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ECONOMIC AND SOCIAL CHANGES: FACTS, TRENDS, FORECAST

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

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

Founder: Vologda Research Center of the Russian Academy of Sciences

Federal State Budgetary Institution of Science Vologda Research Center of the Russian Academy of Sciences (VolRC RAS) is the only unit of the Academy on the territory of the Vologda Oblast. The history of the Center started in 1990 from a Department of the Institute for Economic Studies of the Kola Science Centre of RAS on studying the problems of socio-economic development of the Vologda Oblast. Since then the Center has undergone manifold transformations. In 1993 it became an independent subdivision – the Vologda Scientific Coordinating Center of RAS. In 2009 it transformed into the Institute of Socio-Economic Development of Territories of RAS (ISEDT RAS).

In 2017 the socio-economic research was supplemented by agricultural issues. ISEDT RAS was joined by the Northwestern Dairy and Grassland Farming Research Institute, and was reorganized into the Vologda Research Center of the Russian Academy of Sciences.

In 2019 the Center continued expanding having launched the Laboratory of Bioeconomics and Sustainable Development within the framework of the national project "Science". The Laboratory is engaged in scientific research aimed at introducing biotechnologies into the practice of agriculture.

The VolRC RAS Director is Aleksandra A. Shabunova (Doctor of Economics). The Academic Leader of the Center is Vladimir A. Ilyin (RAS Corresponding Member, Doctor of Economics, Professor, Honored Worker of Science of the Russian Federation).

MAIN RESEARCH DIRECTIONS

In accordance with the Charter, the Vologda Research Center carries out fundamental, exploratory and applied research 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;
- development of scientifically based systems of dairy cattle breeding in the conditions of the North-Western region of Russia;
- development of new breeding methods, methods and programs for improving breeding work with cattle;
- development of scientifically based feed production systems, norms, rations and feeding systems for cattle in the conditions of the North-Western region of Russia;

- development of zonal technologies for the cultivation of agricultural crops;
- development of technologies for the creation, improvement and rational use of hayfields and pastures in the conditions of the North-Western region of Russia;
- development of technologies and technical means for agricultural production in the North-Western region of Russia;
- assessment of biodiversity in the North-Western region of Russia;
- development and implementation of biotechnologies in agricultural production;
- improvement of breeding methods and creation of new varieties of forage crops.

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2007 – Cooperation agreement is signed with the 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 the Institute of Economics of the National Academy of Sciences of Belarus (Minsk, Belarus, 2010).

2011 – Cooperation agreements are signed with National Institute of Oriental Languages and Civilizations (Paris, France, 2011), Institute of Business Economy at Eszterhazy Karoly College (Hungary, 2011), Republican research and production unitary enterprise "Energy Institute of NAS" (Belarus, 2011). Memoranda of understanding 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 – Memorandum of understanding is signed with Jiangxi Academy of Social Sciences (China, 2013). July 2013 – The application for research performance by international consortium involving ISEDT RAS within the 7th Framework Programme of European Community.

2014 – Cooperation agreement is signed with Center for System Analysis and Strategic Research of the National Academy of Sciences of Belarus (Belarus, 2014). Memoranda of understanding are signed with Jiangxi Academy of Social Sciences (Mao Zhiyong, China, 2014), National Institute for Oriental Studies INALCO (Julien Vercueil, France, 2014).

2015 – Memorandum of understanding is signed with Jiangxi Academy of Social Sciences (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 the Center for the Study of Industrialization Modes of the School of Advanced Studies in the Social Sciences (EHESS) (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). Memoranda of understanding are signed with Jiangxi Academy of Social Sciences (China, 2016).

2018 – Cooperation agreements are signed with the Department of Agrarian Sciences of the National Academy of Sciences of Belarus (Belarus, 2018); the Republican Unitary Enterprise "Scientific and Practical Center of the National Academy of Sciences of Belarus for Agricultural Mechanization" (Belarus, 2018). Memorandum of understanding is signed with the European School of Social Innovation (ESSI) (Germany, 2018).

2019 – Memorandum of understanding is signed with Jiangxi Academy of Social Sciences (China, 2019).

2020 – Memorandum of understanding is signed with Jiangxi Academy of Social Sciences (China, 2020).

CONTENT

EDITORIAL

REGIONAL ECONOMICS

SCIENTIFIC, TECHNOLOGICAL AND INNOVATION DEVELOPMENT

THEORETICAL AND METHODOLOGICAL ISSUES

BRANCH-WISE ECONOMICS

SOCIAL AND ECONOMIC DEVELOPMENT

GLOBAL EXPERIENCE

MONITORING OF PUBLIC OPINION

EDITORIAL

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The Fifth Political Cycle of Russian President Vladimir Putin: "Cosmetic Repairs" for Crony Capitalism or a Transition to "Social Capitalism"?

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Abstract. The new political cycle and Vladimir Putin's fifth presidential term are beginning in rather difficult and contradictory conditions for Russia. On the one hand, there are more and more signs that NATO countries are preparing for a direct military conflict with our country; this fact leads to an escalation of the already tense international situation. On the other hand, there are still no signs in the domestic political arena that the elites (primarily in the public administration system, representatives of big business) are beginning to feel the essence of the historical moment and, accordingly, shift their motivation and their values from personal interests to the interests of national security. The reason lies in the fact that although the President is adopting important decisions necessary for the start of a new political cycle (formulation of national development goals until 2030, 2036, appointment of responsible executors for

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their implementation), he has not given an answer to the question of what kind of State we are building. The State of "social capitalism" or "crony capitalism"? The need for an answer to this question (and specifically from the President) has been maturing in society for many years and has now reached such a degree of relevance that it became the subject of a plenary discussion with the participation of the head of state at the Saint Petersburg International Economic Forum, held in Russia on June 5–8, 2024. However, at the Forum, there was still no response from the President to this question; so many experts (mostly reflecting the opinion of the majority of the country's population) remain in a state of anxious expectation about where Russia is going; whether the country has a clear understanding of the image of the future, which is necessary for the successful achievement of all the goals of the special military operation and for building the contours of a new Social Contract that should replace what can be called the paradigm of semi-colonial dependence on the West... The article uses an extensive database in the form of expert opinions, facts, and monitoring sociological surveys results. Scientific novelty of the approach consists, first of all, in a combination of various aspects of the social and political life of the country, which become the subject of our analysis. Among them are specific administrative decisions of the head of state, assessments of public opinion, views of representatives of big business, opinions of State Duma deputies, political and public figures, historians, economists, etc. In particular, the article presents the results of the vote in the lower house of Parliament on the approval of candidates for new members of the Government of the Russian Federation, as well as data from the open accounts of a number of large metallurgical corporations, indicating that the priorities of their activities do not correspond to the challenges that Russia has faced after the beginning of the special military operation.

