years.

Five years later, in 2015, along with crude birth rate increase and increase of the birth rate per woman, there was a clear growth in the age-specific rate in the group of women aged 25–29 years from 99.2 to 112.6‰. At the same time, there is the increase of the birth rate in neighboring age groups. Thus, in the group of 20–24 years, the birth rate increased by 2.5‰ in comparison with 2010, amounting to 90 births per 1000 women, and in the group of 30–34 years – by 15‰ (83 births per 1000 women).

Figure 2. Dynamics of age-specific birth rates in the Russian Federation, 2000–2018



Source: *Demographic Yearbook of Russia. 2002, 2005–2019: Stat. Coll.* Rosstat. M.: Federal State Statistics Service, 2002, 2005–2019.

In our opinion, this redistribution of the birth rate is related to two factors:

1. Realization of deferred reproductive plans of the female population at a later age. It is mainly about first births.

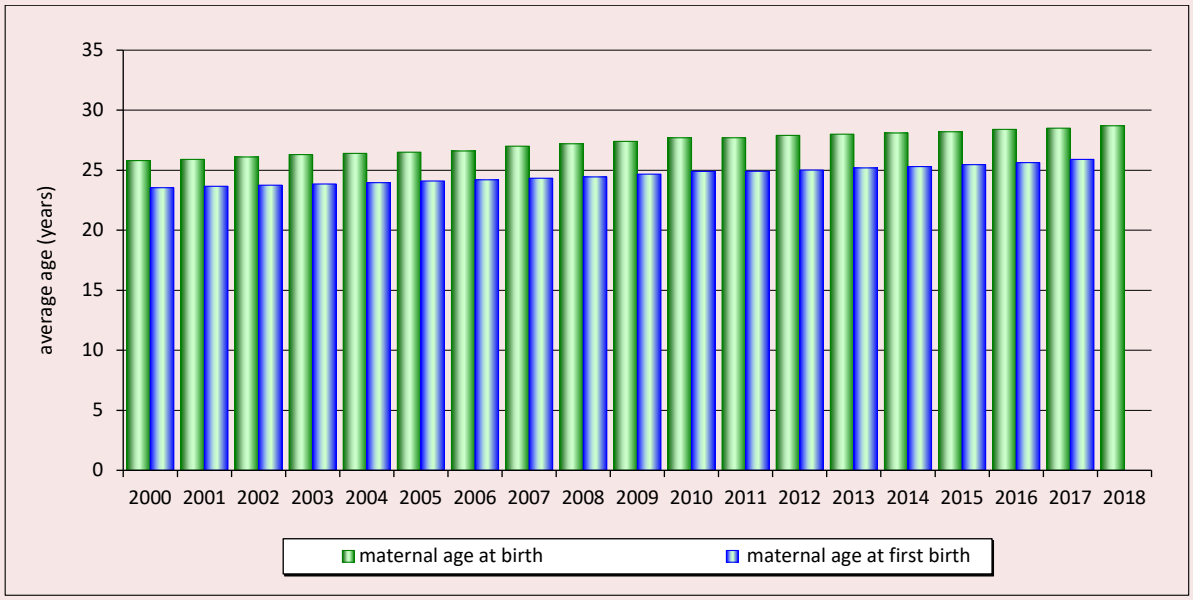
2. Birth of second and subsequent children, i.e. it is worth speaking about the fullness of reproductive plans, which was contributed to a certain degree by the state pronatalist policy, which flourished and had the greatest impact in the second decade of this century.

At the end of the study period (2018), as well as in 2015, the main birth concentration occurred at the age of 25–29 years (96.5%), and, in the neighboring ages, birth rates were approximately at the same level (78.4% at the age of 20–24 and 76.1% at the age of 30–34). However, in 2018, the birth rate in these three age groups was significantly lower than in 2015, due to changes in the age structure of female population.

Changes related to the transformation of patterns of birth rate and women's reproductive behavior affected such important indicators as an average maternal age at birth of children and average maternal age at first birth. A characteristic feature of their dynamics since the beginning of the 21st century has been their stable growth, indicating the postponement of motherhood to a later age *(Fig. 3)*.

Thus, since 2000, the average maternal age at birth has risen to 28.7 years (in 2018) and at first birth – to 25.9 years. The average maternal age has increased by almost 3 years since the beginning of the study period. The average maternal age at first birth, i.e. the age at which 50% of first child births occurred in a given year, increased from 23.5 to 25.9 years (the growth was 2.4 years). These indicators correspond to age-specific birth rates and confirm the transition of Russian women to a new reproductive behavior model.

Figure 3. Dynamics of the average maternal age at birth of children and at first birth in the Russian Federation, 2000–2018



Source: *Demographic Yearbook of Russia. 2002, 2005–2019: Stat. Coll.* Rosstat. Moscow: Federal State Statistics Service, 2002, 2005–2019.

As a result, at the beginning of the 21st century in Russia, there is a significant transformation of birth rate and reproductive behavior patterns of female population. Conditionally, three types of such patterns can be distinguished that significantly differ from each other.

The first pattern is typical for the period from 2000 to 2005. Its main features are:

– growth of a number of births from 1.2 million to 1.4 million: increase of the crude birth rate from 8.7 to 10.2% and a very slight increase of the total birth rate from 1.19 to 1.29 births per woman of fertile age;

– rather high birth rate intensity (up to 27.4%) in the youngest group of fertile women aged 15–19;

– strongly pronounced peak of births in the group aged 20–24 (93.6% in 2000 and 88.4% in 2005) and a sharp drop of birth intensity after the peak;

– very low birth rates in the second phase of a woman's reproductive life, namely at the ages of 35–39, 40–44, and 45–49;

– maternal average age at first birth increased from 23.5 to 24.1 years, which is consistent with the peak of age-specific birth rates.

The patterns reflect typical features of the second demographic transition. In this period, many researches note the increase of a number and percentage of informal marriages and gradual replacement of abortion with contraception, which demonstrates the change of reproductive behavior in terms of planning the child birth[4]. The birth rate level, even with a slight increase, is well below the level needed to replace generations. A low total birth rate and the increase of an average maternal age at birth can be explained by the theory of rational choice and the theory of consumer behavior in the key intelligent design of the socio-economic conditions for birth and upbringing of children.

The second birth rate and reproductive behavior pattern is typical for the longest period from 2006 to 2015. Its characteristic features are:

– growth of birth number up to 1.9 million; growth of the crude birth rate up to 13.3%, significant increase of the total birth rate from 1.30 to 1.77 births per a fertile woman;

– decrease of birth intensity in women of the youngest fertile group at the age 15–19 up to 24%;

– disappearance of strongly pronounced peak birth rate at the age of 20–24, which is replaced by concentration of births in two age groups: 20–24 and 25–29 years;

– by 2015, the peak birth rate fell on the age of 25–29 (112%), when, in the neighboring age groups, the birth rate is distributed relatively equally; 20–24 years – 90% and 30–34 years – 83%;

– the beginning of delayed first births and the birth of second and subsequent children coincides with the entry into the intensive reproductive women's period born in the 1980s, as well as with the realization of demographic policy, which leads to the increase of birth intensity;

– sharp increase of birth rate by one and a half to two times in the second phase of the reproductive women's cycle aged 35–39, 40–44, and 45–49, which is associated with the spread of assisted reproductive technologies.

[4] *Population of Russia, 2005. Thirteen Annual Demographic Report*, Executive editor S.V. Zakharov; National Research University "Higher School of Economics", 2007. Pp. 40–125; A.R. Mikheeva, *Marriage, Family, Parenthood: Social and Demographic Aspects*. Novosibirsk State University Novosibirsk, 2001. Pp. 74.

The economic component of the theory of rational choice and the theory of consumer behavior is shown in the second type of birth rate and reproductive behavior patterns of female population. In our opinion, this is largely facilitated by the realization of pronatalist policy. Birth of a child, especially of a second and third, significantly affects the family financial situation and a possibility of improving housing conditions. It is through the economic component that reproductive plans are implemented in relation to a number of children in a family. In this pattern, the theory of child value most clearly appears through increase in the birth rate in older age categories. In older age groups of fertile women, the economic component fades into the background, as they already have relatively solid material resources and certain career achievements, and therefore the leading factor is the axiological and psychological motives that contribute to making decisions on a child birth.

The third pattern of the birth rate and reproductive behavior is typical for the period from 2016 to the present. Its main features are:

– decreasing number of births to 1.6 million, the crude birth rate to 10.9%, drop of the total birth rate to 1.58 births per woman of reproductive age, which coincides with the level of 2011;

– natural potential represented by women born in the 1980s has almost completely exhausted itself. At the same time, there is a shift of child birth to a later age, which is expressed through a noticeable decrease of the birth rate in the age group of 15–19 from 24 to 16.1‰;

– the concept of "conscious motherhood" became common; as in the second reproductive behavior model, birth concentration falls on three age groups: 20–24, 25–29, and 30–34 years with a peak at the age of 25–29 years, but the birth intensity in these age groups is significantly lower than in the second type of model;

– birth rate level in older reproductive ages remains persistently high;

– average maternal age at birth and an average maternal age at first birth reach their maximum values (28.7 and 25.9, respectively).

The third type of reproductive behavior patterns shows all the features described in the theory of the second demographic transition and the theory of the value of the child, i.e. it is worth speaking about complete change in the regime of population reproduction. Women's personal preferences come to the foreground in the context of getting an education, building a career, and starting a family. The main factor of child birth becomes the rational behavior of families or mothers, which is emphasized in the theories on consumer behavior and rational choice.

In our opinion, decrease in both absolute and relative birth rates should be expected in the near future. The highest birth concentration will occur in the 25–29 and 30–34 age groups; the spread of assisted reproductive technologies is likely to ensure a stable birth rate in older age groups of women. It also makes sense to speak about the continued growth of an average maternal age at child birth and at first birth.

Discussion

Summing up the transformations of reproductive behavior patterns of female population, it is worth emphasizing the main features inherent in the new behavior pattern:

1. Cardinal reconstruction of women's values in favor of one or two-child family hoping to provide their children with a decent living

standards and good education. This transformation is confirmed by a low total birth rate.

2. Orientation of female population to education, high social status, and economic independence. As a result, there is a gradual shift in age-specific birth rate to the second half of women's fertile age.

3. The average motherhood age increases in Russia, which reflects women's preference to create conditions for their economic, social, and cultural independence.

The question remains open: what is the influence measure of economic, social, and axiological factors on reproductive behavior in a particular historical period? The answer to the question will allow evaluating and adjusting measures of the state demographic policy. In our opinion, consideration of only economic and social aspects in attempting to increase the birth rate is insufficient and fundamentally contradicts the reproductive behavior concept, as any behavior is based on axiological, i.e. value factor. It is the combination of all the factors that will help to understand the reproductive behavior mechanism and, consequently, regulate it. Such views are noted in the works of the Ural Demography School. Thus, A.I. Kuzmin noted that the spread of childlessness was associated with the weakening of the economic substance, the strengthening of a value birth rate aspects and family formation [19; 20].

Conclusion

Reproductive behavior transformations in Russia show that population has adaptation mechanisms to a new socio-economic reality, and they are an integral part of demographic development at this historical stage. The whole set of changes not only affects the problems of demographic nature but also determines the future socio-economic and cultural development of the country.

In spite of the dependence on traditions, tendencies in the reproductive behavior development in Russia are also affected by the general influence of the processes of globalization and increasing individualism of population. In this case the socio-economic component is a catalyst for these changes and their consequence.

State demographic policy without transformation of reproductive and marital-family behavior models may not only be inefficient in long term but also lead to formidable obstacles in development of Russian society.

As a result of our research, we proved the necessity to consider the birth rate and reproductive behavior patterns from the point of view of an interdisciplinary approach. It is the interdisciplinarity and usage of the main guidelines of the selected demographic and socio-economic theories that represent an element of scientific novelty and serve as the basis for deeper and more comprehensive study of birth rate and reproductive behavior. Our proposed approach can be used to enrich the theoretical base of future research in the field of birth rate. In practical terms, the results of the work can be used by scientific community as a material for more detailed issue consideration related to birth rate and reproductive behavior transformation and serve as a source of knowledge for the authorities in improving demographic policy measures and making management decisions aimed at improving the demographic situation in the country as a whole and in its entities.

References

1. Arkhangel'skiy V.N. *Faktory rozhdaemosti* [Fertility Factors]. Moscow: TEIS, 2006. 399 p.
2. Arkhangel'skiy V.N. Reproductive and marriage behavior. *Sotsiologicheskie issledovaniya=Sociological Studies*, 2013, no. 2, pp. 129–136 (in Russian).
3. Arkhangel'skiy V.N. Studying fertility issues. *Uroven' zhizni naseleniya regionov Rossii=Living Standards of the Population in the Regions of Russia*, 2008, no. 3–4, pp. 80–93 (in Russian).
4. Arkhangel'skiy V.N. The influence of the subjective assessment of living standards on the reproductive behavior. *Uroven' zhizni naseleniya regionov Rossii=Living Standards of the Population in the Regions of Russia*, 2011, no. 8, pp. 36–41 (in Russian).
5. Roshchina Ya.M., Boikov A.V. *Faktory fertil'nosti v sovremennoi Rossii* [Fertility Determinants in Modern Russia]. Moscow: EERC, 2005. 64 p.
6. Kalachikova O.N. Shabunova A.A. *Reproduktivnoe povedenie kak faktor vosproizvodstva naseleniya: tendentsii i perspektivy* [Reproductive behavior as a factor of population reproduction: Trends and prospects]. Vologda: ISERT RAN, 2015. 172 p.
7. Kalachikova O.N. Some aspects of students' reproductive behavior. *Vysshee obrazovanie v Rossii=Higher Education in Russia*, 2012, no. 3, pp. 132–136 (in Russian).
8. Van De Kaa, D. The Idea of a Second Demographic Transition in Industrialized Countries. In: *The Sixth Welfare Policy Seminar of the National Institute of Population and Social Security, Tokyo, Japan, 2002.* Available at: https://scinapse.io/papers/2185048759 (accessed: 26.05.2020).
9. Van De Kaa, D. Is the second demographic transition a useful research concept: Questions and answers. In: *Vienna Yearbook of Population Research, 2004.* DOI: 10.1553/populationyearbook2004s4 (accessed: 27.05.2020).
10. Vishnevskiy A.G. *Demograficheskaya revolyutsiya. Izbrannye demograficheskie trudy. T.1. Demograficheskaya teoriya i demograficheskaya istoriya* [Demographic Revolution. Selected Demographic Works. Vol. 1. Demographic Theory and Demographic History]. Moscow: Nauka, 2005. 214 p.
11. Becker G.S. An economic analysis of fertility. In: *Demographic and Economic Change in Developed Countries.* Editor: Universities-National Bureau, 1960. Pp. 209–240. Available at: https://www.nber.org/chapters/c2387.pdf (accessed: 27.05.2020).
12. Wachter K.W., Bulatao R.A. Offspring: Human fertility behavior in biodemographic perspective. In: *National Research Council. Panel for the Workshop on the Biodemography of Fertility and Family Behavior.* Washington, DC: The National Academies Press. 2003. 400 p.
13. Becker G.S. *The Economic Way of Looking at Life.* University of Chicago Law School Chicago Unbound. 1993. 31 p.
14. Mcdonald P. Gender equity, social institutions and the future of fertility. *Journal of Population Research,* 2000, no. 17, pp. 1–16. DOI: 10.1007/BF03029445. Available at: https://www.researchgate.net/publication/225763511_Gender_Equity_Social_Institutions_and_the_Future_of_Fertility (accessed: 27.05.2020).
15. Michael R.T., Becker G.S. On the new theory of consumer behavior. *The Swedish Journal of Economics*, 1973, vol. 75 (4), pp. 378–396. Available at: http://blog.wbkolleg.unibe.ch/wp-content/uploads/MichaelBecker1973_On-the-New-Theory-of-Consumer-Behavior.pdf (accessed: 27.05.2020).
16. Gurko T.A. *Teoreticheskie podkhody k izucheniyu sem'i* [Theoretical approaches to family studies]. Moscow: Institut sotsiologii RAN, 2010. 184 p.
17. Hoffman L.W. The Value of Children to Parents and the Decrease in Family Size. In: *Proceedings of the American Philosophical Society*, 1975, vol. 119(6), pp. 430–438. Available at: https://www.jstor.org/stable/986377?seq=1
18. Friedman D., Hechter M., Kanazawa S. A theory of the value of children. *Demography*, 1994, no. 31, pp. 375–401. Available at: https://doi.org/10.2307/2061749
19. Kuz'min A.I., Kuz'mina A.A., Lanskikh V.N. The influence of the deformation of the institution of the family on the demographic behavior of the population in the Ural Federal District. In: *Instituty razvitiya demograficheskoi*

sistemy obshchestva: V Ural'skii demograficheskii forum: sbornik materialov [Development Institutions of the demographic system of society: Fifth Ural Demographic Forum: A collection of materials]. Ekaterinburg: Institut ekonomiki UrO RAN, 2014. Pp. 74–91 (in Russian).

20. Kuz'min A.I. Socio-economic factors of fertility in light of the concept of demographic transition. *Uchenye zapiski Zabaikal'skogo gosudarstvennogo universiteta=Scholarly Notes of Transbaikal State University*, 2013, no. 4 (51), pp. 62–69 (in Russian).

Information about the Authors

Olga A. Kozlova – Doctor of Sciences (Economics), Professor, Head of the Center, Institute of Economics, Ural Branch of Russian Academy of Science (29, Moskovskaya Street, Yekaterinburg, 620014, Russian Federation; e-mail: Olga137@mail.ru)

Olga O. Sekitski-Pavlenko – Leading Economist, Institute of Economics, Ural branch of Russian Academy of Science (29, Moskovskaya Street, Yekaterinburg, 620014, Russian Federation; e-mail: pavlenko_ola@mail.ru)

Received July 15, 2020.

DOI: 10.15838/esc.2020.5.71.14
UDC 314.74; LBC 60.7

Structure of International Migration of Researchers. Case Study of Russia*

Vadim A.
MALAKHOV
S.I. Vavilov Institute for the History of Science and Technology, Russian Academy of Sciences
Moscow, Russian Federation, 14, Baltiyskaya Street, 125315
E-mail: yasonbh@mail.ru
ORCID: 0000-0001-6656-1036; ResearcherID: R-7336-2016

Irina N.
VASIL'EVA
Russian Research Institute of Economics, Politics and Law in Science and Technology
Moscow, Russian Federation, 20A, Dobrolubova Street, 127254
E-mail: i.vasilyeva@riep.ru
ORCID: 0000-0002-5602-5237

Filipp D.
BELOV
Russian Research Institute of Economics, Politics and Law in Science and Technology
Moscow, Russian Federation, 20A, Dobrolubova Street, 127254
E-mail: fdbelov@yandex.ru
ORCID: 0000-0003-1725-6873; ResearcherID: AAI-7161-2020

* The article is prepared within the RIEPL state assignment no. 075-01402-20-01, dated March 16, 2020, on the topic "Organizational, technical, scientific and methodological provision for analyzing the experience and opportunities of using the potential of foreign scientists, including scientists-compatriots working abroad, for development of the scientific and technical sphere in Russia".

For citation: Malakhov V.A., Vasil'eva I.N., Belov F.D. Structure of international migration of researchers. Case study of Russia. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 232–246. DOI: 10.15838/esc.2020.5.71.14

Abstract. In modern conditions, processes of international migration of researchers affect the level of countries' development and competitiveness. To develop and implement a national science policy that would be adequate to the challenges, it is necessary to objectively understand the structure of international migration flows of researchers. The purpose of the work is to identify and analyze the structure of scientists' migration, as well as to explain it using the case study of Russia. The authors conducted a comparison of gender distribution among Russian researchers, affiliated with foreign scientific organizations, by scientific area and countries where they relocated. Data on Russian scientists are compared to data on foreign scientists who came to Russia. Information on Russian scientists, who moved abroad, was taken from the Web of Science bibliometric database, and data on foreign scientists who visited Russia was obtained after conducting a survey among employees of Russian universities and scientific organizations. The gender, geographical, and disciplinary structure of migration of Russian researchers abroad and foreign scientists to Russia is revealed. It is determined that, among Russian scientists, representatives of natural sciences (mostly mathematics and physics) are the ones who are involved the most in processes of international circulation of scientific personnel. The share of women among scientists, who migrated abroad, is lower than among those who stayed in Russia. It is shown that such gender and disciplinary structure of scientists' migration is not a unique feature of Russian science. Several possible explanations for the existing structure of international migration of researchers are proposed: high demand for Russian physicists and mathematicians on the international scientific labor market; uneven distribution of family obligations; and existence of cultural barriers, which restrict women in choosing potential countries for changing their place of work and residence, in some states. In the future, the bibliometric approach, used by the authors, may be applied to the assessment of the efficiency of public policy instruments aimed at developing international scientific cooperation and interaction with fellow scientists abroad.

Key words: gender inequality, circulation of scientific personnel, researchers, bibliometric approach, scientific career, international academic mobility, Russian scientific diaspora.

Problem statement and literature analysis

One of distinctive features of modern globalization era is an unprecedented level of international labor migration. High international mobility is especially typical for highly qualified specialists and scientists. Today, in many scientific disciplines, the level of involvement of a scientist in the international circulation of personnel becomes one of important signs of a successful academic career [1], and biographies of leading modern researchers contain records of work in universities and research institutes in various countries. It is not uncommon for researchers to grow up in one country, get a degree in another, and work in a third one. Despite the fact that, while moving abroad, scientists face a number of cultural barriers that can hinder development of an academic career [2], numerous studies indicate a positive correlation between the level of mobility and scientific performance, measured by a number of articles, citations, and participation in international scientific projects [3–6]. Now, international circulation of scientific personnel is not often seen as necessarily harmful to states which scientists leave. It may promote technological transfer and development of international scientific and technical cooperation between a recipient country and a donor country of scientists [7]. Diaspora connections become an important factor for

stimulating innovation and knowledge transfer. Networks of scientists-compatriots, which emerge abroad, function as some kind of a transfer mechanism that provides international knowledge exchange: this effect is particularly noticeable in high-tech industries [8]. After the collapse of the USSR, Russia faced the problem of mass intellectual emigration, and a Russian-speaking scientific diaspora was formed in Western countries, whose potential can be used for development of the domestic scientific and technical sphere [9; 10].

To better understand causes and consequences of intellectual migration, as well as to create efficient mechanisms for interaction with scientific diaspora, it is necessary to have a clear understanding of the migration structure (geographical, disciplinary, gender, age). At the same time, in Russia and abroad, official statistical sources do not provide a reliable picture of a size and directions of researchers' migration flows [11]; therefore, the bibliometric method of assessing migration flows of scientists and identifying its structure becomes more popular among scientific researchers. By analyzing information about affiliations of authors of scientific articles, collected in bibliometric databases like Scopus or Web of Science (hereinafter – WoS), it is possible to track movements of researchers between organizations and countries [12]. In recent years, Russia has also started to use the method of bibliometric analysis to identify main migration patterns of Russian scientists [13; 14]. However, most of the works using this method only affected a certain part of Russian researchers: for example, representatives of a particular scientific branch [15] or employees of a particular university [13]. There are no works devoted to the study of the structure of international migration of all Russian scientists.

The gender and age structure of migration remains poorly studied. Due to a lack of data on authors' age in international bibliometric systems, the age structure of migration of researchers is usually estimated by analyzing the results of questionnaire surveys [16]. The problem of women's participation in the processes of international circulation of scientific personnel was studied to a certain extent on a case study of scientists who visited Germany with short-term visits in the 1980s and 2000s [17]. One of the important problems that interests researchers is the impact of a family and children on the work of female scientists [18; 19]. Thus, the influence of family obligations on women researchers' international mobility is analyzed using emigration of computer scientists from former Soviet Union to the UK as an example. It is shown that, in general, academic career of female researchers, in comparison with their male colleagues, much more depends on family circumstances [20]. Another study analyzed the impact of government policies on women scientists' willingness to work abroad [21]. Researchers note that, despite a number of problems, due to public policies implemented in many European countries, the share of women actively involved in the processes of transnational circulation of scientific personnel has been growing in recent years. The existence of social, political, family, and economic barriers affects not only international mobility of female researchers but the level of their participation in international collaborations as well [22].

Our research is a continuation of a previous work, which was devoted to the analysis of the structure (primarily gender) of migration among Russian scientists [23]. Its purpose is the analysis of the structure of international mobility of Russian researchers, its comparison with data on foreign scientists who visited

Russia due to research activities in 2018, and explanation of reasons for the formation of such structure. Information about foreign researchers, who visited Russia, was obtained through a survey of employees of Russian universities and research organizations conducted by the Ministry of Science and Higher Education of the Russian Federation in March 2019.

Research methods and initial sample

The study analyzed several complementary data sets. Information sources about the disciplinary structure and the ratio of men and women among scientists working in Russia are statistical collections of Rosstat.

The analysis of the disciplinary and gender structure of international mobility of Russian researchers was carried out using a database on those who work or have worked in foreign scientific organizations and universities. The main method, used to form the database, was bibliometric analysis. There are two ways to search for information about authors in the WoS system.

First, a sample of articles of one author was compiled for 2008–2017. The author was included in database if he had at least two affiliations during a specified period: one – with a Russian scientific organization (Research Institute or University), the other – with a foreign one. In this case, a foreign affiliation indicates that a scientist moved to another country (including temporary residence abroad). It is worth mentioning that often, even after they move abroad and start working at foreign universities, researchers continue to indicate their Russian affiliation in their articles.

Second, articles with two authors, published in collaboration with Russian scientists, were selected. As a rule, scientists who moved abroad maintain working relations with their colleagues who stayed in Russia, continuing to carry out joint publications. Co-authors who had Russian surnames (ending with -in, - ov, etc.) and affiliation with a foreign organization were considered members of the Russian scientific diaspora.

In addition, to supplement database, contact information of members of Russian scientific diaspora was collected from free sources (social networks, publications, etc.). At the final stage, database was expanded with information about fellow scientists obtained from a survey of employees of Russian universities and research institutions.

Information on each researcher was manually checked on the Internet, some repeated contacts were deleted (for example, the WoS system could count the author twice if his last name was transcribed differently in articles), a number of foreign scientists who had a Russian affiliation in 2008–2017 and accidentally got into database were identified and deleted.

Final database contains information on 2,865 Russian researchers who worked at foreign universities and research organizations. Among them, there are scientists who emigrated during the Soviet era and have virtually no contact with Russia, as well as researchers who worked abroad only temporary and currently return to their homeland. In this article, we use the terms "academic mobility", "circulation of scientific personnel", and "migration of researchers" interchangeably, applying them to all scientists: those who emigrated permanently or work abroad temporarily.

It should be noted that, in addition to Russian scientists themselves, the sample could include a certain number of researchers – representatives of post-Soviet countries who were affiliated with Russian universities and scientific institutions in 2008–2017, as well as

scientists who left the USSR before its collapse. We refer these groups to the "scientists-comrades" category.

Disadvantages of bibliometric analysis are the limited and inaccurate information provided in databases. For example, different transliteration variants of surnames used by authors in different articles make it difficult to calculate accurately. A unique internal identification number is intended to solve this problem, but not all researchers, whose articles are indexed by WoS, have it. In addition, the sample may not include scientists who moved abroad at the beginning of their academic career and did not have a WoS publication with a Russian affiliation, as well as those who adhere to an atypical publication strategy (not publishing in journals indexed in WoS). First of all, it applies to representatives of humanities (since humanitarian journals are not as widely represented in the WoS database as natural science journals). However, in comparison with other methods of identifying scientists-compatriots (for example, search on university pages, etc.), bibliometric analysis allows covering the largest possible sample of scientists working abroad.

All researchers, selected according to this principle, were sorted by gender, scientific areas, and countries where they worked. After that, a comparative analysis of obtained groups was performed. In situations when the author's affiliation changed in relation to institutions of different states (other than Russia), the last one was chosen for analysis. All scientific disciplines are grouped according to the broad OECD classification[1]. If researchers wrote articles in various scientific fields, areas where they had the largest number of publications were taken into account.

The technology for collecting information about Russian scientists, involved in international academic migration, can be mathematically represented as the sum of samples in the following areas:

$$SRS_{rus.scient.} = SLT_{1aut} + SLT_{2aut} + RusD_{open.srs} + CompScient_{surv},$$

where:

$SRS_{rus.scient.}$ – sources of the 1st direction analysis (Russian scientists);

SLT_{1aut} – articles with one author;

SLT_{2aut} – articles with two authors in collaboration with Russian scientists;

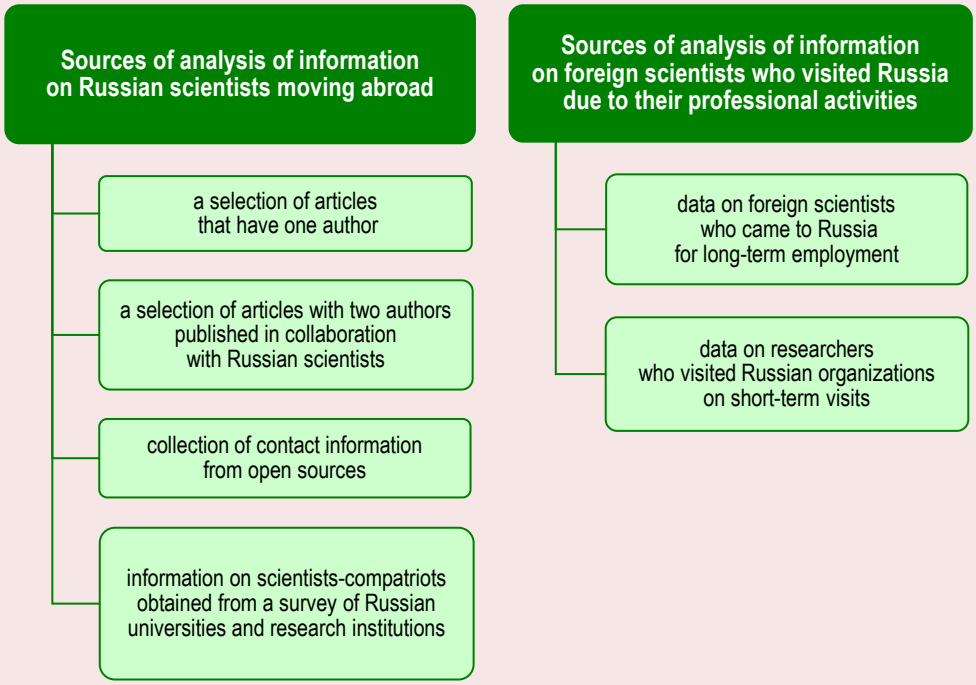
$RusD_{open.srs}$ – information on members of Russian scientific diaspora from open sources;

$CompScient_{surv.}$ – information about scientists-compatriots obtained from a survey of employees of Russian universities and research institutions.

Information about foreign scientists who visited Russian universities and research organizations in 2018 was obtained as a result of a survey of employees of Russian universities and research institutions conducted in March 2019. It was carried out by sending requests to 864 Russian organizations in order to collect and then analyze statistical data. Responses were received from 441 organizations: 153 universities and 288 research institutions. Information contained general data about foreign scientists; countries and organizations from where they came from; scientific direction of their activities. Responses provided data on foreign scientists who came to Russia for long-term employment and researchers who had short-term visits in Russian organizations (speeches at conferences, readings of short lecture courses and seminars, helding studies).

[1] The scheme of correspondence between the classification of Web of Science and OECD scientific disciplines is given on the WoS website. Available at: http://help.prodincites.com/inCites2Live/filterValuesGroup/researchAreaSchema/oecdCategoryScheme.html

Figure 1. Technology and features of information collection concerning Russian and foreign scientists for comparative analysis



In addition to actual foreign scientists, responses contained information about members of Russian scientific diaspora who visited an organization in 2018.

All research fields, where scientists worked in, were grouped into six areas according to the broad OECD classification. In addition, all researchers were sorted by gender. If it was impossible to determine the gender according to the first and last name, information search was carried out in open sources. Data on scientists whose gender could not be determined were not analyzed. Final list of foreign scientists, who visited Russian universities and research organizations in 2018, contains 5,970 entries. It was analyzed to identify patterns of international academic mobility of foreign scientists in Russia depending on gender, country of departure, and scientific field.

In the second direction (analysis of foreign scientists who visited Russia as part of their professional activities), the method of collecting information may be presented as a sum:

$$SRS_{for.scient.} = ForScient_{long\text{-}t} + ForScient_{short\text{-}t},$$

where:

$SRS_{for.scient}$ – sources of analysis of the 2nd direction (foreign scientists);

$ForScient_{long\text{-}t}$ – data on foreign scientists who came to Russia for long-term employment;

$ForScient_{short\text{-}t}$ – data on researchers who visited Russian organizations on short-term visits.

Information about foreign scientists was obtained by sending requests to Russian organizations for the purpose of collecting and analyzing statistical data.

Thus, the technology for collecting information for analysis in two directions is schematically presented in *figure 1.*

At the final stage of the analysis, data on Russian and foreign scientists were combined, and both groups were sorted by several criteria. Thus, the dependence across Russian researchers will be:

$$SRS_{rus.scient}^{sort} = (SLT_{1aut} + SLT_{2aut} + RusD_{open.srs} + CompScient_{surv})^{gend,count,disc},$$

where:

$SRS_{rus.scient}^{sort}$ – sorted sources of the 1st direction analysis (Russian researchers).

The sorting of Russian scientists was carried out in three directions: gender, countries, and scientific disciplines.

The sorting of foreign scientists was carried out in two directions: gender and scientific disciplines:

$$SRS_{for.scient}^{sort} = (ForScient_{long\text{-}t} + ForScient_{short\text{-}t})^{gend,disc},$$

where:

$SRS_{for.scient}^{sort}$ – sorted sources of the 2nd direction analysis (foreign scientists).

In general, the sorting of both groups (Russian scientists affiliated with foreign scientific organizations, and foreign scientists who visited Russia in 2018) can be presented as follows:

1) by gender;
2) by countries where researchers worked;
3) by scientific disciplines (according to the OECD classification).

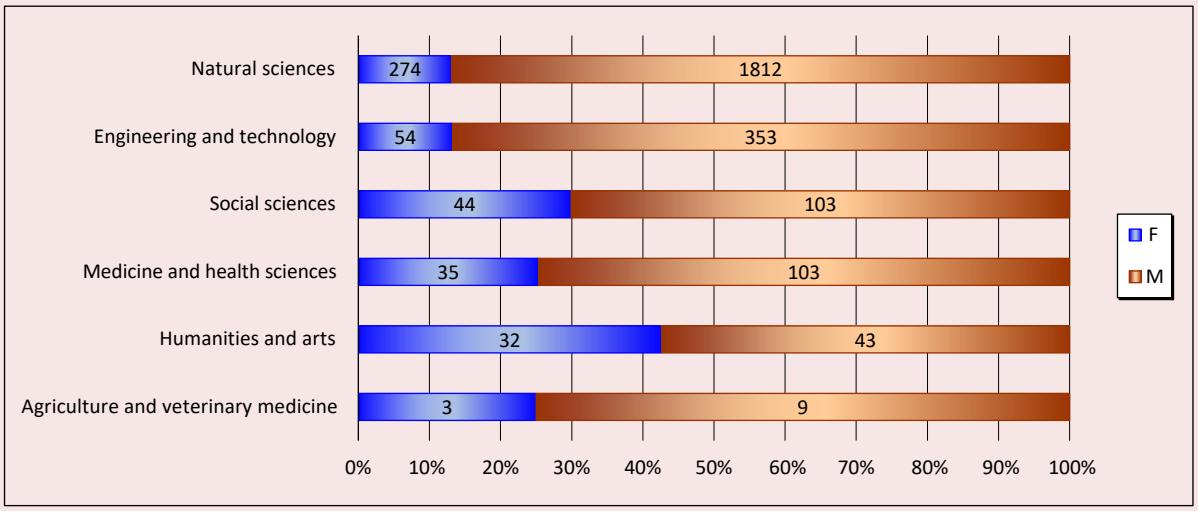
At the final stage of the study, a comparative analysis of two databases was carried out: Russian scientists who went abroad, and foreign scientists who visited Russia. This made it possible to compare the migration flows of scientific personnel sent to and from Russia within the gender and scientific areas. At the same time, the applied approach is limited by the fact that these databases were collected using different methodologies. The database on foreign researchers contains information about all scientists who visited Russian organizations in 2018 (including short-term visits), the database on Russian scientists includes information about researchers who went abroad for a long period and had a foreign affiliation.

Results of the research

As a result of bibliometric analysis and data search in open sources, 2,865 Russian scientists affiliated with foreign scientific organizations and universities were identified, only 15% of them (442 scientists) were women. At the same time, according to Rosstat data for 2016, the share of women in a number of researchers working in Russia is about 40%. These results generally confirm the conclusions of previous studies based on data from other countries about a low level of international mobility of female researchers in comparison with their male counterparts [17].