Key words: new political cycle, social capitalism, oligarchic capitalism, new Social Contract, 2024 "May decree".

In May 2024, a new political cycle began in Russia, as Vladimir Putin assumed office as President for the fifth term. This period in the life of the country quite naturally brings to the fore some questions about the future. Moreover, it is connected not only with the course of the special military operation (SMO) (which, of course, poses major challenges to national security), but more broadly, it is about the future until 2030, 2036: will the country be able to overcome the set of problems accumulated during Vladimir Putin's previous presidential terms and in general during the post-Soviet period? Will Russia be able to make a U-turn in the most difficult political and economic conditions, establish prerequisites for the development of a multipolar world and get done with a semi-colonial dependence on the United States, in which it has been all the previous 30 years? Will the goals and objectives of the national development of the coming political cycle be really achieved, and if so, how much will this allow Russia to get closer to achieving the main goal – gaining full national sovereignty?

A. Kolganov (Doctor of Sciences (Economics), Professor, head of laboratory at Lomonosov Moscow State University): "We are in the situation that developed in the 1990s. The growth rate is low, the growth rate of welfare is minuscule... **The problem lies in the economic model that has developed in Russia. It is necessary to change the model. It should be about measures of an emergency nature. Because the problems are extreme...**

But no steps are being taken to fix the model. Many paradigms that led to extremely negative socio-economic consequences continue to function. This is evident in finances.

Why is this so and what needs to be done to fix the situation? What is wrong? **I am not satisfied that this model is capitalist, but leaping over capitalism is an extremely difficult task.**

Why is our model of capitalism ineffective?... Why is the Russian economic model stuck in such a condition? **Its spontaneous formation in the 1990s, when there were interests of the bureaucracy, when they thought about their private selfish interests; the situation remains...**"[1]

There are many questions, and answers to them will have to be found in extremely difficult and ambiguous conditions inside the country (in the public administration system, society, business, culture) and, above all, in the foreign political arena – around Russia and in the world as a whole.

"The President of the Russian Federation considers his state activity **precisely in the historical context,** and this time is quite long. It would seem that there have been no troubles and internal upheavals in Russia for a long time. **But if you think in long time periods, then all the lessons, of course, can be considered recent and definitely relevant.** First of all, we are talking about the experience of political uncertainty and anarchy. **Or the experience of losing power by a responsible elite who was entrusted with running the country.**

The current president obviously does not want this experience to be repeated or reproduced. The next six years are an important period for him"[2].

At least, this is what the situation looks like today, at the beginning of a new political cycle. In particular, against the background of strengthening the BRICS, signing of a comprehensive strategic partnership agreement[3] between Russia and North Korea, which has "far-reaching consequences for relations between Moscow and Pyongyang, for the situation in Northeast Asia, for security in the global dimension"[4], and also against the background of the ongoing special military operation[5], when European NATO member countries are increasingly involved in the conflict in Ukraine.

Vladimir Putin: "The share of the Big Seven in world GDP at purchasing power parity in 1992 was 45.7%, and the BRICS, even without expansion ... only 16.5; **and in 2022 the G7 has 30.3%, and the BRICS – 31.5%. By 2028, the situation will change even more in favor of the BRICS:** there will be 36.6%, for G7 the forecast for 2028 is 27.8"[6].

Sergey Lavrov: over the year 2023, the BRICS **association doubled** (from 5 to 10 members); "about 30 countries have applied for rapprochement with the BRICS in one form or another"[7].

June 18–19, 2024, Vladimir Putin paid a state visit to the Democratic People's Republic of Korea, during which the heads of state signed a comprehensive strategic partnership agreement, which is **"a geopolitical breakthrough radically changing the situation in East Asia and the world"**[8].

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[1] Russia is "stuck" in an inefficient model of capitalism of the 1990s. Available at: https://newdaynews.ru/moscow/819535.html (materials of the Fifth All-Russian Social Forum, held within the framework of the WSF-2024 World Social Forum on February 16–18, 2024).

[2] How to ensure the stability of the system in Russia. Available at: https://www.ng.ru/editorial/2024-05-08/100_08052024_red.html

[3] On the signing of a comprehensive strategic partnership agreement between the Russian Federation and the Democratic People's Republic of Korea: Resolution of the President of the Russian Federation 182, dated June 17, 2024.

[4] Tavrovsky Y. Korean response to the Ukraine and Taiwan crises. Available at: https://www.ng.ru/kartblansh/2024-06-19/3_9031_kb.html

[5] "The Armed Forces of the Russian Federation have maintained the initiative on the fronts for more than six months: they do without major campaigns with the breakthrough of numerous formations to the depth of the front, but also without serious pauses with the division into seasonal operations. Pressure remains in almost all directions" (Source: Smirnov A. On the threshold of uncontrolled escalation. Available at: https://monocle.ru/monocle/2024/24/na-poroge-neupravlyayemoy-eskalatsii/).

[6] Address of the President of the Russian Federation to the Federal Assembly on February 29, 2024. Available at: http://www.kremlin.ru/events/president/news/73585

[7] Speech by RF Minister of Foreign Affairs Sergey Lavrov during the meeting of the BRICS Business Council, Moscow, May 31, 2024. Available at: https://www.mid.ru/ru/foreign_policy/news/1953913/

[8] Shkolnikov A. Russian billiards, two balls in one pocket. Available at: https://zavtra.ru/blogs/russkij_bil_yard_dva_shara_v_odnu_luzu

Their actions[9] and public statements[10] increase the degree of international tension and provoke an escalation of the conflict. As an expert pointed out, **"it feels like the world has gone crazy, that someone is deliberately pushing it toward disaster"**[11].

"The self-centeredness and arrogance of Western countries have led us to a highly perilous situation today. **We are inching dangerously close to a point of no return.** Calls for a strategic defeat of Russia, which possesses the largest arsenals of nuclear weapons, demonstrate **the extreme recklessness of Western politicians. They either fail to comprehend the magnitude of the threat they are creating or are simply consumed by their notion of invincibility and exceptionalism"**[12].

"The increase in military spending ... of countries that are directly or covertly waging war against Russia amounted to 90.9 billion USD last year [2023]. And if we compare this total increase with the increase in Russian military spending, the latter turns out to be **more than four times less. In this military race, the West (including its satellite, Ukraine) is outstripping Russia dramatically"**[13].

Moreover, we cannot but recognize two things.

✓ First, from the very beginning of the special military operation, the states of the Collective West, united by the NATO military bloc, have been acting harmoniously, purposefully and precisely against Russia. While the friendly states of the Russian Federation, which advocate the formation of a multipolar world, are not united in any military bloc; thus, our country de facto remains "one on one" with an enemy that is many times superior in military potential...

✓ Second, the Collective West acts quite openly and consistently. The goal of inflicting a "strategic defeat" on Russia was announced by NATO representatives from the very beginning of its operation (this was publicly stated by US Deputy Secretary of State V. Nuland on March 9, 2022[14]), and that goal has not changed since then. The tactical task

K. Sivkov: "The Western elites, in particular the American ones, **have made too great of a bid for Russia's defeat in the zone of SMO...** Therefore, Washington has no choice but to start **fighting for its own survival.** They will try to achieve this by gradually expanding the combat zone... **Thus, we will be dealing with the slow and gradual involvement of individual European countries in the confrontation with Russia"**[15].

[9] In particular, the fact that the United States and at least 11 other European NATO countries (UK, Latvia, Lithuania, Canada, the Netherlands, Poland, Finland, France, Czech Republic, Sweden, Estonia) allowed Ukraine to use long-range weapons to strike deep into the territories of Russia.

[10] First of all, we are talking about the statements of French President Emmanuel Macron to send a military contingent to the zone of SMO. In addition, according to retired colonel A. Koshkin, "the Baltic States and Poland can send their military to the zone of the special military operation in Ukraine" (Information portal News.ru. Available at: https://dzen.ru/a/Zjnetp50uRIjaaBy?ysclid=lxg1gyonk6568011656)/

[11] Vladimir Putin's meeting with the heads of international news agencies on June 5, 2024 (quoting A. Kondrashov). Available at: http://www.kremlin.ru/events/president/transcripts/74223

[12] Vladimir Putin's meeting with the leadership of the Russian Foreign Ministry on June 14, 2024. Available at: http://www.kremlin.ru/events/president/news/74285

[13] Katasonov V. A new round of the arms race begins. Available at: https://zavtra.ru/blogs/o_voennih_rashodah_v_mire_nachinaetsya_novij_raund_gonki_vooruzhenij?ysclid=lxmtwzitlm698795933

[14] Nuland named the US goal in Ukraine. Available at: https://ria.ru/20220309/tsel-1777205074.html?ysclid=lxmufvwhc157188618

[15] Military expert: The United States is trying to involve Russia in a European-scale conflict. Available at: https://vz.ru/news/2024/3/7/1256953.html

of "weakening" Russia by fighting "to the last Ukrainian" has also been quite explicit; according to this logic, as many experts note, to continue to fight with Russia "to the last European"[16] satisfies the United States of America – the true instigator of the Ukrainian conflict.

As a result, the situation around Russia in the foreign political arena and in the world as a whole is still very alarming: "further raising the stakes is almost impossible without a military conflict outside Ukraine and without the use of nuclear weapons"[17]. **And perhaps, today no political or military observer can say with certainty how this situation will be resolved…**

However, despite the fact that the main issues on which the achievement of SMO goals and the outcome of the Ukrainian conflict depend are solved primarily on the battlefield, **"it will not work to win this confrontation only by military means" as A. Dugin points out[18].** The future of Russia is depends in many ways on its internal life; on the ability of society as a whole and, above all, its elite groups (in politics, culture, business, public administration, etc.) to "get out" of the paradigm of Western thinking, values and lifestyle; to mentally adjust to the goals that our country defends in its foreign policy: the achievement of full national sovereignty, reliance on traditional values, a social (and not capitalist) state.

> *A. Dugin:* "Now Russia is combating an ideological opponent, **and this is a battle not only of the army, but also of countries, ideas and civilizations… And therefore we need to very quickly determine this Russian worldview, the foundations of which are laid in the documents of the president, in speeches, in his decrees, in our doctrines"**[19].

And, unfortunately, in this sense, the actual situation inside the country is no less contradictory than in the foreign political arena.

We should note that, in general, the state is taking many important system-wide steps to ensure the course of national development for the period of the next political cycle and for the longer term. Thus:

February 29, 2024, during his annual Address to the Federal Assembly of the Russian Federation, Vladimir Putin publicly announced the goals and objectives of national development **for the period up to 2030**, including the development prospects outlined in the report of the Agency for Strategic Initiatives (ASI) "Horizon 2040"[20];

March 17, 2024, the election of the President of the Russian Federation was held, at which Vladimir Putin's "action program"[21] **was**

[16] Are they completely out of their minds? (quoting N. Patrushev). Available at: https://rg.ru/2023/03/27/oni-sovsem-strah-poteriali.html

[17] Smirnov A. On the threshold of uncontrolled escalation. Available at: https://monocle.ru/monocle/2024/24/na-poroge-neupravlyayemoy-eskalatsii/