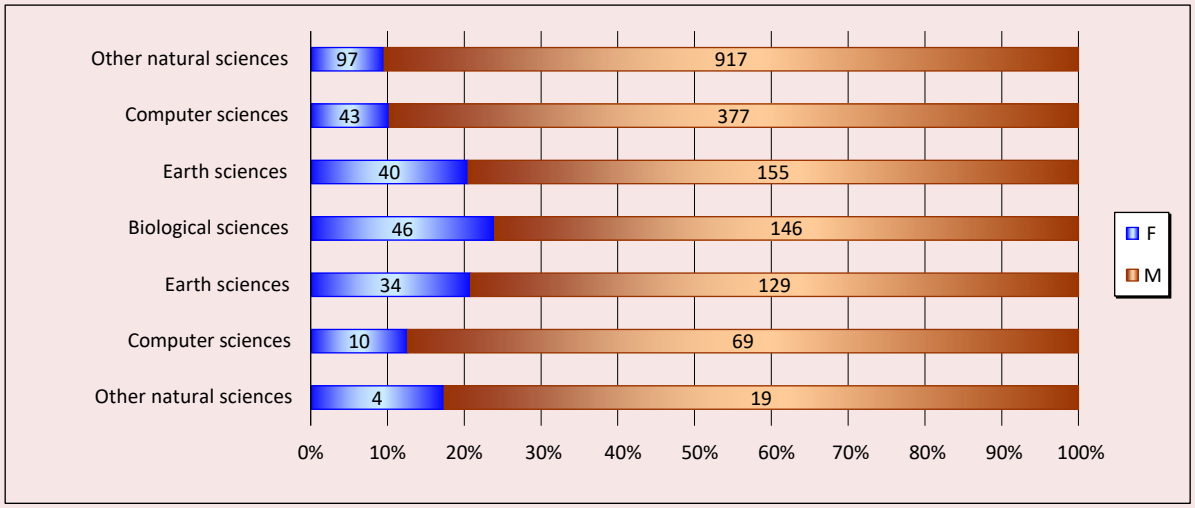
If we discuss the distribution of scientists-compatriots in scientific areas, an absolute majority of them study natural sciences (more than 70% of them). Then, engineering (about 14% of Russian scientists), social (about 6%), medical (less than 5%), humanities (about 3%), and agricultural (less than 1%) sciences are presented. The greatest gender imbalance is observed in the most numerous areas – among representatives of natural and engineering sciences. The share of women in these categories of researchers is only 13%. The situation with gender imbalance is better among representatives of medical, social, and especially humanitarian sciences (*Fig. 2*). In nearly all industries, the share of women among migrated scientists is lower than the share of women among all those working in Russia. The exception is immigrants-representatives of humanities, among whom the share of women is approximately 40%, which corresponds to their share among all Russian researchers, but it is still inferior to the share of women among the representatives of humanities who stayed in Russia.

Figure 2. Distribution of scientists-compatriots participating in the international circulation of scientific personnel by scientific field and gender



If we divide the group of Russian scientists, studying natural sciences, into narrower areas (the second level of the OECD classification), we will see that nearly half of researchers (or a third of all Russian scientists) are physicists or astronomers, many are mathematicians, followed by those who study chemical, biological sciences, as well as Earth sciences and related environmental sciences. The greatest gender imbalance occurs among mathematicians and physicists (i.e. the most widely represented scientific fields), where the share of women is only about 10%, while this number exceeds 20%, out of migrated scientists-compatriots, among biologists, chemists, and people studying Earth sciences (*Fig. 3*).

Figure 3. Distribution of scientists-compatriots representing natural sciences by narrow scientific areas and gender



Most often, Russian scientists travel to the United States and developed countries in Western Europe (*Tab. 1*). Among Asian countries, only Israel is among top 10 countries in terms of a number of Russian scientists working there. The first four countries on the list of recipients of scientific personnel from Russia in relation to men and women are the same: the USA, Germany, France, and the United Kingdom (although the share of women in France is slightly higher than in the United Kingdom). More than 60% of Russian scientists were affiliated with these countries' scientific institutions. Then, there are some differences in the lists for men and women: the most noticeable one is a low proportion of women among Russian researchers who went to Israel (6 female scientists against 65 male scientists). In Sweden, Finland, and Poland, on the contrary, the share of women is higher than an average number (more than 20%). According to this data, as a result of the bibliographic analysis, Asian countries, even developed ones like Japan or South Korea, are chosen as a place of work by a relatively small number of scientific personnel: 47 scientists moved to Japan, 36 – to China, and 19 – to South Korea. This can be explained by the existence of certain cultural barriers. At the same time, the share of women among Russian researchers working in China is very low – 2 out of 36 people, which is also related to cultural characteristics of a recipient country.

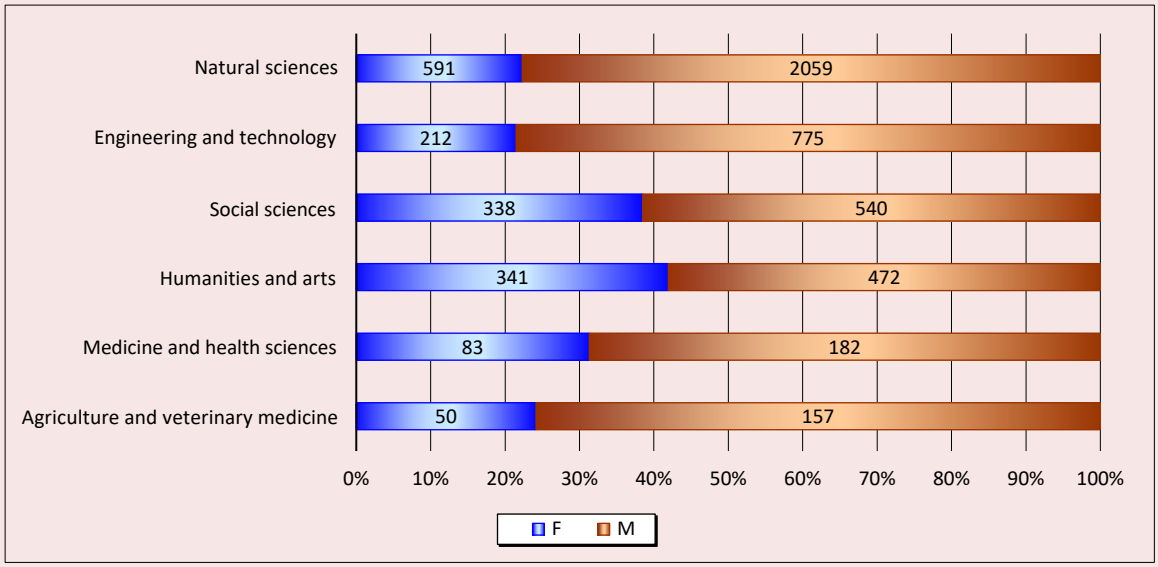
It should be noted that, in all countries where Russian scientists moved to, people who study exact sciences – primarily physics and mathematics – prevail. Among main recipient countries of Russian scientists, Finland, where the share of representatives of humanities and social sciences is high (more than 20% of Russian scientists who worked where in comparison with average 10% worldwide), stands out.

Among foreign researchers, who visited Russian universities and research organizations in 2018, 28% were women. Representatives of natural sciences formed the largest group (about 46%), followed by engineering (about 17%), social sciences (about 15%), humanities (about 14%), medical and agricultural sciences (about 4% for each group). It is interesting that, in comparison with Russian scientists who went abroad, among foreign scientists who came to Russia, the share of representatives of natural sciences is significantly lower, and the share of representatives of social sciences and humanities is significantly higher (*Fig. 4*).

Table 1. Distribution of Russian researchers participating in the international circulation of scientific personnel by gender and countries, where they relocated to

Countries	Women		Men		Total
	people	share, %	people	share, %	people
USA	88	13.0	591	87.0	679
Germany	81	15.3	450	84.7	531
Great Britain	37	14.0	228	86.0	265
France	43	16.2	222	83.8	265
Finland	15	20.0	60	80.0	75
Israel	6	8.5	65	91.5	71
Switzerland	11	15.9	58	84.1	69
Italy	8	11.6	61	98.1	69
Sweden	15	22.1	53	77.9	68
Canada	9	14.5	53	85.5	62
Other countries	129	18.1	582	81.9	711
Source: own compilation.					

Figure 4. Distribution of foreign scientists who visited Russian universities and research organizations in 2018 by scientific areas and gender



It corresponds to data on Russian scientists and shows that the situation with a significant gender imbalance in STEM-disciplines (Science, Technology, Engineering, and Math) is not unique for the Russian scientific community. At the same time, the share of women among foreign scientists who visited Russia in 2018 was higher than the share of women among scientists-compatriots working abroad.

As for the distribution of foreign scientists by countries they came from, it is worth noting that Germany, China, Belarus, and the United States are leaders. The share of women is highest among scientists from neighboring countries like Ukraine (86 out of 196), Kazakhstan (179 out of 408), Bulgaria (45 out of 107), Finland (42 out of 120), and the Republic of Belarus (189 out of 504).

Interpretation of the results

Among the countries that Russian scientists choose to work in, Western Europe and North America are most common. It could be explained by their high level of socio-economic development and the existence of certain cultural and linguistic barriers to the integration of Russian researchers in Asian societies.

The disciplinary structure of migration of Russian scientists abroad is dominated by people who study natural and engineering sciences (more than 85% of authors). This distribution of scientists-compatriots by discipline could be explained by several factors:

– Russian researchers who study natural (primarily physics and mathematics) and engineering sciences are traditionally in high demand on the international labor market: this is also confirmed by other studies [13];

– a low share of representatives of medical sciences is explained by the fact that, according to the OECD classification, many of them could be attributed to representatives of natural (biological) sciences;

– a low share of representatives of humanities may be caused by relatively low representation of humanitarian journals in the WoS system and, as a result, non-inclusion of a number of Russian researchers in this area in our sample.

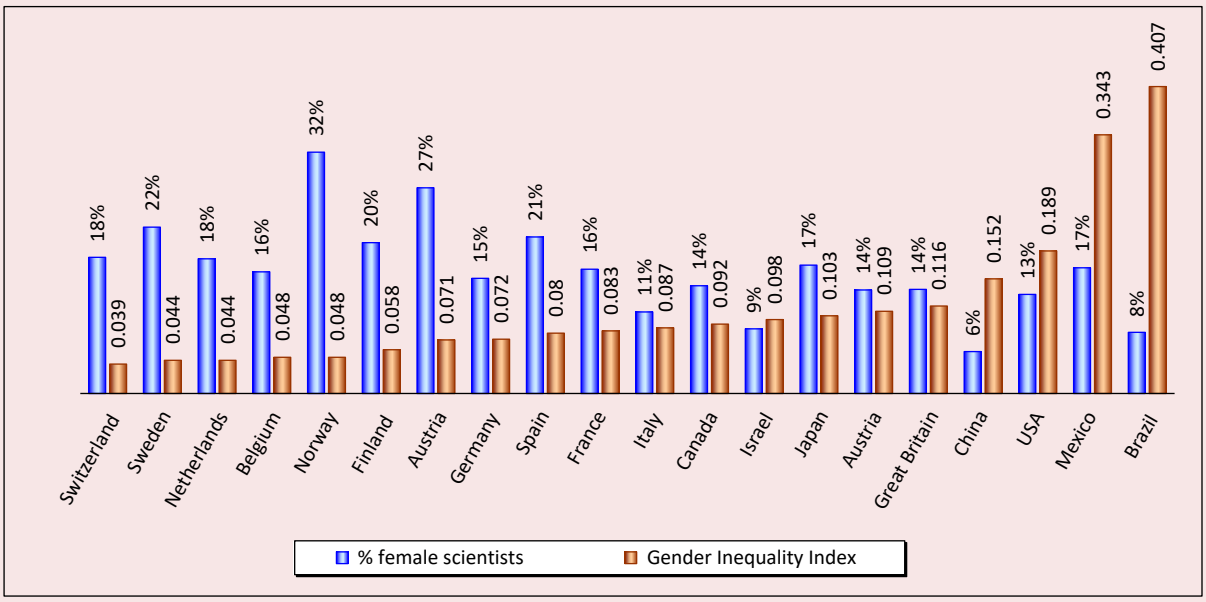
A significant gender imbalance among scientists-compatriots, affiliated with foreign universities and research organizations, may be caused by several factors. One possible hypothesis, explaining the inequality, is that women more than men depend on circumstances which make international mobility difficult, such as a family and children.

The research results on the impact of marriage on academic career development show that marriage often hinders successful development of women's academic careers, while it has a simultaneous positive impact on male scientists' careers [24]. This is due to asymmetrically distributed family obligations and existing social stereotypes. Unfortunately, analyzed databases do not contain information about the marital status of scientists for us to confirm or refute this hypothesis.

The second hypothesis that explains the greater international mobility of Russian male researchers, in comparison with women, is the presence of certain socio-cultural features in some countries. For example, a higher, compared to Russia, level of gender discrimination may not affect the decision of a male researcher, but it may limit options for abroad employment for a woman. The existence of social and cultural barriers that prevent women from finding employment in foreign scientific institutions may be seen not only in certain countries but in scientific disciplines or scientific schools established in specific organizations [17].

Let us analyze the database to test this hypothesis. It may be assumed that the lowest share of women is among fellow scientists who work in Muslim countries, which are traditionally characterized by a high level of gender inequality. We have data on five such countries: Turkey, Qatar, Kuwait, Pakistan, and Saudi Arabia. All the fellow scientists who worked there were men. Their total number was too small (14 people), and it could not significantly affect overall statistics, and the absence of women may be explained

Figure 5. Distribution of countries with the largest number of Russian-speaking scientists by the share of female scientists and Gender Inequality Index



by a statistical error. In order to reduce the significance of such errors, we will analyze only the countries with more than 30 cases of researchers' visits. If we divide the countries where Russian-speaking scientists move to according to the UN Gender Inequality Index (hereinafter – GII), it is possible to notice that the share of female scientists correlates with a value of the index. *Figure 5* shows 20 countries with the largest number of Russian-speaking scientists (according to the bibliometric analysis), allocated according to GII.

It may be noted that, in 8 countries out of top ten (except Belgium and Germany), the share of female scientists is higher or equal to an average number (18%). In all countries of the second ten, the share of female scientists is below average value. There is a negative correlation between the inequality index and the share of female scientists among all members of the Russian-speaking scientific diaspora in studied countries (the higher the inequality index, the lower the share of female scientists). It suggests that Russian-speaking female scientists who leave for countries with low GII have a great chance of self-realization in science. Thus, our hypothesis (socio-cultural characteristics of countries can influence Russian female scientists' choice of a place for immigration) was confirmed.

Finally, the third hypothesis that explains the gender imbalance in the international circulation of scientific personnel from Russia may be the fact that Russian scientists-representatives of exact sciences (physics and mathematics) are traditionally in most demand on the international labor market, and the share of women is lowest in these scientific disciplines. According to Rosstat, in 2015, only 40% of graduates of Russian universities, who were trained in physics and mathematics, were women, while 57% of graduates among all specialties were female, and the proportion of women who graduated from technical and engineering programs was even lower[2]. According to the bibliometric analysis, a number of women among STEM scientists who worked abroad is even lower – only 13%. Thus, this hypothesis is confirmed, and it explains a low share of women among all Russian scientists affiliated with foreign organizations, but it cannot explain why, in each individual scientific area, the share of women, involved in the international circulation of scientific personnel, is lower than among scientists working in Russia.

Analysis of the database on foreign scientists, who visited Russian universities and scientific organizations in 2018, showed that representatives of natural and engineering sciences also prevail among them, but their share in a number of foreign scientists coming to Russia is not as large as among Russian scientists going abroad. At the same time, the share of representatives of social sciences and humanities among foreign scientists is significantly higher. It could be explained by the existence of certain demand on the international market of scientific personnel and the difference in the methodology of information collection (the sample of foreign scientists includes all researchers who visited Russia, regardless of their publications in the WoS database).

Foreign scientists are also characterized by the gender distribution in scientific areas; the share of women in STEM-disciplines was significantly lower than in social and humanitarian fields. However, the share of women among foreign scientists was significantly higher than among Russian scientists in general and

[2] *Women and Men in Russia, 2016: Stat. Coll.* Moscow, 2016. Available at: https://www.gks.ru/bgd/regl/b16_50/Main.htm (accessed: March 10, 2020).

specific scientific areas. It is also related to peculiarities of data collection methodology: not only foreign scientists who came to Russia for employment, but also those who arrived in Russian scientific organizations and universities with short-term visits were taken into account. It could be assumed that it is easier for female scientists, even if they have a family and children, to decide on a short-term work trip abroad. At the same time, for long-term abroad employment, a family is a more significant obstacle for women than for men. To confirm this hypothesis, further research is required, since analyzed databases do not contain information about the marital status of scientists.

Conclusion

Thus, we tested the bibliometric approach for determining the structure of migration of Russian scientists. Data obtained were comparable to data on foreign scientists who visited Russia in 2018. It shows a high degree of objectivity of the bibliometric approach being a tool for determining the structure of intellectual migration. As a result of our research, we identified and interpreted the disciplinary, gender, and geographical structure of international migration of scientists with a case study Russia. It is proved that representatives of STEM-disciplines are in high demand on the international labor market (among Russian scientists, it primarily concerns physics and mathematics).

Our work clearly showed the existence of significant gender inequality in the global circulation of personnel in Russia. In comparison to men, female scientists are much less likely to choose foreign universities and research organizations as their places of work. This imbalance is typical for all academic disciplines, but it is especially noticeable in exact and engineering sciences, where the share of women is only about 13% among all Russian scientists who went to work abroad.

To explain gender inequality among Russian scientists affiliated with foreign scientific organizations and universities, we put forward three hypotheses:

1) Asymmetrically distributed family obligations that hinder successful development of academic careers for women scientists.

2) The level of gender inequality in some countries is higher than in Russia, which may be an obstacle to female scientists' employment.

3) High demand on the world labor market for Russian physicists and mathematicians, among whom the share of women is traditionally low.

By analyzing database on Russian scientists, we were able to confirm the second and third hypotheses, but further research, using methods such as questionnaires and in-depth interviews, is required in order to test the first hypothesis.

While analyzing database on foreign scientists who visited Russian universities and research organizations in 2018, it was revealed that the gender and disciplinary structure of international migration of scientists among Russian researchers generally corresponds to the structure of migration of their foreign colleagues. The landscape of gender inequality across scientific areas also barely depends on the country. The share of women among foreign scientists compared to their compatriots could be explained by the difference in the methodology for collecting information, as well as by the fact that, among foreign scientists who visited Russia, there were significantly more representatives of social and humanitarian sciences, which are less characterized by gender inequality. As for the geographical structure of scientists' migration, it is worth noting that Russian scientists mainly go to Western countries, while scientists, including

neighboring countries (CIS countries, Bulgaria, China) come to Russia. Therefore, in the regional measurement, Russia remains a significant scientific center of attraction.