[18] Dugin A. The battlefield is Ukraine, the main weapon for victory is available. Available at: https://tsargrad.tv/articles/aleksandr-dugin-pole-bitvy-ukraina-dlja-pobedy-est-glavnoe-oruzhie_653555?ysclid=lxmv2d79n1647799129

[19] Dugin called for the formation of a sovereign Russian worldview as quickly as possible. Available at: https://ren.tv/news/v-rossii/1189235-dugin-prizval-skoree-sformirovat-suverennoe-russkoe-mirovozzrenie

[20] The Horizon 2040 report was prepared in November 2023 by the Agency for Strategic Initiatives, whose Supervisory Board is headed by the President of the Russian Federation Vladimir Putin. The project brought together "more than 130 leading Russian experts in the fields of demography, ecology, climate, energy, technology, space, healthcare, food, socioculture and economics". A "vision of key challenges and trends that can occur with varying degrees of probability in key areas of socio-economic life of both the Russian and global communities is presented, as well as key opportunities and threats to development on the horizon of 2040 are identified" (Source: Horizon 2040. November 14, 2023. Pp. 3, 7. Official website of the Agency for Strategic Initiatives. December 29, 2023. Available at: https://asi.ru/library/main/198226/).

[21] Address of the President of the Russian Federation to the Federal Assembly on February 29, 2024. Available at: http://www.kremlin.ru/events/president/news/73585

unconditionally supported by Russians: he won a landslide victory and got twice as many votes as during his first and second presidential elections (on March 26, 2000, 39.7 million voters supported Vladimir Putin; on March 17, 2024 – 76.3 million);

✓ May 7, 2024, issuing his first decree after the inauguration (by analogy with the May decrees of 2012 and 2018[22]) the head of state **legislated** the plans announced during the Address and for the first time set medium-term indicators of national development **for the period up to 2036.**

Some key benchmarks of national development outlined in the May 2024 Decree[23]:

✓ increase in the total fertility rate to 1.6 by 2030 and to 1.8 by 2036, including an annual increase in the total fertility rate of third and subsequent children;

✓ increase in life expectancy to 78 years by 2030 and to 81 years by 2036, including a faster increase in healthy life expectancy;

✓ reduction in the number of deaths due to road accidents by one and a half times by 2030 and by two times by 2036 compared to the indicator of 2023;

✓ reducing the poverty level below 7 percent by 2030 and below 5 percent by 2036, including the poverty level of large families to 12 percent by 2030 and to 8 percent by 2036;

✓ ensuring the promotion and protection of traditional Russian spiritual and moral values in the framework of at least 70 percent of projects in the field of culture, art and folk art funded by state development institutions by 2030 and at least 80 percent of such projects by 2036;

✓ reducing the Gini coefficient (income concentration index) to 0.37 by 2030 and to 0.33 by 2036;

✓ providing citizens with housing with a total area of at least 33 square meters per person by 2030 and at least 38 square meters by 2036.

[22] On May 7, 2012, the day of the inauguration, the President signed 11 decrees containing instructions to the Government of the Russian Federation for implementation in the period up to 2020:

Decree 596 "On long-term state economic policy";

Decree 597 "On measures to implement the state social policy";

Decree 598 "On the improvement of state policy in the field of healthcare";

Decree 599 "On measures to implement state policy in the field of education and science";

Decree 600 "On measures to provide citizens of the Russian Federation with affordable and comfortable housing and improve the quality of housing and communal services";

Decree 601 "On the main directions of improving the public administration system";

Decree 602 "On ensuring interethnic harmony";

Decree 603 "On the implementation of plans (programs) for the construction and development of the Armed Forces of the Russian Federation, other troops, military formations and bodies and the modernization of the military-industrial complex";

Decree 604 "On further improvement of military service in the Russian Federation";

Decree 605 "On measures to implement the foreign policy of the Russian Federation";

Decree 606 "On measures to implement demographic policy in the Russian Federation".

On May 7, 2018 (on the inauguration day), the President of the Russian Federation signed Decree 204 "On national goals and strategic objectives for the development of the Russian Federation for the period up to 2024".

[23] On the national development goals of the Russian Federation for the period up to 2030 and for the perspective up to 2036: Presidential Decree 309, dated May 7, 2024. Available at: http://www.kremlin.ru/events/president/news/73986

✓ May 14, 2024, the President signed decrees on the appointment of members of the Government of the Russian Federation. Thus, specific executors were identified – **persons responsible for the practical implementation of the instructions of the head of state** and, importantly, they were mostly people who proved themselves and received a positive assessment for their previous work from the majority of experts and State Duma deputies. Responsibilities for the supervision of federal projects were distributed among the deputy prime ministers, which **"significantly improves executive discipline and, in general, the quality of public administration"[24].**

V. Volodin: "The times when **unexpected** people appearing in the Cabinet of Ministers are gone; M. Mishustin proposed those candidates **who do not need to study and do not need to start all over again"**[25].

Along with these comprehensive and consistent steps concerning the very foundations of the national development course for the next 12 years (until 2036), the government does not forget about the current state of affairs, continuing to make managerial decisions to improve people's financial situation, regulate the information space, and implement priority tasks required for successful combat operations in the course of the SMO, as well as to strengthen the cultural sovereignty and national identity of Russian society *(Insert 1)*.

In this regard we should note one of the first decrees adopted by the head of state after the inauguration – Decree 314 of May 8, 2024 "On approving the foundations of the state policy of the Russian Federation in the field of historical education"[26]. We agree with the opinion of A. Dugin, who noted the "colossal importance" of this decree, describing it as "a radical breakthrough in our historical science, in historical education, which until the last moment was dominated by Westernism"[27].

"The decree signed by the President today is **a fundamental shift.** That is, we actually declare on behalf of the President, on behalf of the highest state authority, that our Russian people should be at the center of our historical consciousness...

This is a radical breakthrough in our historical science, in historical education, which was dominated by Westernism until the last moment... Putin's decree on state policy in historical education puts an end to these destructive processes and begins a **new era, the era of national historical education...**

This decree is of great importance. A completely new stage of our historical journey begins... Today's Decree, combined with Decree 809 "On traditional values" of 2022, actually form **a new ideology,** if you will, **a new state idea, a new Russian worldview, which is now documented by the highest authority"**[28].

[24] Delyagin M. Personal responsibility for the implementation of federal projects. Available at: https://zavtra.ru/blogs/personal_naya_otvetstvennost_za_realizatciyu_federal_nih_proektov

[25] *Parlamentskaya gazeta*. May 13, 2024. Available at: https://www.pnp.ru/politics/volodin-vse-kandidatury-na-dolzhnosti-vice-premerov-deputatam-khorosho-izvestny.html

[26] On the approval of the foundations of the state policy of the Russian Federation in the field of historical education: Presidential Decree 314, dated May 8, 2024. Available at: http://www.kremlin.ru/acts/bank/50534

[27] Dugin A. The enlightenment of society through Russian history. Available at: https://izborsk-club.ru/25700?ysclid=lxsz182bqx89409709

[28] Ibidem.

Insert 1

The monitoring of regulatory legal acts (laws, decrees) signed by the RF President in the period from April 22 to June 18, 2024[29]

MEASURES TO SUPPORT THE PARTICIPANTS OF THE SMO AND THEIR FAMILY MEMBERS, TO DEVELOP THE MILITARY-INDUSTRIAL COMPLEX, MEASURES ON MOBILIZATION, ORGANIZATION OF MARTIAL LAW, IMPROVEMENT OF ANTI-TERRORIST PROTECTION OF FACILITIES

May 29 – Federal Law 117 "On amendments to the Law of the Russian Federation "On the status of Heroes of the Soviet Union, Heroes of the Russian Federation and Full Cavaliers of the Order of Glory"". The law provides for the expansion of benefits for family members of deceased Heroes of the Soviet Union, Heroes of the Russian Federation and Full Chevaliers of the Order of Glory.

May 29 – Federal Law 118 "On amendments to certain legislative acts of the Russian Federation". Amendments have been made to certain legislative acts concerning additional payments to the Chevaliers of the Order of St. George and St. George's Cross, as well as guarantees of pension provision for the spouses of deceased military personnel.

May 29 – Federal Law 125 "On amendments to the Federal Law "On the protection of the population and territories from natural and man-made emergencies" and Articles 16 and 18 of the Federal Law "On fire safety"". Amendments are being introduced providing for the empowerment of state authorities of constituent entities of the Russian Federation and local self-government bodies to carry out measures to prevent emergencies of an inter-municipal and regional nature and eliminate their consequences, implement measures aimed at saving lives and preserving people's health in emergency situations.

MEASURES TO PROTECT INFORMATION SECURITY AND REGULATE THE ACTIVITIES OF FOREIGN AGENTS, MEASURES AIMED AT THE EDUCATION AND UPBRINGING OF THE YOUNGER GENERATION

April 22 – Federal Law 93 "On amendments to the Federal Law "On the state language of the Russian Federation". The National Dictionary Fund is being established, which is a federal state information system created in order to ensure access of citizens, organizations, public authorities, other state bodies and local self-government bodies to information about the norms of the modern Russian literary language using the Internet information and telecommunications network free of charge. The operator of the National Dictionary Fund is the Ministry of Education and Science of Russia.

May 8 – Decree 314 "On approval of the foundations of the state policy of the Russian Federation in the field of historical education". The Decree defines the goals, basic principles, tasks and mechanisms for the implementation of state policy in the field of historical education. The goals of state policy in this area include the formation of an all-Russian civic identity and the strengthening of the community of the Russian world on the basis of traditional Russian spiritual, moral, cultural and historical values by preserving the memory of significant events in the history of Russia; popularization of the achievements of national science and culture; patriotic education, preservation of the memory of the defenders of the Fatherland and prevention of belittling the importance of the feat of the people in the defense of the Fatherland; formation of an active civic position regarding the importance of historical education and preservation of historical memory, etc.

[29] The insert is a continuation of the monitoring of the most important regulatory legal acts signed by the RF President; we have been conducting the monitoring since June 2022. Thus, it has been going on for 19 months; its results have been published in 10 articles (the first issue of the monitoring is presented in the article: Ilyin V.A., Morev M.V. (2022). A difficult road after the Rubicon. *Economic and Social Changes: Facts, Trends, Forecast,* 15(3), 9–41).

Continuation of Insert 1

May 16 – Federal Law 99 "On amendments to the Federal Law "On basic guarantees of electoral rights and the right of citizens of the Russian Federation to participate in a referendum and certain legislative acts of the Russian Federation". The Federal Law is aimed at improving the provisions of electoral legislation and provides, in particular, for the consolidation of additional guarantees aimed at preventing foreign interference in the electoral process in the Russian Federation. The obligation of a candidate to terminate the status of a foreign agent is established, which must be confirmed by a document that is submitted to the relevant election commission along with other documents necessary for the registration of a candidate, a list of candidates. At the same time, a registered candidate cannot be included in the register of foreign agents. It is envisaged to conduct checks on persons appointed by members of election commissions, referendum commissions, for the inclusion of information about them in the unified register of information about persons involved in the activities of an extremist or terrorist organization.

MEASURES TO PROVIDE SOCIO-ECONOMIC SUPPORT TO THE GENERAL POPULATION, STRENGTHEN THE NATIONAL ECONOMY, INCLUDING IN THE INTERNATIONAL ARENA

April 23 – Federal Law 97 "On amendments to the Federal Law "On the Central Bank of the Russian Federation (Bank of Russia)"". Amendments are envisaged to certain provisions of the Federal Law "On the Central Bank of the Russian Federation (Bank of Russia)" concerning the powers of the Bank of Russia to regulate and supervise the activities of credit institutions and banking groups in the field of compliance with credit risk indicators. Systemically important credit institutions are required to apply banking credit risk management techniques and quantitative credit risk assessment models in order to assess assets, calculate equity (capital) adequacy ratios and other mandatory standards.