The results, obtained in the course of the study, may be used to develop management decisions at the government level (creation and improvement of mechanisms for interaction with fellow scientists abroad) and at the level of specific scientific organizations and universities (creation of favorable working conditions for foreign scientists, including women with families).

The study showed the prospects of the bibliometric approach application to data analysis for applied socio-political sciences and the correctness of data, obtained with its help. In the future, the approach may be refined and used in combination with other methods to assess the efficiency of public policy instruments aimed at developing international scientific and technical cooperation (for example, the "Megagrants" program, international competitions of Russian scientific foundations, etc.).

Special thanks

The authors express their gratitude to their colleague Dmitriy Stanislavovich Pokrovsky for his assistance with editing the text of the article and valuable advice.

References

1. Ackers L, Gill B. *Moving People and Knowledge: Scientific Mobility in an Enlarging European Union*. Cheltenham: Edward Elgar Publishing, 2009. 273 p.
2. Antoshchuk I. The notion of diaspora knowledge network revisited: Highly skilled migrants forming a new invisible college. In: *Centre for German and European Studies (CGES) Working Paper WP 2018-10,* 2018. Available at: https://zdes.spbu.ru/images/WP_Antoshchuk_10.pdf
3. Fernández-Zubieta A., Geuna A., Lawson C. Mobility and productivity of research scientists. In: *Global Mobility of Research Scientists: The Economics of Who Goes Where and Why.* London: Academic Press, 2015. Pp. 105–131.
4. Petersen A.M. Multiscale impact of researcher mobility. *Journal of the Royal Society Interface*, 2018, 15: 20180580. DOI: https://doi.org/10.1098/rsif.2018.0580. Available at: http://rsif.royalsocietypublishing.org/content/15/146/20180580
5. Jonkers K., Tijssen R. Chinese researchers returning home: Impacts of international mobility on research collaboration and scientific productivity. *Scientometrics*, 2008, no. 77, pp. 309–333. DOI: https://doi.org/10.1007/s11192-007-1971-x
6. Franzoni C., Scellato G., Stephan P. The mover's advantage: The superior performance of migrant scientists. *Economics Letters*, 2014, vol. 122, no. 1, pp. 89–93. DOI: https://doi.org/10.1016/j.econlet.2013.10.040
7. Jöns H. 'Brain circulation' and transnational knowledge networks: studying long-term effects of academic mobility to Germany, 1954–2000. *Global Networks*, 2009, vol. 9, no. 3, pp. 315–338. DOI: https://doi.org/10.1111/j.1471-0374.2009.00256.x
8. Kerr W.R. Ethnic scientific communities and international technology diffusion. *The Review of Economics and Statistics*, 2008, vol. 90, no. 3, pp. 518–537. DOI: https://doi.org/10.1162/rest.90.3.518
9. Dezhina I.G., Kuznetsov E.N., Korobkov A.V., Vasil'ev N.V. *Razvitie sotrudnichestva s russkoyazychnoi nauchnoi diasporoi: opyt, problemy, perspektivy* [Development of Cooperation with the Russian-Speaking Scientific Diaspora: Experience, Problems, Prospects]. 2015, no. 23. Moscow: Spetskniga, 2015. 104 p.
10. Dushina S.A., Lomovitskaya V.M. Distinctive features of academic mobility in today's Russia. *Sociologia Nauki I Tehnologij=Sociology of Science and Technology,* 2013, vol. 4, no. 1, pp. 70–80.
11. Yurevich M.A., Malakhov V.A., Aushkap D.S. Diversity of estimations of scientific migration in Russia. *Nauka. Innovatsii. Obrazovanie=Science. Innovations. Education*, 2017, no. 4, pp. 116–124 (in Russian).
12. Moed H.F., Halevi G.A. Bibliometric approach to tracking international scientific migration. *Scientometrics,* 2014, vol. 101, no. 3, pp. 1987–2001. DOI: https://doi.org/10.1007/s11192-014-1307-6

13. Koksharov V. A., Agarkov G.A. International scientific migration: Progress or a threat to Russia's scientific and technological security. *Ekonomika regiona=Economy of Region*, 2018, vol. 14, no. 1, pp. 243–252. DOI: 10.17059/2018–1–19 (in Russian).
14. Markova Y.V., Shmatko N.A., Katchanov Y.L. Synchronous international scientific mobility in the space of affiliations: Evidence from Russia. *SpringerPlus*. 2016, no. 5: 480. DOI: 10.1186/s40064-016-2127-3. Available at: https://springerplus.springeropen.com/articles/10.1186/s40064-016-2127-3
15. Yurevich M.A., Aushkap D.S. Brain drain in computer and information sciences: a Bibliometric estimate. *Informatsionnoe obshchestvo=Information Society*, 2018, no. 6, pp. 46–53 (in Russian).
16. Shiryaev A., Aushkap D. Digital technology research of the number of scientific diaspora. In: *2nd International Scientific conference on New Industrialization: Global, national, regional dimension (SICNI 2018)*. Atlantis Press, 2019. Pp. 451–454. DOI: https://doi.org/10.2991/sicni-18.2019.91
17. Jöns H. Transnational academic mobility and gender. *Globalisation, Societies and Education,* 2011, vol. 9, no. 2, pp. 183–209. DOI: 10.1080/14767724.2011.577199
18. Ward K., Wolf-Wendel L. Academic motherhood: Managing complex roles in research universities. *The Review of Higher Education*, 2004, vol. 27, no. 2, pp. 233–257.
19. Leemann R.J. Gender inequalities in transnational academic mobility and the ideal type of academic entrepreneur. *Discourse: Studies in the Cultural Politics of Education*, 2010, vol. 31, no. 5, pp. 605–625. DOI: https://doi.org/10.1080/01596306.2010.516942
20. Antoshchuk I. Female computer scientists from Post-Soviet space: migration and academic career in the UK. In: *23rd International Conference on Science and Technology Indicators (STI 2018)*. Centre for Science and Technology Studies (CWTS), 2018. Pp. 414–419. Available at: https://openaccess.leidenuniv.nl/handle/1887/65354
21. Zippel K. How gender neutral are state policies on science and international mobility of academics? *Sociologica,* 2011, no. 5, no. 1, pp. 1–17. DOI: 10.2383/34631
22. Fox M.F., Realff M.L., Rueda D.R., Morn J. International research collaboration among women engineers: frequency and perceived barriers, by regions. *The Journal of Technology Transfer*, 2017, vol. 42, no. 6, pp. 1292–1306. DOI: https://doi.org/10.1007/s10961-016-9512-5
23. Malakhov V.A. Gender aspect of international academic mobility of Russian scientists. *Zhenshchina v rossiiskom obshchestve=Woman in Russian Society*, 2019, no. 4, pp. 88–89 (in Russian).
24. Ginther D.K., Kahn S. Does science promote women? Evidence from academia 1973-2001. In: *Science and Engineering Careers in the United States: An Analysis of Markets and Employment*. Chicago: University of Chicago Press, 2009. Pp. 163–194. Available at: https://www.nber.org/chapters/c11621

Information about the Authors

Vadim A. Malakhov – Candidate of Sciences (History), Senior Researcher, S. I. Vavilov Institute for the History of Science and Technology, Russian Academy of Sciences (14, Baltiyskaya Street, Moscow, 125315, Russian Federation; e-mail: yasonbh@mail.ru)

Irina N. Vasil'eva – Candidate of Sciences (Economics), Associate Professor, Head of the Center for International Scientific and Technical Cooperation, Russian Research Institute of Economics, Politics and Law in Science and Technology (20A, Dobrolubova Street, Moscow, 127254, Russian Federation; e-mail: i.vasilyeva@riep.ru)

Filipp D. Belov – Candidate of Sciences (Economics), Head of the Center for Research of Organizational Processes in Science and Innovation, Russian Research Institute of Economics, Politics and Law in Science and Technology (20A, Dobrolubova Street, Moscow, 127254, Russian Federation; e-mail: fdbelov@yandex.ru)

Received March 24, 2020.

DOI: 10.15838/esc.2020.5.71.15
UDC 364(437); LBC 65.29(4Cheh)

Awareness and Attitudes towards Social Entrepreneurship among University Students and Disabled People. The Case of the Czech Republic*

Ondrej
KROČIL
Palacký University
Olomouc, Czech Republic, Křížkovského 511/8, 779 00
E-mail: ondrej.krocil@upol.cz
ORCID: 0000-0002-0749-1848

Richard
POSPÍŠIL
Palacký University
Olomouc, Czech Republic, Křížkovského 511/8, 779 00
E-mail: richard.pospisil@upol.cz
ORCID: 0000-0002-1428-4038

David
KOSINA
Palacký University
Olomouc, Czech Republic, Křížkovského 511/8, 779 00
E-mai:l david.kosina@upol.cz
ORCID: 0000-0002-3520-8384

* This research was supported by the grant IGA_FF_2020_001 Shifts in Entrepreneurial Approaches in the Contemporary Economy 2 of the internal grant agency of Palacky University Olomouc.

For citation: Kročil O., Pospíšil R., Kosina D. Awareness and attitudes towards social entrepreneurship among university students and disabled people. The case of the Czech Republic. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 247–263. DOI: 10.15838/esc.2020.5.71.15

Abstract. In the Czech Republic, the concept of social entrepreneurship is still being developed and lacks, for example, systematic public support and regulation. In addition, the total number of social enterprises operating in the Czech Republic is low and thus, the concept of social entrepreneurship cannot reach its potential. To accelerate this development, raising awareness of social entrepreneurship among the Czech population may be important. Based on the survey carried out among 200 possible stakeholders of Czech social enterprises we explored the awareness and attitudes of selected groups of people towards social entrepreneurship. These groups of people are disabled people as typical employees of Czech social enterprises and university students as possible future founders of these enterprises. Our research project focuses on three issues: i) the level of awareness of the concept of social entrepreneurship among university students and disabled people; ii) the position of disabled people in the current labour market iii) the willingness of students to become entrepreneurs and to start business with social purpose. During the research, we used the method of structured questionnaires. The research shows that the awareness of the concept of social entrepreneurship is generally low. Nevertheless, students consider becoming entrepreneurs and starting a business with social purpose. The research also shows that according to the opinion of the respondents, it is difficult to find employment as a disabled person and that the current labour market does not offer enough vacant positions which could be interesting for these persons. From this perspective, we can assess further development of Czech social enterprises (especially of Work Integration Social Enterprises) as very important.

Key words: social enterprise, WISE, social entrepreneurship, disabled people, university students, awareness.

Introduction

In the Introduction, the typical features of the social entrepreneurship environment in the Czech Republic are highlighted. At the same time, this chapter also emphasizes the relationship between the conceptualization of social entrepreneurship in the Czech Republic and in the EU countries. This relationship is represented especially by influence of EMES ™ European Research Network approach to social entrepreneurship.

Social Entrepreneurship in the European Union

Nowadays, social entrepreneurship represents one of the possibilities the entrepreneurs can use to contribute to the solution of pressing social problems such as social exclusion, crime and unemployment. The general definition identifies social enterprises as the subjects selling products and providing services to achieve economic self-sufficiency and at the same time following a social purpose. According to Borzaga, Galera, Franchini, Chiomento, Nogales and Carini [1], the term "social enterprise" is often conflated with WISE (Work integration social enterprise) in public understanding in European Union countries. These enterprises focus on the employment of labour-market disadvantaged persons and the objective of these enterprises is to integrate these people into society or prevent their social exclusion. The labour-market disadvantaged persons are disabled persons, socially excluded persons, low-qualified persons and older or long-term unemployed people.

Although the typical feature of the pre-pandemics labour market (EU-28; 6.3% in September 2019, Eurostat[1]) is the low rate of

[1] *Unemployment statistics, Eurostat.* Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Unemployment_statistic

unemployment, it is necessary to pay continuous attention to disadvantaged persons because these people face many specific social and health risks. According to Eurostat data, in 2018, 28.7 % of the EU population with a physical activity limitation was at risk of poverty or social exclusion, compared with 19.2 % of those with no limitations. Social entrepreneurship can be an effective tool for the integration of these people into society and an innovative way to protect them against social exclusion.

In EU countries, there is no uniform definition of social entrepreneurship. In some EU countries, social entrepreneurship is included in national legislation (e. g. Slovakia and Finland). In other countries, social entrepreneurship is not yet officially regulated (e. g. the Czech Republic and Austria). The definition of social entrepreneurship according to EMES (research network of university research centres and individual researchers of social enterprise) is widely recognized in the EU countries [2] (*Table 1*).

The definition provided above suggests that social entrepreneurship is based on two sets of principles – economic and social, and the emphasis is placed on the role of stakeholders.

Social Entrepreneurship in the Czech Republic

Currently, the Czech Republic lacks formal legislative regulation of social entrepreneurship. For this reason, an unofficial definition created by the non-profit organization TESSEA[2], inspired by the definition of EMES (introduced above), is used in the Czech Republic. This definition recommends the principles and indicators which should a social enterprise comply with (*Table 2*). The definition is intended primarily for the allocation of subsidies and not for including social enterprises in the indicative database administered by the Czech

Table 1. The definition of social entrepreneurship according to EMES

Economic principles	
The principle	Explanation of the principle
a) continuous activity; production, sale of goods and provision of services	Operating in market of the goods and services is one of the main goals of the social enterprise.
b) a high degree of autonomy	Social enterprises are not the entities managed by public authorities or other organizations.
c) a significant level of economic risk	Those who establish a social enterprise assume totally or partly the risk inherent in the initiative.
d) a minimum amount of paid work	The activity carried out in social enterprises requires a minimum level of paid workers.
Social principles	
e) an explicit aim to bring a benefit to the community	The main goal of the social enterprise is to serve society as the whole or to a certain group of people.
f) the initiative launched by a group of citizens	The social enterprise is the result of a joint effort of citizens who share the idea of pursuing a socially beneficial goal.
g) one member = one vote	The decision-making power is not derived from corporate capital.
h) a participatory nature, which involves various parties affected by the activity	The impact of the stakeholders on decision making in a social enterprise.
i) a limited profit distribution	Social enterprises are non-profit organizations or enterprises in which any profit is redistributed only to a limited extent.
Source: *EMES.*	

[2] Definition and Principles of Social Enterprise, TESSEA. Available at: http://www.tessea.cz/tessea-o-nas/definice-a-principy-socialniho-podnikani

Table 2. The principles of social entrepreneurship according to TESSEA

Principle	Meaning
Social impact	Implementation of activities beneficial for society or a specific group of disadvantaged people
	Employing of disadvantaged people in the labour market (in case of WISE)
Economic impact	Possible profit is used for further development of an enterprise
	Autonomy in management decision-making
	Sales from the sale of own products and services must form at least a part of the revenue
	Ability to manage economic risks
Environmental impact and impact on local society	Taking into consideration the environmental impacts of business activities of the enterprise
	Cooperation of the social enterprise with local entities
Source: TESSEA.	

Table 3. The indicators for social enterprises according to TESSEA

Area	Indicator
Social	Employees are regularly and systematically informed of activities of the enterprise, its revenues and implementation of socially beneficial activity
	People from disadvantaged groups form at least 30 % of all employees (in the case of WISE)
Economic	At least 50 % of profit is used for further development of the enterprise and its socially beneficial objectives
	In its decision making, the management is not dependent on other entities.
	Sales from the sale of own products and services form at least 30 % of the total revenue
	The enterprise uses one of the standard methods of economic management or risk management
Environment and local society	The enterprise has formulated principles of environmentally friendly policy and fulfils them in practice
	The enterprise communicates and cooperates with local entities
Source: TESSEA.	

Ministry of Labour and Social Affairs (listing in the database is voluntary). The principles and indicators are recorded in the following tables:

The following *table 3* contains indicators that specify the implementation of the principles.

The research carried out in the Czech Republic in 2018 by the authors of this article suggests that WISE are the most frequented type of social enterprises. Czech WISE focus predominantly on the integration of disabled people back into society by giving them job opportunities (Kročil, Dopita, Pospíšil, [3]). At the same time, the research showed that in 2018, there was an excess supply over the demand for work of disabled people. That suggests even higher importance of the existing WISE as without them the excess supply would be even more significant.

According to TESSEA[3], there are currently 300 social enterprises operating in the Czech Republic and 90% of them have the character of WISE. 80% of these companies focus on the integration of people with disabilities – in 2018 they employed almost 4,000 such disadvantaged people (according to Czech Labour Office[4], in December 2019 there were 33,000 unemployed disabled people in the labour market). However, in the Czech Republic, the concept of social entrepreneurship is still being developed and lacks, for example, systematic public support and regulation. In addition, the total number of social enterprises operating in the Czech

[3] *Questionnaire Survey of Social Enterprises,* TESSEA. Available at: http://www.tessea.cz/aktuality/528-dotaznikove-setreni-socialnich-podniku-2019

[4] *Unemployment Statistics, Czech Labour Office.* Available at: https://www.mpsv.cz/web/cz/statistiky#statistiky-o-trhu-prace

Republic is low and thus, the concept of social entrepreneurship cannot reach its potential. To accelerate this development, raising awareness of social entrepreneurship among the Czech population may be important. In this research we focus on two selected groups of people within Czech population – these are disabled people as typical employees of Czech social enterprises and Czech university students of humanities as potential founders of new social enterprises. The relationship between social entrepreneurship on the one hand, and university students and people with disabilities on the other, is supported by the following Literature Review.

Literature review

Following literature review is divided into three parts. The first part provides definition and characteristics of WISE ™ the concept of social entrepreneurship prevalent in the Czech Republic and in European countries. In the second part, the connection between social entrepreneurship and disabled people integration is discussed. The third part reveals the position of university students as potential social entrepreneurs.

Definition and characteristics of European WISE

The literature approaches the field of WISE from various perspectives. A significant contribution to WISE research in Europe was made by experts from EMES network. Defourny and Nyssens [4] mention that social enterprises can be active in many areas as meeting the socially beneficial objective relates to a wide range of activities. However, so-called integration social enterprises, commonly called WISE (Work Integration Social Enterprise) are dominant in Europe. The authors suggest, that the lasting structural unemployment in some groups, limitations to traditionally perceived active labour-market policies and the increasingly needed innovative policies in this area bring questions concerning the role of a social entrepreneur in combating the unemployment and support of employment opportunities. To help unemployed people with a low qualification who are facing permanent labour market exclusion is exactly the objective of work integration of social enterprises. Social enterprises integrate these people into society providing the possibility to engage in productive activity.

Davister, Defourny and Gregoire [5] describe the integration social enterprises as autonomous economic subjects whose main objective is the professional integration or persons facing employment difficulties. The integration happens through a productive activity or training aimed to increase the qualification of the disadvantaged persons. According to the cited experts, the most frequent activities WISE focus on are manual works, waste treatment, greenery maintenance or packaging works.

Davister, Defourny and Gregoire [5] distinguish four main types of social enterprises according to the way they integrate persons.

• Temporary employment – the focus in on providing the target group with work experience (temporary employment) or training at the workplace with the purpose to integrate these disadvantaged workers at the open labour market. The target persons participate in traineeships or are employed for a fixed period.

• Creating a permanent work position financed by the social enterprise – the objective of this type of integration is to create work positions for the labour market disadvantaged persons which are stable and economically sustainable in the mid-term horizon. In the initial phase, the public subsidies are used to finance the work position and these subsidies balance the insufficient productivity of the

target group. These subsidies are temporary and the amount of subsidy decreases when the workers become competitive in the labour market. After this interim phase, the integration social enterprises pay the wage of the employees from own resources (mainly from their revenues).

• Professional integration supported by permanent subsidies – In the case of the most disadvantaged persons the integration of which would be difficult in a mid-term horizon, these people are provided with stable work positions permanently financed from public resources.

• Socialisation through productive activity – The aim of the last type of integration enterprise is not the professional integration into the open labour market (however, it is not excluded) but rather social rehabilitation of the target groups through social contact, complying with roles, improvement of lifestyle, etc. The enterprises of this type work mainly with people with serious social problems (alcohol and drug-addicted, former convicts) or the people with a serious physical or mental handicap.

Spear and Bidet [6] provide several views on WISE:

• The amount of financing of the social enterprise from public sources – that means if whether the financing from the public sources is permanent, temporary of whether the enterprise is only self-financed.

• The type of employment the social enterprise provides to the disadvantaged persons – in that case, the authors distinguish permanent and temporary employment.

• The emphasis the social enterprise places on the training of the employees.

Davister, Defourny and Gregoire [5] describe the types of social enterprises from the financial perspective in a similar way.

In European countries, WISE have a strong position among other types of social enterprises. According to Adam, Aviles, Ferrari, Amstutz, Crivelli, Enrico, Gafner, Greppi, Schmitz, Wüthrich and Zoebeli [7], as in other countries, WISE is currently the dominant and more visible model of social enterprises in Switzerland. WISE's dominant position among other types of social enterprises in a number of European countries is confirmed for example by Greblikaite, Sroka and Grants [8] in the case of Poland and by Asmalovskij and Sadilek [9] in the case of Slovakia and the Czech Republic. As stated by the authors, in the Czech Republic, social entrepreneurship is often perceived as the employment of disabled or otherwise disadvantaged people. According to Anastasiadis [10], WISE in Austria correspond to a high degree to the international understanding of social enterprises as they display the social, economic and governance-related dimensions of social enterprises such as are outlined in the EMES approach, and they pursue a specific social mission of work integration.

Social Enterprises and Disabled People in the Labour Market

Disabled people are one of the groups of disadvantaged people who can be supported by WISE. Shier, Graham and Jones [11] dealt with the employment of disabled persons. They carried out individual and group interview with 56 disabled. The interviews revealed that the disabled persons face discrimination and it is difficult for them to find and retain the job. Thornton [12] described the inequalities between the disabled and non-disabled persons in the context of employment – she points out that discrimination of disabled people during the selection process of applicants often exists and that the non-disabled candidates were 150 per cent more likely to gain a positive reply than the disabled candidates.

Social enterprises as the partners of disabled persons were the research subject of Harris, Renko and Caldwell [13; 14]. According to the authors, if supported adequately, social entrepreneurship is an employment option that can lead to economic self-sufficiency, assist broader economic growth, and support businesses that address the social problems affecting people with disabilities. The connection between social entrepreneurship and social inclusion of disabled persons was made by Hall and Wilton [15], Shaheen [16] and Buhariwala, Wilton and Evans [17] and Smith, McVilly, McGillivray and Chan [18]. According to the authors, social enterprise can deliver higher wages, and extend to otherwise disadvantaged and marginalised individuals the dignity and respect of 'real work for real pay. Based on the research of Kummitha [19], the WISE approach helped the excluded sections to gain access to dignified livelihood and to attain quite active participation in mainstream society. Both economic and social empowerment were identified as positive results from such initiatives. Especially through professional integration, the excluded regain dignity by participating in employment and social activities. Regaining dignity has connections to the social ties that such individuals can rebuild during the process.

The presented research supports the importance of WISE in the inclusion process of disabled people into society. For disabled people, it is necessary to be informed about the opportunities that WISE offer. For this reason, we decided to contribute to existing literature and to reveal if Czech disabled people are familiar with social entrepreneurship concept and how they perceive their situation in the labour market which could be improved by WISE.

University students as future social entrepreneurs

As the second group of social enterprises key stakeholders, we have selected university students. To support the legitimacy of our position to include university students as potential social entrepreneurs, we have performed a review of relevant scientific literature on university students' intentions to become social entrepreneurs and their knowledge about the concept.

Franco, Haase and Lautenschläger [20] compared entrepreneurial intentions of university students in eastern and western Germany and also in central Portugal. They revealed that most of the respondents are so-called potential founders – they do not exclude the possibility of being self-employed. The largest number of students considering to become entrepreneurs (so-called founders) is in Portugal. According to Ashour [21], a significant number of higher education students in the United Arab Emirates have positive attitudes towards entrepreneurship and social entrepreneurship as career options. The research revealed that 38% of students expressed an interest in becoming entrepreneurs and 23.3% expressed an interest in becoming social entrepreneurs. Students' intentions to become social entrepreneurs were also researched by Kedmenec, Rebernik and Peric [22]. The authors found out almost 70 per cent of the respondents (Croatian university students) intend to start a venture in the next ten years. Half of those respondents show a tendency toward commercial entrepreneurship, while the other half prefers social entrepreneurship. Ip, Wu, Liu and Liang [23] argue that university students are our society's future, and because of that they should be encouraged to treasure environmental resources and help disadvantaged people. The study of Barton,

Schaefer and Canavati [24] shows that more than half of American business students who were interviewed reported social entrepreneurial intentions.

According to one of the latest research focused on Russian university students' knowledge of social entrepreneurship (Kireeva, Zavyalov, Saginova and Zavyalova [25]), only 34.8% of respondents are familiar with the phenomenon of social entrepreneurship. Nevertheless, students' knowledge of social entrepreneurship and students' intentions to become entrepreneurs and social entrepreneurs in the Czech context are not analysed in the literature. This fact provides an opportunity for this research, which can contribute to a better understanding of this topic. The methodological approach to our research is described in the next section.

Article Objective and Research Questions

The aim of the paper is to explore the awareness and attitudes of selected groups of people - possible SE stakeholders towards social entrepreneurship in the Czech Republic. In our research, these groups of people are Czech disabled persons and Czech university students of humanities. We focus on these groups, because:

• Disabled people are the largest group of disadvantaged persons in the Czech labor market and increasing their awareness of social entrepreneurship can support their further involvement in this concept and thus improve the overall situation of these people in the labor market. For disabled people, it is necessary to be informed about the opportunities that SE offer. For this reason, we decided to contribute to existing literature and to reveal if Czech disabled people are familiar with social entrepreneurship concept. In addition, we tried to find out how these people perceive their situation in the labour market. A possible difficult situation can be solved by the establishment of new social enterprises (especially by WISE), which, according to previous research (for example, Kročil, Dopita, Pospíšil, [3]), make a significant contribution to the integration of disadvantaged people.

As presented in literature review, university students often have social entrepreneurial intentions and they would become the founders of new social enterprises. Especially students of humanities who, based on their study direction, could be interested in social innovations, can respond to the situation of disadvantaged people in the labor market and develop new social enterprises (including WISEs) that will contribute to solving societal problems in the field of unemployment.

To achieve the aim stated above, the following research questions were defined:

Q1: To what extent do Czech university students and people with disabilities know of the existence of social entrepreneurship concept and how are they able to define it?

Q2: Do Czech university students consider starting businesses with social purposes and helping integrate disadvantaged people back into society?

Q3: How Czech disabled people perceive their position in the current labour market?

Methodological approach

Within this research, we consider as potential entrepreneurs the students of the first year of humanities-focused programs of the Department of Applied economics, Palacky University Faculty of Arts. After finishing their studies, these individuals will decide whether their income will come from an employment or entrepreneurial activity. If they chose the second option, they will also need to determine their business goals. At the same time, their study focus on humanities could contribute to increased interest in social innovations. 106 students out of 146 enrolled in the researched first year filled the questionnaire.

The survey results do not take into account the respondents' gender as the authors do not consider this factor as relevant to the objective of the survey. The structured questionnaire was provided in the paper form.

The first-year students were chosen on purpose as the students of higher study years meet the term social entrepreneurship in their courses. This would negatively influence the research results as the assessment of the initial awareness of students starting the university studies is one of the research outputs.

The disabled persons, who are potential employees of social enterprises, were provided with the questionnaire in the electronic form using the platform Survio. This questionnaire was shared through the social networks profiles of the Chart 77 Foundation the main project of which is the fund-raising campaign Konto Bariéry focusing on the improvement of life of disabled persons and their integration to society, and Brno based association Liga vozíčkářů, z.ú. In this case, gender was not taken into account as well. 102 disabled persons filled the questionnaire. For the form of distribution of the questionnaires, it is impossible to determine the total population.

Of course, the possibility that the social entrepreneur, that means the social enterprise founder can be a person from the disadvantaged group or disabled person is not excluded. However, from the perspective of this research, disadvantaged persons are primarily considered as the employees of social enterprises. There is also a possibility that during the survey the surveyed student was at the same time a disabled person or that the interviewed person was at the same time the student of a humanities-focused programme of the Department of Applied Economics, Faculty of Arts, Palacky University Olomouc.

The students of humanities programmes of the Department of Applied Economic – the potential social entrepreneurs/founders of social enterprises were asked to answer the following questions (*Table 4*).

Table 4. Questions for university students

Question	Type of question
Do you consider becoming an entrepreneur or founding an enterprise in your future professional life?	The closed-ended question, answer YES - NO
Regardless of the fact whether you want to do business or set up an enterprise, can you imagine following a social purpose as a part of your business activity?	The closed-ended question, answer YES - NO
If yes, what would be the subject matter of such social purpose?	An open-ended question, free answer
Have you ever heard the term "social entrepreneurship"?	The closed-ended question, answer YES – NO
If yes, please try to describe briefly what does this term mean or what is your understanding of this term?	An open-ended question, free answer
Do you know any particular social enterprise? If yes, please provide its name or at least the area of its activities	A combination of closed and open-ended questions

Table 5. Questions for disabled people

Question	Type of question
According to your opinion, is it difficult to find employment as a disabled person in the current labour market?	The closed-ended question, answer YES – NO
Do you perceive the number of work positions interesting for disabled persons as sufficient?	The closed-ended question, answer YES – NO
Have you ever heard the term "social entrepreneurship"?	The closed-ended question, answer YES – NO
If yes, please try to describe briefly what does this term mean or what is your understanding of this term?	An open-ended question, free answer
Do you know any particular social enterprise? If yes, please provide its name or at least the area of its activities.	A combination of closed-ended and open questions

Disabled persons were asked to answer the following five questions:

Results

Responses of Czech university students – potential social entrepreneurs

Question 1

More than half of the questioned students consider becoming an entrepreneur or setting up a business (*Table 6*). This result is in line with the research of Kedmenec, Rebernik and Peric [22]. According to these authors, the majority of Croatian students expressed the intention to start an entrepreneurship career. On the other hand, the study of Ashour [21] and Franco, Haase and Lautenschläger [20], Czech university students show more interest in becoming entrepreneurs than students in the United Arab Emirates, or in Germany and Portugal.

Question 2

More than half of the questioned students can imagine following a social purpose and not only the profit in their future business activity (*Table 7*). This result is important for the development of new social enterprises in the Czech Republic as the most of respondents are willing to follow the main social entrepreneurship principle which is to help the society and not just to reach the profit. Our result is line with previous research done by Barton, Schaefer and Canavati [24]. These authors concluded that more than half of the American business students they interviewed reported social entrepreneurial intentions. In comparison with Ashour's research [21], our respondents show more interest in the unconventional business.

Question 3

60 out of 70 persons who responded positively to the previous question further specified the nature of a social purpose that they would plan to follow in their business activities.

Some of them provided more purposes. The structure of the purposes is shown in the following *figure 1*. Purposes such as helping disadvantaged groups of people and the creation of new work positions are typical for the nature of WISE. However, the most common purpose mentioned by Czech university students is the environmental protection and improvement which is important especially for environmental social enterprises.

Question 4

Surprisingly for us, the majority of students responded that they had never heard of the term "Social entrepreneurship" (*Table 8*). In comparison with the research done by Kireeva, Zavyalov, Saginova and Zavyalova [25], our respondents are less familiar with the concept of social entrepreneurship than the Russian university students. This result does not support the development of new WISE founded by students and it would be the suggestion for the Czech education system to acquaint students with the concept of social entrepreneurship.

Table 6. Am I considering becoming an entrepreneur or setting up a business?

Answer	In absolute terms	In relative terms
YES	56 persons	53 %
NO	50 persons	47 %
Source: Own research.		

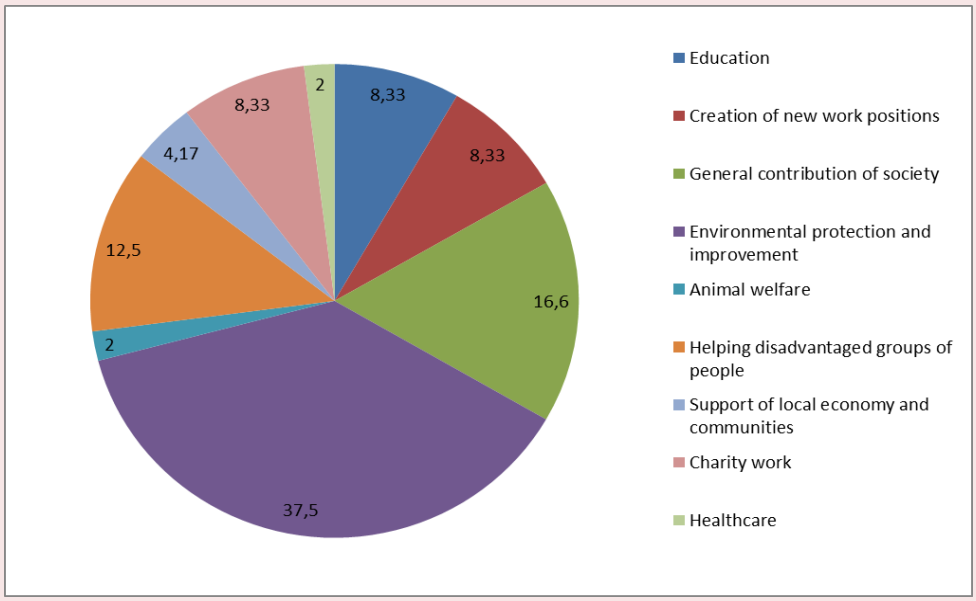
Table 7. Can I imagine following a social purpose in my business activity?

Answer	In absolute terms	In relative terms
YES	70 persons	66 %
NO	36 persons	34 %
Source: Own research.		

Table 8. Do the students know that the concept of social entrepreneurship exists?

Answer	In absolute terms	In relative terms
YES	25 persons	24 %
NO	81 persons	76 %
Source: Own research.		

Figure 1. What could be the subject matter of a social purpose followed by the questioned students? (in % of the total number of mentioned purposes)



Source: Own research.

Question 5

22 students tried to define the concept of social entrepreneurship (21% of all questioned persons, *Table 9*).

Table 9. The features of social entrepreneurship defined by the questioned students (based on answers of 22 students)

Features	In absolute terms	In relative terms
Profit + social purpose	17 persons	76 %
Social purpose	4 persons	18 %
Establishing of a specific type of enterprise	1 person	6 %
Source: Own research.		

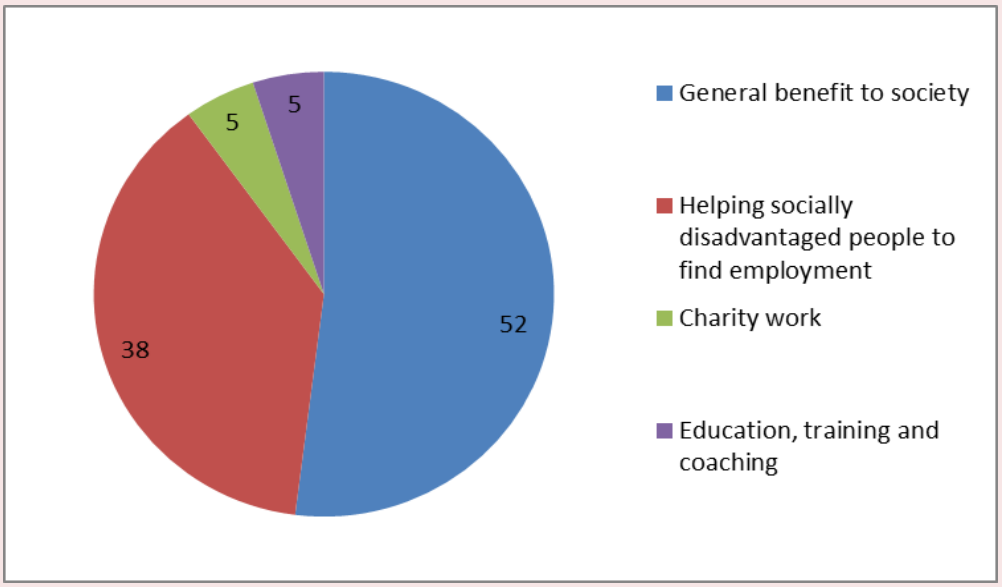
The majority of the students connects social entrepreneurship with achieving profit and at the same time a social purpose. The mentioned respondents perceive these two principles as interconnected. We can evaluate these answers as correct – both sets of principles (economic and social) are covered in these answers. Fewer students mentioned only the aspect of following a social purpose without an effort to make a profit. One questioned student did not generalise the features of social entrepreneurship. The student only suggested that it could be for example establishing a home for elderly people.

As the table shows, 21 respondents mentioned a social purpose as a feature of social entrepreneurship. More than half of the questioned did not provide any specification. These students only mentioned that it was an activity which was generally beneficial to society. However, some respondents defined social purpose in a more concrete way (*Figure 2*). It is evident that students specify the main goal of social enterprises as „general benefit to society“ and „helping disadvantaged people to find employment“. The second objective follows the idea of WISE.