May 7 – Decree 309 "On the national development goals of the Russian Federation for the period up to 2030 and for the future up to 2036". The decree defines the national goals and development indicators of the Russian Federation for the period up to 2030 and for the future up to 2036. The main national goals include: a) preservation of the population, strengthening the health and well-being of people, family support; b) realization of the potential of each person, development of their talents, upbringing of a patriotic and socially responsible personality; c) comfortable and safe environment for life; d) environmental well-being; e) sustainable and dynamic economy; f) technological leadership; g) digital transformation of public and municipal administration, economy and social sphere.

May 29 – Federal Law 100 "On amendments to Parts One and Two of the Tax Code of the Russian Federation". A mechanism is being established for the collection of value added tax by the country of destination of goods when goods are sold by organizations and individual entrepreneurs from the member states of the Eurasian Economic Union through electronic trading platforms to Russian buyers – individuals who are not individual entrepreneurs. According to the law, the territory of the Russian Federation is recognized as the place of sale of such goods if the goods are located on the territory of the Russian Federation at the time of receipt by the specified Russian buyer. Organizations and individual entrepreneurs from the member states of the Eurasian Economic Union selling goods through electronic trading platforms belonging to them, owners of electronic trading platforms selling goods as intermediaries, are subject to registration with the Russian tax authority in order to fulfill their obligations to calculate and pay value added tax to the budget.

End of Insert 1

May 29 – Federal Law 122 "On amendments to Article 7 of the Federal Law "On countering the legalization (laundering) of proceeds from crime and the financing of terrorism" and Article 10 of the Federal Law "On the national payment system". It is envisaged to establish a maximum threshold for simplified identification when transferring funds on behalf of an individual client without opening a bank account, including electronic funds, in the amount of 100,000 rubles or a similar amount in foreign currency.

May 29 – Federal Law 123 "On amendments to Article 251 of Part Two of the Tax Code of the Russian Federation". Income that is not taken into account when determining the corporate income tax base includes income in the form of grants provided by innovative development institutes and other organizations that support government programs and projects through subsidies allocated by federal executive bodies authorized by the Government of the Russian Federation.

June 12 – Federal Law 132 "On ratification of the Agreement on Free Trade in Services, Establishment, Activities and Investments". The agreement is aimed at providing favorable conditions for the growth of the economies of the CIS member states, expanding mutual trade in services, increasing the level of its liberalization and investing by persons of one Party in the territories of other Parties, and will also stimulate an increase in the standard of living of the population of the Parties.

June 12 – Federal Law 137 "On amendments to certain legislative acts of the Russian Federation and invalidation of Paragraph Z3 of Part 4 of Article 2 of the Federal Law "On assistance to the development and improvement of management efficiency in the housing sector and on amendments to certain legislative acts of the Russian Federation"". The provisions of the Federal Law "On measures of state support for families with children in terms of repayment of obligations on mortgage housing loans and on amendments to Article 132 of the Federal Law "On acts of civil status"" are being extended. The right to receive state support measures in the form of full or partial repayment at the expense of the state (no more than 450 thousand rubles) of citizens' obligations under a housing mortgage loan will be acquired by borrowers who had a third child or subsequent children born between January 1, 2019 and December 31, 2030. This support measure will be provided in respect of loan agreements concluded by borrowers before July 1, 2031.

June 12 – Federal Law 142 "On amendments to Article 2 of the Federal Law "On amendments to Article 241 of the Federal Law "On the development of small and medium-sized enterprises in the Russian Federation"". The term of the regulation providing for classifying small and medium-sized businesses as social enterprises engaged in the sale of book products for children and youth, educational, educational and reference literature, is extended until December 31, 2027.

June 13 – Decree 498 "On amendments to Presidential Decree 565 "On additional measures of state support for persons who have shown outstanding abilities" dated November 18, 2019. It has been established that starting from the 2024/25 academic year, recipients of Presidential grants studying in bachelor's degree and specialty programs (starting from the third year of study), master's degree programs and having scientific, engineering, technological, creative achievements in the priorities of scientific and technological development of the Russian Federation, based on the results of individual selection, receive Presidential grants in an increased amount 40,000 rubles each month until the completion of the established period of study for bachelor's degree programs, specialty programs and master's degree programs, subject to annual confirmation of their right to receive a grant.

Thus, the state is actively implementing key tasks of internal development: the goals and objectives of national development until 2030 and 2036 have been set, and responsible executors have been appointed... But at the same time, the plans outlined for implementation are so ambitious that **(according to some experts) it will take an "economic miracle" to fulfill them.**

However, there still remain key risks related to implementing national projects; in addition, there are at least two conditions that seriously complicate the implementation of the May 2024 decrees, and both of them are related to the circle of persons entrusted with the practical implementation of the President's instructions.

First, in the coming years, we cannot expect any improvements in the external situation around Russia, which means that the **May 2024 decrees will have to be implemented in much more difficult conditions than the May 2018 decrees.** This is evidenced by one of the most significant personnel changes in the Government, namely, **the appointment of economist A. Belousov to the post of Minister of Defense of the Russian Federation.** This decision made by the head of state came as a surprise to many, but was generally supported by experts and regarded by them as a "long game"; "putting the economy on a war footing", preparing the country for a long-term and protracted conflict with the West.

K. Kostin, head of the Foundation for the Development of Civil Society: "...what has been announced is a kind of **formula for an economic miracle.** If all this is done, we will see **very impressive GDP growth rates, the solution of tasks related to the incomes of citizens, and tasks related to the development of the country's infrastructure!** Despite the fact that all the plans that were outlined yesterday should be implemented by 2030, everyone understands that the result of what needs to be done **will determine life and politics in Russia for the entire first half of the 21st century"**[30].

"...the comprehensive transformations proposed in national projects can lay the foundation for national development, including beyond 2030. However, the implementation of such significant projects for the country requires a comprehensive, system-wide analysis and effective management of emerging risks, **a significant part of which are common to all national projects and have been preserved since the beginning of their implementation in 2019...**

The problems and risks of implementing national projects **are largely due to the insufficiently high quality of public administration"**[31].