Question 6

11 students provided at least one name of a possible social enterprise. In total, the students

Figure 2. Social purpose as the feature of social entrepreneurship and its achieving according to the responses of questioned students (in %; the base are the responses of 21 students)



Source: Own research.

mentioned 17 names of the enterprises. As shows the graph (*Figure 3*), some names were mentioned repetitively.

The following section of this chapter provides commented answers of the Czech disabled people who were asked for five questions.

The responses of the Czech disabled people

Question 1

The majority of questioned people believe that it is difficult to find employment as a disabled person. (*Table 10*). This result is in line with the conclusion made by Shier, Graham and Jones [11] who reported that it is difficult for disabled people to get and retain their job. Establishing new social enterprises (WISE especially) may be particularly useful in overcoming these obstacles.

Question 2

The majority of the respondents are convinced that the current labour market does not provide enough work positions suitable for disabled persons (*Table 11*). In 2018, Czech WISE provided work for almost 4,000 disabled people. According to the Czech Labour Office, in December 2019 there were 33,000 unemployed disabled people in the labour market. Without existing Czech WISE, this number would have increased by 12%. In the case of new WISE establishing, the current labour market situation could be further improved.

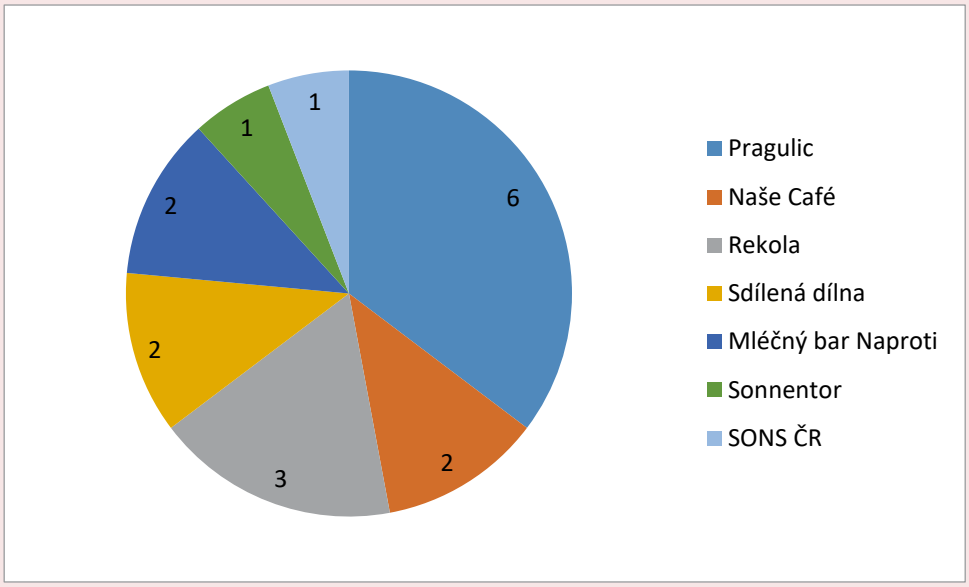
Table 10. According to the opinion of the questioned persons, it is difficult to find employment as a disabled person.

Answer	In absolute terms	In relative terms
YES	91 persons	89 %
NO	11 persons	11 %
Source: Own research		

Table 11. Do the questioned persons perceive the number of work positions interesting for disabled persons as sufficient?

Answer	In absolute terms	In relative terms
YES	20 persons	20 %
NO	82 persons	80 %
Source: Own research		

Figure 3. Names of possible social enterprises provided by the questioned students (in absolute values)



Source: Own research.

Question 3

A slight majority of the questioned persons responded that they had never heard of the term "Social entrepreneurship" (*Table 12*). Same as in the case of the students' answers, this is a surprising finding for us.

Table 12. Do the disabled persons know about the existence of the concept of social entrepreneurship?

Answer	In absolute terms	In relative terms
YES	47 persons	46 %
NO	55 persons	54 %
Source: Own research.		

Question 4

57% of all respondents tried to characterise the term "social entrepreneurship" Only two persons mentioned that social entrepreneurship interconnected two objectives – making a profit and pursuing of a societally beneficial purpose. The majority of the respondents defined this concept as the business with a societally beneficial objective and almost one fifth as an entrepreneurial activity of disabled people (*Table 13*).

Table 13. The characteristics of social entrepreneurship defined by the disabled persons (based on answers of 57 respondents)

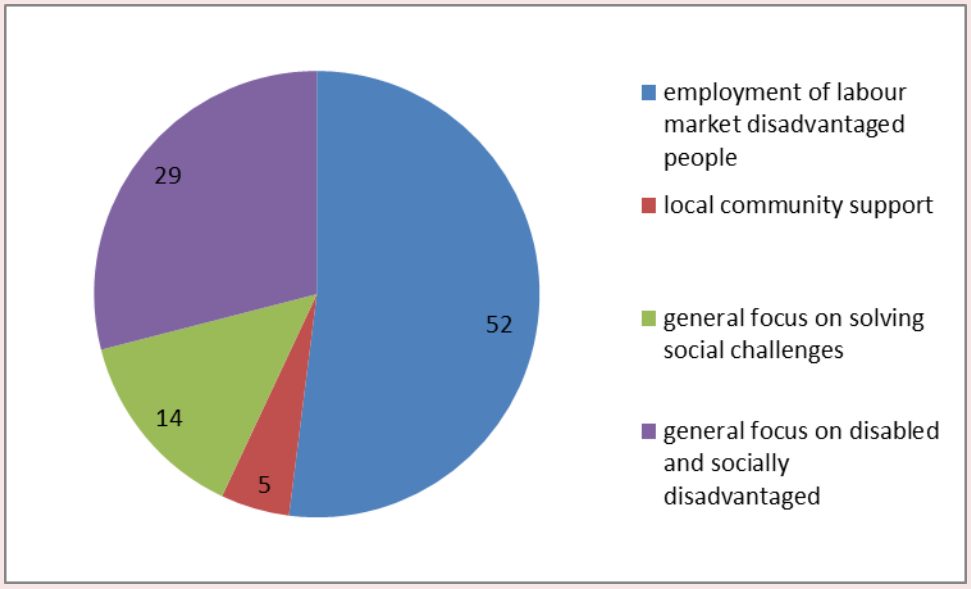
Features	In absolute terms	In relative terms
Profit + societally beneficial objective	2 persons	4 %
Societally beneficial objective	45 persons	77 %
Entrepreneurial activity of disabled persons	11 persons	19 %
Source: Own research.		

Fulfilling an objective which specifically or generally contributes to society appeared in the respondents of 47 respondents. The graph show structure of the responses (*Figure 4*).

Question 5

17 respondents provided at least one name of a possible social enterprise. In total, the respondents mentioned 18 names of the enterprises. One name was mentioned repetitively. For this reason, the enterprises are not showed in the graph but in the form of a list (*Table 14*).

Figure 4. Societally beneficial objective as the feature of social entrepreneurship and its pursuing according to the responses of questioned disabled persons (in %; the base are the responses of 47 disabled persons)



Source: Own research.

Table 14. Possible social enterprises mentioned by disabled people

Enterprise name	Enterprise name
Naše café	Černí koně
2p servis	Trend vozíčkářů
Ashoka	Help me Hand
Helpnu Ti	Lipka
Senior Teplice	Bárka Kafe
Ergotep (included in two responses)	Café na půl cesty
Učebnice Vaníček	Kačaba
Smero	Myjómi
Podané ruce	Kolibřík
Source: Own research.	

Limitations of the Research

Although the research presents original results and its conclusions can be used in practice (for example by universities in their educational activities or by non-profit organizations helping disabled people), it still has its limitations. First, the research sample could be extended to students of other universities, which would allow a better generalization of the conclusions. Second, the research does not focus on some other possible stakeholders of social enterprises, whose awareness and attitudes would also be appropriate to examine. These stakeholders are, for example, representatives of public administration bodies who can play an important role in the development of social entrepreneurship. Third, the research is descriptive in nature and does not answer the question of the relationship between respondents' characteristics and their awareness and attitudes towards social entrepreneurship. These limits offer room for further research.

Conclusion and Discussion

This research aimed to explore the awareness and attitudes of selected groups of people – possible SE stakeholders towards social entrepreneurship in the Czech Republic. We based our findings on the results of the questionnaire survey among possible social enterprises' stakeholders – Czech university students and disabled persons. We also tried to find out

how disabled people perceive their situation in the labour market. A possible difficult situation can be solved by the establishment of new social enterprises (especially by WISE), which, according to previous research, make a significant contribution to the integration of disadvantaged people.

According to our findings, the level of awareness of the concept of social entrepreneurship in the Czech Republic is generally low. In the case of both groups of respondents, the majority of them never heard of social entrepreneurship and when compared, the level of awareness is better in the group of disabled persons. We consider these findings to be negative in terms of higher involvement of disabled people in social entrepreneurship. It is useful for people with disabilities to know about the existence and nature of social entrepreneurship, which can help integrate them into society. As a practical contribution of our article, we suggest that the Czech educational system (both secondary and university) should include the topic of social entrepreneurship into its study plans – in the form of practical workshops, as part of existing subjects or in the newly developed specialized courses. In the case of disabled people, it could be the role of the Czech social policy and non-profit organizations helping disabled people (such as The Czech National Disability Council) to increase their knowledge.

Approximately 20% of the questioned students tried to define social entrepreneurship, while there were 50% of the disabled persons who answered the same question. The cumulative results differ as well. The majority of responding students are aware of the objective to make a profit which is necessary for social entrepreneurship. The absolute majority of disabled persons did not mention this objective and focused their answers only to the idea of following a social purpose, which is only one of the important characteristics of social entrepreneurship. As shows table no. 1, an integral part of the definition of social enterprise are the economic principles represented by the effort to make a profit or, in the case of not-for-profit social enterprises, at least by the production of products and delivery of services. According to the EMES definition, for-profit and not-for-profit social enterprises engage in economic activity. This fact was omitted by the majority of disabled respondents. In the majority of cases, the students who mentioned the profit-making did not omit the social purpose.

We can say that both students and disabled persons often relate social entrepreneurship to its integration role, although it is only one of the possible objectives of social enterprises. In the majority of cases, the students mentioned a social purpose only in a general way and did not specify it. However, in second place the students mentioned the objective of employment or helping to the labour-market disadvantaged people. In the first place, disabled people linked the social purpose of enterprises with the employment of disadvantaged persons.

As part of the questioning, both students and disabled persons mentioned names of 24 enterprises which they consider to be social. However, the question is whether these enterprises are social enterprises. 10 out of these 24 subjects claim to be a social enterprise on their web pages or by the fact that they are listed in the database of social enterprises administered by the Czech Ministry of Labour and Social Affairs. Many enterprises considered by the respondent as social do not provide this information on their web page or through the listing in the database of the Ministry of Labour and Social Affairs. However, there can be at least identified the purpose to employ the labour-market disadvantaged persons.

The willingness of university students to become entrepreneurs or to start a business and consider pursuing a societally beneficial objective is very important for further development of social entrepreneurship and integration of disabled people. From this perspective, social entrepreneurship including WISE has a potential of its further development as the majority of respondents responded positively to both questions. Our findings are in line with previous research and support the idea of university students as a group of potential social enterprise founders. University students need to increase their knowledge of social entrepreneurship during their studies. However, they must understand not only the benefits of this type of entrepreneurship but also the threats and risks associated with it.

The absolute majority of disabled respondents reported that it is difficult to find employment as a disabled person and that the current labour market does not offer enough vacant positions which could be interesting for these people. Knowledge of existing difficult position of Czech disabled people in the current labour market could be an impulse for establishing new social enterprises (especially WISE) in the Czech Republic. From this perspective, we can assess the importance of further development of social enterprises (especially WISE) as very significant. On average, one Czech WISE employs almost 15 disabled people. The establishing of new WISE would help in meeting the work needs of people with disabilities.

As a topic for the discussion and further research what suggest to focus on the causes of low awareness of social entrepreneurship among questioned persons. One of the possible reasons can be the fact that in the Czech Republic, so far there is not in force any law regulating social entrepreneurship. Such a law exists in many countries of the European Union. We see an opportunity to carry out similarly oriented research in some of these states to find out whether the level of awareness differs from the results presented in this article. Another research topic could focus on the space given to the topic of social entrepreneurship in the study programmes of humanities-focused institutions of higher education or lower level of education.

References

1. Borzaga C., Galera G., Franchini B., Chiomento S., Nogales R., Carini Ch. *Social Enterprises and Their Ecosystems in Europe. Comparative Synthesis Report*. European Commission, 2020. 30 p.
2. Defourny J., Nyssens M. The EMES approach of social enterprise in a comparative perspective. *Working Paper no. 12/03*, 2012. 47 p. Available at: from https://emes.net/content/uploads/publications/EMESi WPi 12i 03_ Defournyi Nyssens.pdf
3. Kročil O., Dopita M., Pospíšil R. Integration social enterprises as a tool of employment policy. *Ekonomski Pregled*, 2019, vol. 70, pp. 554–571.
4. Defourny J., Nyssens M. Social enterprise in Europe: Recent trends and developments. *EMES Working Papers no. 08/01 (transversal paper)*, 2008. Available at: https://emes.net/publications/workingi papers/sociali enterprisei ini europei recenti trendsi andi developments/
5. Defourny J., Gregoire O., Davister C. Work integration social enterprises in the European Union: An overview of existing models. *EMES Working Papers no. 04/04 (transversal paper)*, 2004. Available at: https://emes.net/ publications/workingi papers/worki integrationi sociali enterprisesi ini thei europeani unioni ani overviewi ofi existingi models/
6. Spear R., Bidet E. The role of social enterprise in European labour markets. EMES *Working Papers no. 03/10 (transversal paper)*, 2003. Available at: https://emes.net/publications/workingi papers/thei rolei ofi sociali enterprisei ini europeani labouri markets/

7. Adam S., Aviles G., Ferrari D., Amstutz J., Crivelli L., Enrico C., Gafner A., Greppi S., Schmitz D., Wüthrich B., Zoebeli D. Work integration social enterprises in Switzerland. *Nonprofit Policy Forum*, 2016, vol. 7, pp. 509–539.
8. Greblikaite J., Sroka W., Grants J. Development of social entrepreneurship in European Union: Policy and situation of Lithuania and Poland. *Transformations in Business and Economics*, 2015, vol. 14, pp. 376–396.
9. Asmalovskij A., Sadilek T. The current state of social entrepreneurship in the Czech Republic and Slovakia. *Sociologia*, 2016, vol. 48, pp. 319–339.
10. Anastasiadis M. Work integration social enterprises in Austria – characteristics, evolution and perspectives. *Nonprofit Policy Forum*, 2016, vol. 7, pp. 541–564.
11. Shier M., Graham J.R., Jones M.E. Barriers to employment as experienced by disabled people: A qualitative analysis in Calgary and Regina, Canada. *Disability & Society*, 2009, vol. 24, pp. 63–75.
12. Thornton P. Disabled people, employment and social justice. *Social Policy and Society*, 2005, vol. 4, pp. 65–73.
13. Harris S.P., Renko M., Caldwell K. Accessing social entrepreneurship: Perspectives of people with disabilities and key stakeholders. *Journal of Vocational Rehabilitation*, 2013, vol. 38, pp. 35–48.
14. Caldwell K., Harris S.P., Renko M. The potential of social entrepreneurship: conceptual tools for applying citizenship theory to policy and practice. *Intellectual and Developmental Disabilities*, 2012, vol. 50, pp. 505–518.
15. Hall E., Wilton R. Alternative spaces of 'work • and inclusion for disabled people. *Disability & Society*, 2011, vol. 26, pp. 867–880.
16. Shaheen G.E. Inclusive entrepreneurship: A Process for improving selfi employment for people with disabilities. *Journal of Policy Practice*, 2016, vol. 15, pp. 58–81.
17. Buhariwala P., Wilton R., Evans J. Social enterprises as enabling workplaces for people with psychiatric disabilities. *Disability & Society*, 2015, vol. 30, pp. 865–879.
18. Smith P., McVilly K.R., McGillivray J., Chan J. Developing open employment outcomes for people with an intellectual disability utilising a social enterprise framework. *Journal of Vocational Rehabilitation*, 2018, vol. 48, pp. 59–77.
19. Kummitha R.K.R. Social entrepreneurship as a tool to remedy social exclusion: A win – win scenario? *South Asia Research*, 2016, vol. 36, pp. 61–79.
20. Franco M., Haase H., Lautenschläger A. Students • entrepreneurial intentions: An interi regional comparison. *Education and Training*, 2010, vol. 52, pp. 260–275.
21. Ashour S. Social and business entrepreneurship as career options for university students in the United Arab Emirates: The drive – preparedness gap. *Cogent Education*, 2016, vol. 3.
22. Kedmenec I., Rebernik M., Peric J. The impact of individual characteristics on intentions to pursue social entrepreneurship. *Ekonomski Pregled*, 2015, vol. 66, pp. 119–137.
23. Ip Ch.I., Wu S.Ch., Liu H.Ch., Liang Ch. Revisiting the antecedents of social entrepreneurial intentions in Hong Kong. *International Journal of Educational Psychology*, 2017, vol. 6, pp. 301–323.
24. Barton M., Schaefer R., Canavati S. To be or not to be a social entrepreneur: Motivational drivers amongst American business students. *Entrepreneurial Business and Economics Review*, 2018, vol. 6, pp. 9–35.
25. Kireeva N.S., Zavyalov D.V., Saginova O.V., Zavyalova N.B. Students' perception of social entrepreneurship. *Revista de la Universidad del Zulia*, 2019, vol. 10, pp. 200–210.

Information about the Authors

Ondrej Kročil – Ph.D., Researcher, Head of Department, Palacky University (Křížkovského 511/8, 779 00 Olomouc, Czech Republic; e-mail: ondrej.krocil@upol.cz)

Richard Pospíšil – Associate Professor, Researcher, Palacky University (Křížkovskéhoo 511/8, 779 00 Olomouc, Czech Republic; e-mail: richard.pospisil@upol.cz)

David Kosina – Engineer's degree, Researcher, Palacky University (Křížkovského 511/8, 779 00 Olomouc, Czech Republic; e-mail: david.kosina@upol.cz)

Received February 25, 2020.

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 conducted by VolRC RAS in the Vologda Oblast[1].

The following tables show the dynamics of a number of parameters of social well-being and socio-political moods of the region's population based on the results of the last "wave" of monitoring (October 2020), as well as for the period from August 2019 to October 2020 (last 6 polls).