A. Dugin: "I believe that this person is in some sense **crucial for our economic, maybe even socio-economic strategy.** Therefore, it is very important that such an appointment took place. **It actually changes everything else...** the appointment of Belousov, in my opinion, is what, by and large, was the intrigue of all these appointments, because it really is a **vector toward the Government of Victory that we dreamed of, that we hoped for"**[32].

"The decision to appoint Belousov proves that **Russia is preparing to "play the long game"** in Ukraine... Russia needs to use limited economic resources to pay for the military operation, the end of which is unknown; and it seems that the Kremlin believes that the conflict is unlikely to end this year"[33].

[30] Responsible for post-production. Available at: https://www.kommersant.ru/doc/6550983

[31] Ilyin V.A. et al. (2024). National projects of Russia: Features, effectiveness of implementation: Monograph. Vologda: VolRC RAS. P. 410.

[32] Dugin on Belousov's appointment: "This thumping decision fundamentally changes everything". Available at: https://dzen.ru/a/ZkE83HyQ2AoRExHs

[33] *RIA-novosti.* May 14, 2024. Available at: https://ria.ru/20240514/belousov-1945838345.html?ysclid=lxefl72z1m149112794

S. Mironov: **"We were waiting for more decisive personnel appointments and proposals. But so far we have seen what we have seen"**[34].

A. Dugin: "I couldn't help but be pleased with the fundamental, principled appointment of Anton Alikhanov, perhaps our most outstanding governor, to the post of head of the Ministry of Industry and Trade. This is very serious. **But almost all the other changes were relatively technical"**[35].

Second, most of the personnel changes that took place in the public administration system in May 2024 are of a "relatively technical" nature, while many expected much more significant personnel changes, based on the systemic, historical challenges that the country faced after February 24, 2022.

We recall that after the start of the SMO, Russia witnessed at least two high-profile, symbolic events, which caused great alarm in the expert community regarding the state of affairs in the public administration system. We are talking about the rebellion of the Wagner PMC on June 23– 24, 2023 (which A. Dugin called "an accident of Russian statehood", which must be "understood correctly so as not to make mistakes anymore"[36]), and also about the arrest of the Deputy Minister of Defense of the Russian Federation T. Ivanov (in April 2024) and, subsequently, about the detention of the head of the Main Personnel Department of the Ministry of Defense of the Russian Federation Yu. Kuznetsov (in May 2024)... **and this has happened in a country that has been waging war for two years.**

Yu. Sovetov (political scientist): "The detention of the Deputy Defense Minister is a serious blow to the "elites". The man who was entrusted with such important tasks as restoration of Mariupol, construction of hospitals and so on, did not hesitate to steal at the same time. And, I'm sorry, but **this was happening in many ways in front of those who are obliged to control it...** He bought mansions on Rublevka in front of everyone. Just imagine: he did it openly. His wife traveled abroad, she and his children received Israeli citizenship. Everyone saw it. **Why did they turn a blind eye on it? Why did he get away with it?** It was believed that he was an effective manager, as they once said about Anatoly Chubais. **This very connivance has led to such a scandal"**[37].

In connection with the detention of the Deputy Minister of Defense of the Russian Federation, many experts quite reasonably focus on the **"connivance of those who were obliged to control"** his activities; but perhaps the most generalized assessment of the problem of corruption in the country was given by A. Prokhanov: **behind this "targeted arrest" there is a whole "underworld of Russian corruption":**

[34] Mironov honestly said how the new ministers had been chosen: "You shouldn't have any illusions". Available at: https://tsargrad.tv/articles/mironov-chestno-skazal-kak-vybirali-novyh-ministrov-ne-nuzhno-pitat-illjuzij_1000468?ysclid=lxszcqkm57600928220

[35] Dugin on Belousov's appointment: "This thumping decision fundamentally changes everything". Available at: https://dzen.ru/a/ZkE83HyQ2AoRExHs

[36] Dugin A. Putin – Prigozhin: the accents are set. Available at: https://zavtra.ru/blogs/putin-prigozhin_aktcenti_rasstavleni?ysclid=lxszgeo4x3164181437

[37] How the arrest of Deputy Minister Ivanov and Putin's message are connected: Experts are talking about the red line. Available at: https://tsargrad.tv/news/kak-svjazany-arest-zamministra-ivanova-i-poslanie-putina-jeksperty-zagovorili-pro-krasnuju-liniju_994120?ysclid=lxszhly2b8970336897

"Deputy Defense Minister Timur Ivanov was caught on a bribe... **And this targeted arrest evokes overwhelming horror.**

The targeted arrest of Timur Ivanov leads to the underworld of the Russian corruption system... Timur Ivanov is a beak, exploring which you can identify and draw **the whole giant mysterious bird of Russian corruption. The names of corrupt officials, corrupt connections, all branches of the Russian economy, individual ministries and enterprises, Russian and foreign banks, offshore companies, sums of money comparable to the state budget...** The bird of Russian corruption is terrible. Its beak is made of stainless steel. With this beak, it pecks out Russia's eyes, gnaws at the liver, tears up the Russian heart.

The Russian leap into the future, the Russian path from great upheavals to greatness will include a great plan: "Purification"... The people are waiting for this purification. Russia in Donbass is being washed with tears and blood. The people look to the authorities and wait for purification. This is a great expectation"[38].

We should also note that the May 2024 decrees deal predominantly with socio-economic aspects. As Vladimir Putin noted, "the main thing is the assessment of people, how their lives are changing for the better"[39].

However, the socio-economic bloc of the Government has not actually changed after all the personnel appointments made in May 2024; this fact caused the greatest doubts in the expert community *(Insert 2)*. And this is confirmed by the results of the vote of State Duma deputies during the approval of the candidacies of Government members: T. Golikova, A. Siluanov, M. Reshetnikov, A. Kotyakov, S. Kravtsov – these are the people who received the least support in the lower house of parliament *(Insert 3)*.

Minimal (with some exceptions) changes in the Government quite reasonably raise the question: **where is the border between ensuring the stability of development and preserving the mistakes accumulated in previous years...?**

Can it be that the absence of changes in the Government that were expected by many experts (primarily in its socio-economic bloc) a consequence of the undeveloped "mechanism of elites renewal", which once led to the collapse of the USSR?