We compare the results of the surveys with the data for 2000 (the first year of V. Putin's first presidential term), 2007 (the last year of V. Putin's second presidential term, when the assessment of the President's work was the highest), 2011 (the last year of Dmitry Medvedev's presidency), and 2012 (the first year of V. Putin's third presidential term).

We also provide yearly dynamics of the data for 2017–2019.

In August – October 2020, the level of approval of the work of the President of the Russian Federation did not change significantly. The share of positive assessments is 52%, negative – 33%.

At the same time, population's assessments are somewhat lower than 12 months ago (October 2019): the share of positive assessments decreased by 2 p. p. (from 54 to 52%), negative – increased by 3 p. p. (from 30 to 33%)[2].

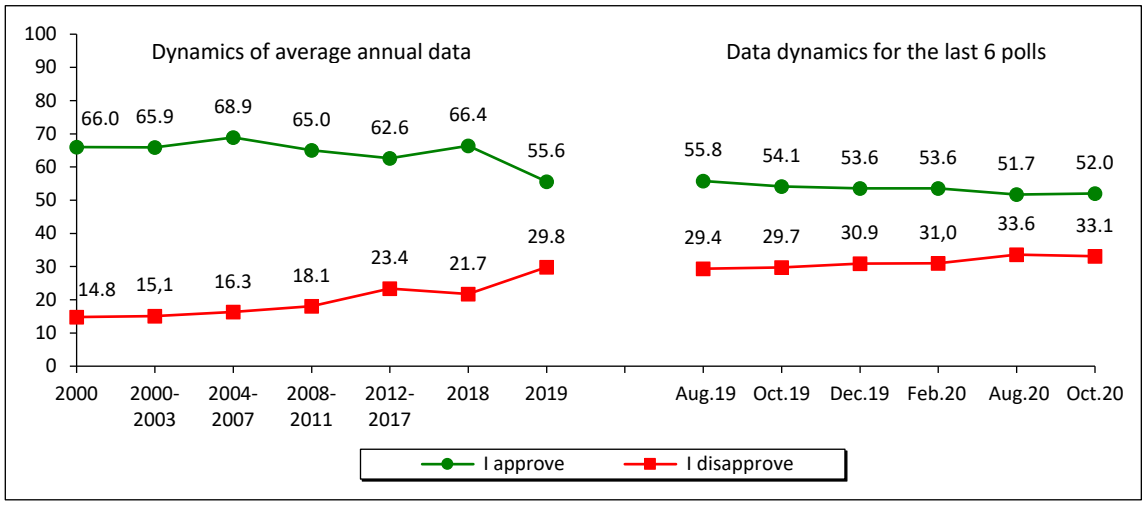
We should say that the level of approval of the President's work is noticeably lower in 2019–2020 than in 2000 (the first year of V. Putin's first presidential term). In this period, the share of positive assessments decreased by 10 p. p. (from 65 to 52–55%), and the relative share of negative assessments increased by nearly 2 times (15–17 p. p., from 15 to 30–33%).

[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/

[2] Hereinafter, the results of the comparison of poll data (October 2020) and the results of the last year "wave" of monitoring (October 2019) are highlighted in a frame.

In general, do you approve or disapprove of the work of the President of Russia?
(% of respondents, FSBIS VolRC RAS data)*



* Hereinafter, all graphs show average annual data for 2000, 2018, 2019, as well as average annual data for 2000–2003, 2004–2007, 2008–2011, 2012–2017, corresponding to the periods of presidential terms.

How do you assess the current performance of..? (% of respondents)*

Respond option	Dynamics of average annual data							Data dynamics for the last 6 polls						Dynamics (+/-), Oct. 2020 to Oct. 2019
	2000	2007	2011	2012	2017	2018	2019	Aug. 2019	Oct. 2019	Dec. 2019	Feb. 2020	Aug. 2020	Oct. 2020	
RF President														
I approve	66.0	75.3	58.7	51.7	67.3	66.4	55.6	55.8	54.1	53.6	53.6	51.7	52.0	-2
I disapprove	14.8	11.5	25.5	32.6	20.0	21.7	29.8	29.4	29.7	30.9	31.0	33.6	33.1	+3
Chairman of the RF Government**														
I approve	-*	-*	59.3	49.6	49.5	48.0	41.1	43.1	41.1	41.1	37.9	38.9	38.8	-2
I disapprove	-	-	24.7	33.3	31.1	31.6	38.4	36.3	37.5	38.9	40.9	40.9	40.8	+3
Governor of the Oblast														
I approve	56.1	55.8	45.7	41.9	39.8	38.4	35.7	36.1	35.6	35.6	36.2	35.2	35.5	0
I disapprove	19.3	22.2	30.5	33.3	39.3	37.6	40.2	38.5	40.1	40.8	41.8	41.9	42.1	+2

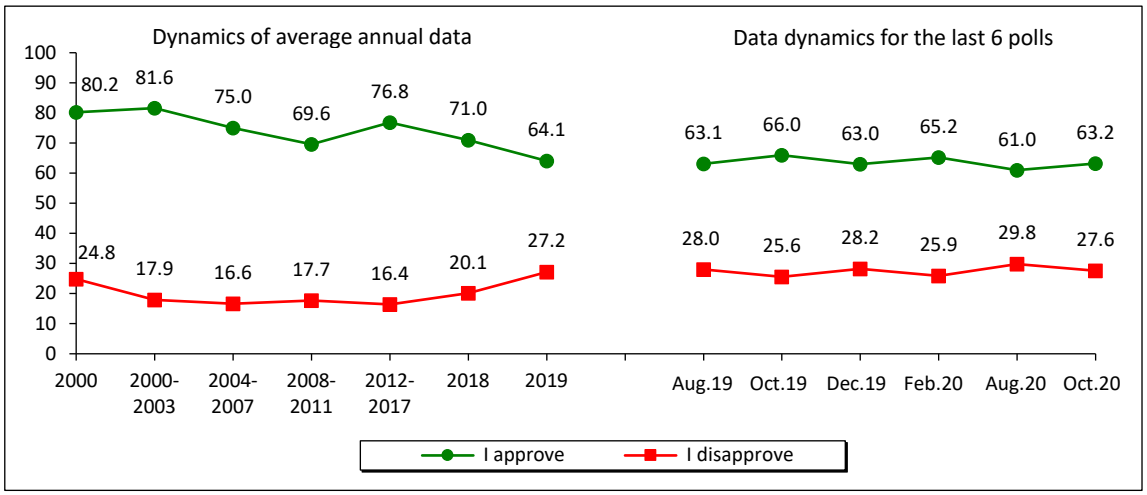
* According to the research methodology, the sampling error does not exceed 3%, therefore, hereinafter, changes with a difference of 2 p. p. or less in all tables are considered insignificant. They are highlighted in blue in the tables (negative changes are highlighted in red, and positive changes are highlighted in green).
** The question was first asked in 2008. In 2020, the first poll was conducted in January 24–February 12. The current chairman of the RF Government M. V. Mishustin has just started his new work (January 16, 2020), therefore, respondents were asked about work of the former Prime Minister – Dmitry Medvedev.

For reference:

According to VCIOM, the level of approval of the President's work did not change significantly in August–October 2020 (61–63%), the share of negative assessments decreased by 2 p. p. (from 30 to 28%).

According to Levada-Center, the relative share of positive assessments of the President's work increased by 3 p. p. (from 66 to 69%), negative – decreased by 3 p. p. (from 33 to 30%)[3].

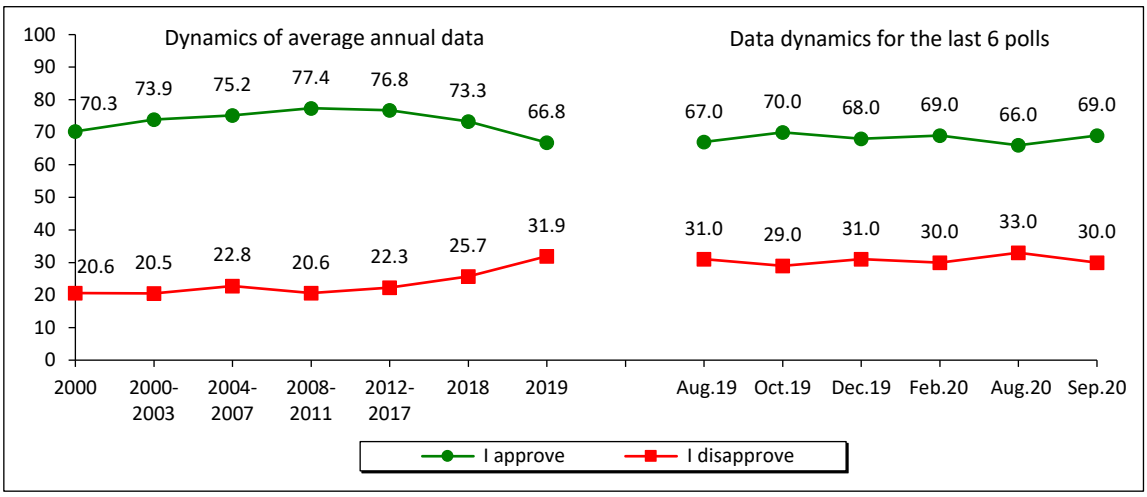
In general, do you approve or disapprove of the work of the President of the Russian Federation? (% of respondents; VCIOM data)



Source: VCIOM data. Available at: https://wciom.ru/

Data for October 2020 – average value for two polls: from October 4, 2020 and October 11, 2020.

In general, do you approve or disapprove of the work of V. Putin at the position of the President of Russia? (% of respondents; Levada-Center data)



Source: Levada-Center data. Available at: https://www.levada.ru/

[3] Different methodological approaches, applied by VCIOM, Levada-Center, and VolRC RAS, do not allow comparing the results with each other. Nevertheless, the collected information makes it possible to analyze the overall dynamics of social attitudes that exist in Russian society, which are recorded by three different research centers (two Russian and one regional).

From August to October 2020, there have been no significant changes in the assessment of the success with which the President solves the country's key problems:

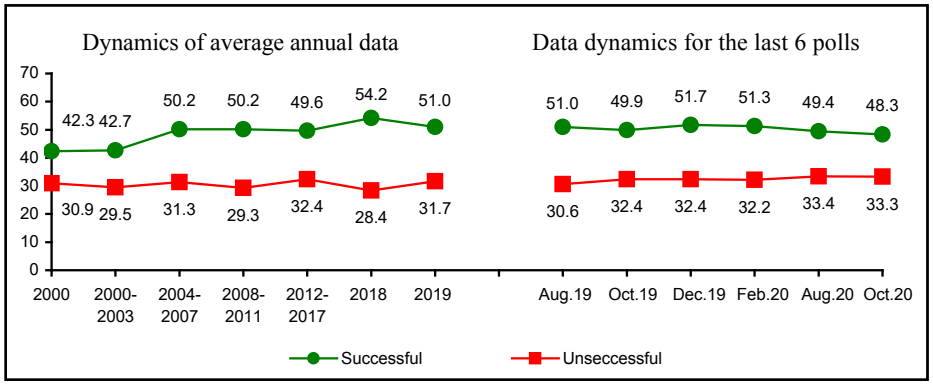
- ✓ 49% of residents of the Vologda Oblast positively assess the work of the head of the state aimed at strengthening Russia's international positions;
- ✓ 43% positively assess the President's efforts aimed at restoring order in the country;
- ✓ 33–34 positively assess the President's efforts aimed at protecting democracy and strengthening the freedoms of citizens (at the same time, 48–49% share the opposite point of view);
- ✓ the share of those who positively assess his efforts aimed at boosting the economy and increasing the welfare of the population is 24–25%, which is three times lower than the share of those who support the opposite point of view (61–62%).

It should also be noted that, compared to October 2019, assessments of the success of the President's work on all aforementioned issues have worsened, except for the strengthening of Russia's international positions. Thus, the share of people who think that the President is not successful in restoring order in the country increased by 3 4 p.p. (from 39 to 42%), protecting democracy and strengthening citizen's freedoms (from 46 to 49%), boosting the economy and increasing the welfare of the population (from 58 to 62%).

In your opinion, how successful is the RF President in coping with challenging issues..?

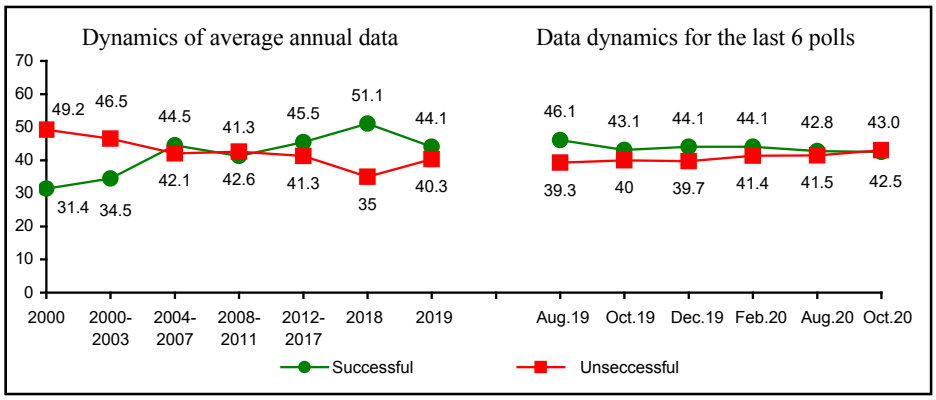
of respondents; FSBIS VolRC RAS data)

Strengthening Russia's international positions



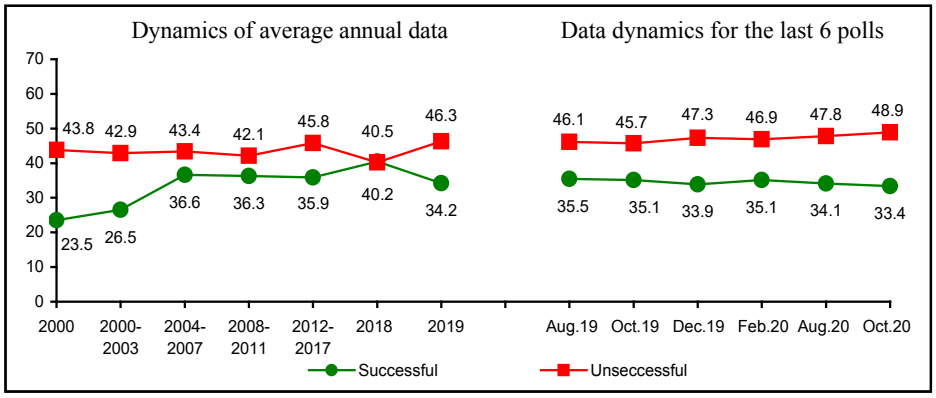
Annual dynamics (October 2020 to October 2019)	
Respond option	Dynamics (+ / –)
Successful	-2
Unseccessful	+1

Imposing order in the country



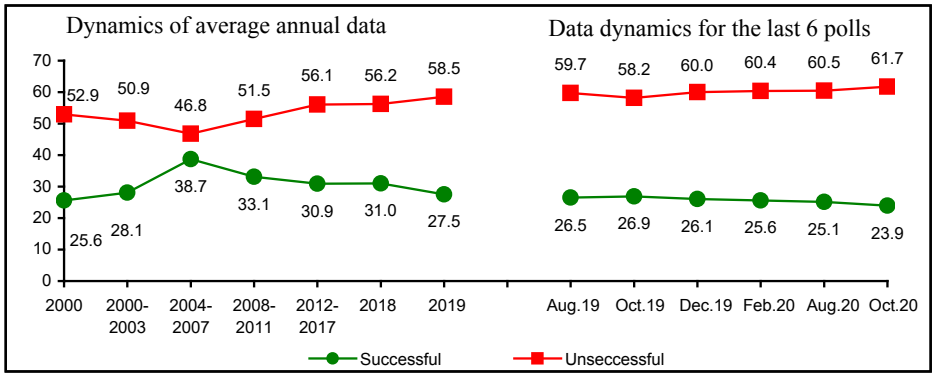
Annual dynamics (October 2020 to October 2019)	
Respond option	Dynamics (+ / –)
Successful	-1
Unseccessful	+3

Protecting democracy and strengthening citizens' freedoms



Annual dynamics (October 2020 to October 2019)	
Respond option	Dynamics (+ / –)
Successful	-2
Unseccessful	+3

Economic recovery and increase in citizens' welfare



Annual dynamics (October 2020 to October 2019)	
Respond option	Dynamics (+ / –)
Successful	-3
Unseccessful	+4

In August–October 2020, the structure of people's political preferences has not significantly changed: the level of support for the United Russia party is 31%, LDPR and KPRF– 8–9%, the Just Russia party – 4%. At the same time, the share of the Oblast's population believing that none of the political forces represented in Parliament express their interests remains high (34%).

The same situation was a year ago (October 2019), however, in comparison with 2000, there are some changes. In particular, the level of support for the United Russia party has increased by 12 p. p. over this period (from 19 to 31%), however, the level of electoral and political apathy has also increased: the share of those who are not satisfied with any parties represented in the State Duma increased by 4 p.p. (from 30 to 34%).

Which party expresses your interests? (%of respondents; FSBIS VolRC RAS data)

Party	Dynamics of average annual data										Data dynamics for the last 6 polls						Dynamics (+/-), Oct. 2020 to Oct. 2019
	2000	2007	2011	Election to the RF State Duma 2011, fact	2012	2016	Election to the RF State Duma 2016, fact	2017	2018	2019	Aug. 2019	Oct. 2019	Dec. 2019	Feb. 2020	Aug. 2020	Oct. 2020	
United Russia	18.5	30.2	31.1	33.4	29.1	35.4	38.0	34.7	37.9	33.8	33.5	32.8	33.7	33.2	30.9	31.1	-2
KPRF	11.5	7.0	10.3	16.8	10.6	8.3	14.2	7.6	9.2	8.8	8.7	9.1	9.2	8.9	8.6	8.8	0
LDPR	4.8	7.5	7.8	15.4	7.8	10.4	21.9	11.0	9.6	9.1	10.5	8.3	9.4	9.9	9.3	9.4	+1
Just Russia	-	7.8	5.6	27.2	6.6	4.2	10.8	4.8	2.9	3.4	3.9	4.2	4.0	4.7	4.8	4.3	0
Other	0.9	1.8	1.9	–	2.1	0.3	–	0.5	0.7	0.3	0.4	0.1	0.1	0.6	0.4	0.3	0
None	29.6	17.8	29.4	–	31.3	29.4	–	29.2	28.5	33.7	32.1	34.3	34.3	34.0	33.6	33.8	-1
Hesitate to respond	20.3	21.2	13.2	–	11.7	12.0	–	12.2	11.2	11.0	10.9	11.2	9.3	8.7	12.4	12.2	+1

The estimates of social well-being changed positively and insignificantly for the first time over the last 6 polls (from August 2019 to October 2020): the share of the Oblast's population who positively assess their daily emotional state, in August – October 2020, increased by 4 p. p. (from 57 to 61%). At the same time, the relative share of those who negatively assess their mood remains stable: as in August 2020, 32% of the Oblast's population noted that they feel "stress, irritation, fear, sadness".

There were no significant changes in the level of stock of patience in August–October 2020: the share of those who think that "everything is not so bad, and it is possible to live; it is difficult to live, but it is possible to stand it" is 72%; the relative share of those who "cannot bear their plight" is 20%.

Besides, in 2020, the structure of population's social self-identification remains stable: 49 50% of the Oblast's residents refer to themselves as "poor and extremely poor". At the same time, the share of those who subjectively refer to themselves as "rich and middle-class people" is nearly 10 p. p lower (39–40%).

Consumer Sentiment Index in October 2020, just like in August 2020, was 86 p., which is 5 p. less than in February (91 p.).

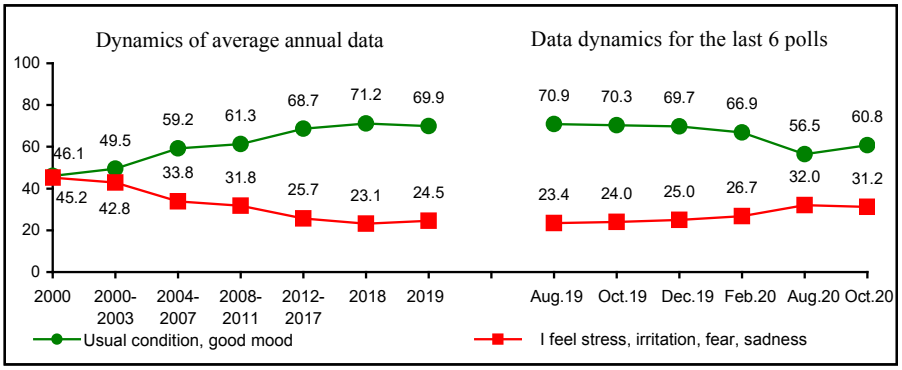
If we compare the current situation (in October 2020) with the last year's period (October 2019), negative change are more obvious:

- ✓ the share of social mood's positive assessments decreased by 10 p.p. (from 70 to 60%);
- ✓ the share of people who think that "everything is not so bad, and it is possible to live; it is difficult to live, but it is possible to stand it" decreased by 6 p. p. (from 78 to 72%);
- ✓ the share of those who refer to themselves as "rich and middle-class people" decreased by 3 p. p. (from 41 to 38%)

Consumer Sentiment Index decreased by 6 points (from 92 to 86 p.). At the same time, for many years (since 2007–2008), it has been below 100 points, which means the prevalence of negative assessments in the population's estimations concerning the future of the Russian economy and their personal financial situation

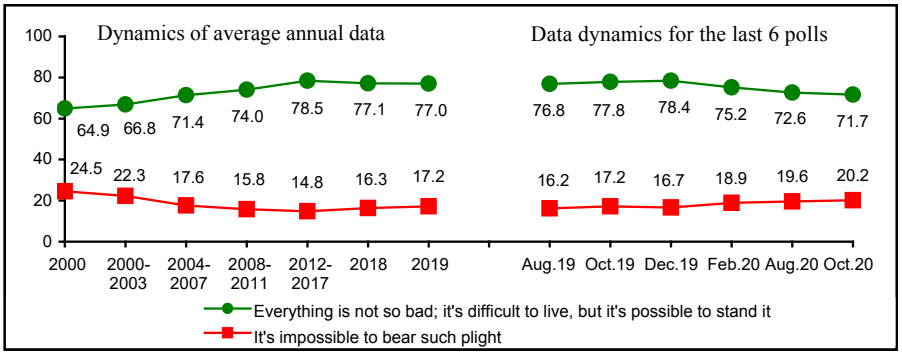
Estimation of social condition *(% of respondents; FSBIS VolRC RAS data)*

Social mood



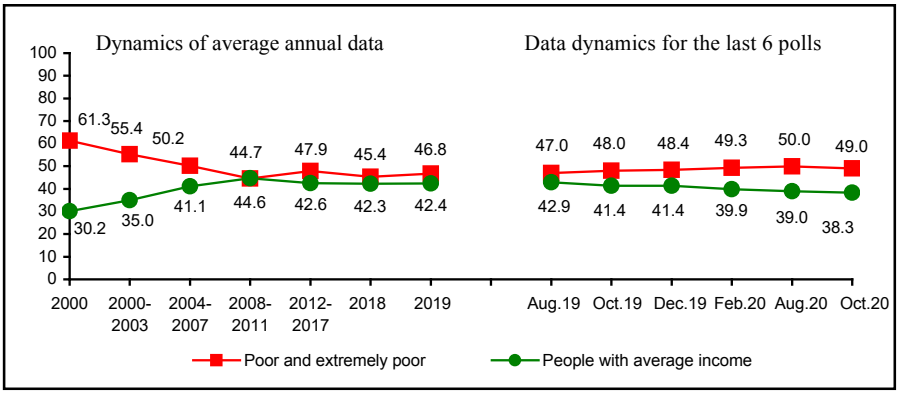
Annual dynamics (October 2020 to October 2019)	
Respond option	Dynamics (+ / –)
Usual condition, good mood	-10
I feel stress, irritation, fear, sadness	+7

Stock of patience



Annual dynamics (October 2020 to October 2019)	
Respond option	Dynamics (+ / –)
Everything is not so bad; it's difficult to live, but it's possible to stand it	-6
It's impossible to bear such plight	+3

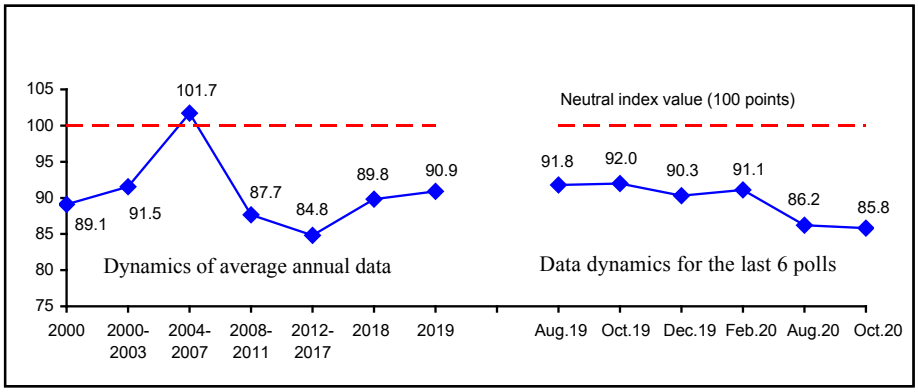
Social self-identification*



Annual dynamics (October 2020 to October 2019)	
Respond option	Dynamics (+ / –)
Share of people who consider their income average	-3
Share of people who consider themselves poor and extremely poor	+1

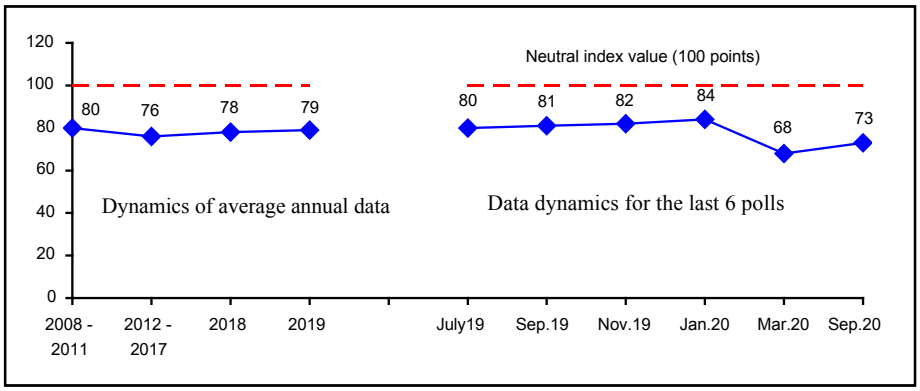
* Question: "Which category do You belong to, in your opinion?"

Consumer Sentiment Index (CSI)



Annual dynamics (October 2020 to October 2019)	
CSI	Dynamics (+ / –)
Index value, points	-6

Consumer Sentiment Index (CSI; Levada-Center data* for Russia)



Annual dynamics (October 2020 to October 2019)	
CSI	Dynamics (+ / –)
Index value, points	– 8

* The index has been calculated since 2008

Source: Levada-Center data. Available at: https://www.levada.ru/indikatory/sotsialno-ekonomicheskie-indikatory/

The improvement of social mood's assessments in August-October 2020 is recorded in population's most (in 11 out of 14) main socio-demographic categories: first of all, among people aged 30–55 (by 7 p. p., from 56 to 63%) and those who, according to self-assessments of income, are included in the group of 20% of the least wealthy citizens (by 6 p. p., from 40 to 46%).

The deterioration of social mood's assessments in August–October 2020 is recorded among people aged under 30 (by 4 p.p., from 69 to 65%) and in the group of 20% of the wealthiest people in the Oblast (by 5 p. p., from 76 to 71%).

It should be also noted that, in comparison with the last year's period (October 2020 compared to October 2019), negative changes of social mood's assessments are recorder in all population's socio-demographic categories. The share of those who experience mostly positive emotions in most groups decreased by 7–11 p. p., among Cherepovets residents – by 13 p. p. (from 72 to 59%), among people aged under 30 – by 15 p. p. (from 81 to 64).

Social mood in different social groups (respond option "Wonderful mood, normal, stable condition", % of respondents; FSBIS VolRC RAS data)

Population group	Dynamics of average annual data							Data dynamics for the last 6 polls						Dynamics (+/-) Oct. 2020 to Oct. 2019
	2000	2007	2011	2012	2017	2018	2019	Aug. 2019	Oct. 2019	Dec. 2019	Feb. 2020	Aug. 2020	Oct. 2020	
Gender														
Male	50.1	65.9	64.5	69.1	70.6	72.8	70.1	71.8	69.2	69.0	67.0	55.6	60.7	-9
Female	43.3	61.7	62.0	65.8	70.2	69.8	69.6	70.1	71.2	70.3	66.9	57.3	60.8	-10
Age														
Under 30	59.1	71.3	70.0	72.3	78.1	80.0	81.1	85.2	79.9	81.3	71.7	69.0	64.6	-15
30-55	44.2	64.8	62.5	67.9	71.5	72.6	71.2	74.0	71.1	71.9	67.5	56.2	62.5	-9
Over 55	37.4	54.8	58.3	62.1	64.9	65.2	63.3	60.7	65.1	62.6	64.3	51.9	56.9	-8
Education														
Secondary and incomplete secondary	41.7	58.4	57.4	57.2	63.6	64.8	63.2	65.6	63.4	64.0	63.1	51.7	56.9	-7
Secondary vocational	46.4	64.6	63.6	66.7	72.0	72.2	72.7	72.8	73.9	70.4	69.0	59.1	63.5	-10
Higher and incomplete higher	53.3	68.6	68.3	77.0	75.8	76.8	73.4	73.9	72.6	74.7	68.6	58.6	61.4	-11
Income groups														
Bottom 20%	28.4	51.6	45.3	51.5	52.9	57.3	53.2	53.2	54.1	50.2	48.4	40.4	46.0	-8
Middle 60%	45.5	62.9	65.3	68.7	72.0	71.9	71.4	72.1	72.6	72.6	68.4	56.6	61.9	-11
Top 20%	64.6	74.9	75.3	81.1	83.7	82.9	81.8	81.4	80.5	80.5	79.1	76.4	70.6	-10
Territories														
Vologda	49.2	63.1	67.1	73.6	72.6	71.0	68.6	68.0	70.8	68.6	66.9	57.0	61.0	-10
Cherepovets	50.8	68.1	71.2	76.2	75.7	75.8	71.2	74.4	72.0	69.9	67.3	54.4	59.3	-13
Districts	42.2	61.6	57.1	59.8	66.1	68.7	69.8	70.5	69.0	70.3	66.8	57.5	61.4	-8
Oblast	46.2	63.6	63.1	67.3	70.4	71.2	69.9	70.9	70.3	69.7	66.9	56.5	60.7	-10

CONSLUSIONS

Analyzing the dynamics of public opinion for the period from August to October 2020, we should highlight one important change which, however, still has not become a steady trend – the improvement of social mood in most (11 out of 14) main socio-demographic categories of population. In general across the Oblast, the share of people who feel mostly positive emotions increased by 4 p. p. (from 57 to 61%) in October 2020. This is not much, but such positive changes were recorded for the first time since August 2019, and this is especially important during the period of relentless epidemiological threat of the coronavirus infection spread.

In August–October 2020, there were no significant changes in other key indicators of public opinion monitoring (including the assessment of the President's work, the assessment of the success of the President's actions to address the country's major problems, population's electoral preferences, as well as the characteristics of their financial situation and its development forecasts).

The vector of public opinion dynamics is more evident while analyzing population's assessments in an average annual retrospective, and in this case, unfortunately, we have to state mainly negative changes.

In comparison with October 2019, in October 2020, the share of negative assessments concerning the President's work insignificantly (by 3 p. p.) increased (from 30 to 33%, and these changes are also recorded in all-Russian VCIOM data). The share of the Oblast's residents who think that the President's work in restoring order in the country, protecting democracy, boosting economy, and increasing citizens' welfare was unsuccessful went up by 3–4 p. p.

The particular concern is caused by the fact that, over the last 12 months (from October 2019 to October 2020), the share of people who positively assess their emotional state in fact decreased by 10 p. p. (from 70 to 60%), and the share of those who experience "stress, irritation, fear, sadness" increased form 24 to 31% (by 7 p. p.).

Undoubtedly, the coronavirus pandemic contributed to the deterioration of the social mood of the Oblast's residents, which perhaps affected a lifestyle of every person in 2020. The uncertainty of the dynamics of the epidemiological situation, lifestyle changes as a result of the common introduction of restrictive measures, the worsening economic situation – all of this has a negative impact on the psychological state of society, and it is further exacerbated by the growing international political tensions in the territorial proximity from Russian borders (protests in Belarus, the deterioration of the situation in Nagorno-Karabakh, "the Navalny's case" that led to another anti-Russian sanctions).

However, it is no less important to pay attention to the fact that the prevalence of negative assessments in the dynamics of financial situation, in the assessment of the success of the President's work to boost the economy and increase population's well-being, in population's forecasts concerning the prospects of the development of economic situation in the country and personal well-being is the trend which has been existing in Russian society for many years, and it had begun long before intial media messages about the upcoming coronavirus pandemic.

In fact, since 2008, Consumer Sentiment Index has been below 100 points which means the prevalence of pessimistic assessments concerning the forecasts for the Russian economy future, and, since 2012–2017, the share of people who subjectively refer to themselves as "poor and

extremely poor" prevails over the share of those who refer to themselves as "rich" or at least "middle-income".

In general, over the last 20 years (from 2000 to October 2020), the share of people negatively assessing the President's work to boost the economy and increase population's well-being increased by 9 p. p. (from 53 to 62%), and Consumer Sentiment Index decreased by 3 points (from 89 to 86 p.).

This is primarily the reason why today we have a situation when the assessment of the President's work is much worse than in 2000, when V. Putin started to act as the President: in 2000 – October 2020, the share of positive assessments of the President's work decreased by 14 p. p. (from 66 to 52%), and the share of negative assessments increased by 18 p. p. (from 15 to 33%).

The similar results are shown by all-Russian studies. Thus, according to VCIOM data for 2000 – October 2020, the level of approval the President's work decreased by 17 p. p. (from 80 to 63%), according to Levada-Center – the share of negative characteristics increased by 10 p. p. (from 20 to 30%).

Thus, based on given factual data, we shall conclude that the absence of positive dynamics in most aspects of the whole range of issues, which characterize the assessment of the efficiency of state administration (most of all, in population's attitude to the President's work, is related not just to the worsening of epidemiological, economic, and global political situation in 2020 but to the fact how efficiently state's social obligations are fulfilled in the long-term perspective, in relation to increasing the growth of well-being and quality of citizens' lives and achieving social justice.

This wording of the question becomes even more relevant after the adoption of amendments to the Constitution of the Russian Federation, which significantly strengthen the status of Russia as a social state, impose increased social obligations on the ruling elites, and stimulate the growth of society's corresponding social expectations.

Will the Government fulfill these obligations? The answer is still uncertain, but, perhaps, it is not less important than overcoming the epidemiological threat of the coronavirus spread; in the long run at least.

The materials were prepared by M.V. Morev, E.E. Leonidova, I.M. Bahvalova

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: esc@volnc.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.

It is recommended to include the following sources in the list of references:

1) articles from printed scientific journals (or electronic versions of printed scientific journals);

2) books;

3) monographs;

4) published conference proceedings;

5) patents.

A reference to the bibliographic source in the body of the article is given in square brackets indicating the ordinal number of the source from the references and page number referenced by the author. It is possible to make reference to multiple sources from the list, the ordinal numbers of these links are separated by a semicolon (for example: [26, p. 10], [26, p. 10; 37, p. 57], [28], [28; 47], etc.).

Articles that do not have the complete package of accompanying documents and articles that do not conform to the editor's requirements are not accepted.

SUBSCRIPTION INFORMATION

Dear readers!

You can subscribe to the journal *Economic and Social Changes: Facts, Trends, Forecast:*

1) at an office of the Russian Post (via the integrated catalog "Press of Russia", the Journal's subscription index is 41319);

2) at the website http://www.akc.ru;

3) by contacting the Journal's editorial office (contact person – Anna S. Artamonova, phone: 8 (8172) 59-78-32, e-mail: esc@volnc.ru).

Make-up page T.V. Popova
Translators and Proof-readers N.N. Boytsova,
N.Ye. Yentus
A.D. Kirillova

Passed for printing December 01, 2020.
Date of publication December 10, 2020.
Format 60×84 1/8. Digital recording.
Con. pr. sheets 32.7. Number of copies 500. Order No. 201.
Price is open.

The journal is registered with the Federal Service
for Supervision of Telecom and Mass Communications (Roskomnadzor).
Certificate of registration PI FS77-71361 dated October 26, 2017.

Founder: Federal State Budgetary Institution of Science
"Vologda Research Center of the Russian Academy of Sciences" (VolRC RAS)

Address of the Publisher and Editorial Office:
56A, Gorky St., Vologda, 160014, Russia
phone (8172) 59-78-03, fax (8172) 59-78-02, e-mail: common@volnc.ru