"We know that the death of our Homeland, the Soviet Union, the monstrous consequences of which have not been eliminated so far, was caused primarily by **political, and not by economic reasons.** However, strangely enough, we know very little about the reasons themselves. The most common among them – and rightly so – **is the lack of a mechanism for renewal of the elites... And understanding the mistakes of the past is necessary to avoid them in the future"**[40].

[38] Prokhanov A. The great expectation. Available at: https://zavtra.ru/blogs/velikoe_ozhidanie?ysclid=lx4fuap3bl928027715

[39] Address of the President of the Russian Federation to the Federal Assembly on February 29, 2024. Available at: http://www.kremlin.ru/events/president/news/73585

[40] Delyagin M. To know and remember the political lessons of the collapse of the USSR! Available at: https://izborsk-club.ru/25693?ysclid=lx4fiaia7u8963308

Insert 2

Expert opinions on the new composition of the Government of the Russian Federation

S. Mironov: **"We are absolutely dissatisfied that the financial and economic bloc remains as it has been. We are not satisfied with social policy.** And here, of course, when voting for ministers, our faction expressed its position ... there is no need to have any illusions. But we had and still have **very big claims, for example, against [Deputy Prime Minister Tatyana] Golikova. Because we do not believe that she will cope with the tasks that the President has set... Neither do we approve of Siluanov, [Minister of Economic Development Maxim] Reshetnikov, [Minister of Labor and Social Protection Anton] Kotyakov. God bless them, but these people will not cope with the tasks"**[41].

M. Delyagin: **"The current composition of the Government means that its policy is recognized as correct and does not need drastic changes. However, resentment among the people is growing, and comprehensive modernization will require systemic changes....**

The social bloc is still the patrimony of the liberals. However, under the leadership of Tatyana Golikova, who retained her deputy prime minister post, there can be nothing else. The industrial bloc is technocrats, and the economic bloc is still the same liberals. No wonder the Ministry of Economic Development is sometimes called the Ministry of Economic Degradation.

Perhaps we can say that the head of the Ministry of Culture, Olga Lyubimova, is not a liberal, but, from my point of view, Ms. Lyubimova turned the supervised department into a kind of ministry of arts, which is hardly a meaningful approach.

I was aware that Anton Siluanov remained in the same positions, but hoped for **some improvement in the social and economic blocs.** In particular, I hoped that at least one real economist would come to work at the Ministry of Economy. **But, probably, there are no more economists in power, except Andrey Belousov**"[42].

"Ordinary citizens and analysts were especially waiting for the resignation of the head of the Ministry of Finance Anton Siluanov. He has been in this position for 13 years, but he has retained the post anyway, despite his participation in the development of the pension reform, his contribution to the loss of 300 billion USD from foreign exchange reserves that were frozen in the West ..."[43]

[41] Mironov honestly said how the new ministers were chosen: "There should be no illusions". Available at: https://tsargrad.tv/articles/mironov-chestno-skazal-kak-vybirali-novyh-ministrov-ne-nuzhno-pitat-illjuzij_1000468?ysclid=lxszcqkm57600928220

[42] Delyagin M. The change of the Minister of Defense is a reaction to people's indignation. Available at: https://www.business-gazeta.ru/article/633476

[43] Mironov honestly said how the new ministers were chosen: "There should be no illusions". Available at: https://tsargrad.tv/articles/mironov-chestno-skazal-kak-vybirali-novyh-ministrov-ne-nuzhno-pitat-illjuzij_1000468?ysclid=lxszcqkm57600928220

End of Insert 2

A. Chadaev (journalist, political scientist): **"Some outlines of the strategy** are being drawn for the national goals stated in the decree on the occasion of the reassignment. **Let us hope that a meaningful vector will emerge there…** Because all this time I had a feeling, for example, that the entire social bloc **was either not assigned tasks properly, or it was unclear how they were stated"[44].**

R. Romanov (sociologist, political consultant): "The current social block resembles an octopus that clings to various stones with all its tentacles, and when one falls out from under them, it tries to cling to something else... **But, of course, it is impossible to move anywhere in such a sprawling position…** The educational sphere, in particular secondary education, requires attention most of all. On this occasion, there are a number of questions to the Minister of Science and Higher Education V. Falkov and the Minister of Education S. Kravtsov. I understand why they haven't been replaced. This is the very conservative style of Vladimir Putin... **But if within ten years we do not change generations of teachers, scientific personnel, and so on, then there will simply be no one to win wars"**[45].

M. Khazin: **"…all the people who could not organize import substitution remained in their places,** Manturov was even promoted. Whether Mishustin will be able to continue his work on increasing budget investments is a big question, there are no more resources under the current economic policy... **Liberal pressure on the Russian economy in general and on entrepreneurs in particular will continue, most likely they will have a hard time.**

The effectiveness of our bureaucrats, including in the external areas, is far from desirable. By the way, this was clearly seen **under the old government, when something was done in most cases only when Mishustin was directly involved in it….** All of them [the various forces in the West] have their own support groups in Russia. By the way, we should note that it is for this reason that **serious conflicts are inevitable within the power groups in our country,** including those that support certain ministers"[46].

[44] An "octopus" in the new Russian government: Experts talk about weaknesses and strengths. Available at: https://tsargrad.tv/articles/osminog-v-novom-pravitelstve-rossii-o-slabyh-i-silnyh-mestah-govorjat-jeksperty_1001105

[45] Ibidem.

[46] Mikhail Khazin: Mishustin should continue his work, to which there are no special complaints, and everyone else should not harm too much. Available at: https://dzen.ru/a/ZkDuLCs4gXy74ohZ

Insert 3

Results of the vote of RF State Duma deputies on May 13, 15, 2024 on the issue of approving candidates for Government members*

Name / Post	For		Against		Abstained		Did not vote	
	pers.	%	pers.	%	pers.	%	pers.	%
Prime Minister of the Russian Federation								
M.V. Mishustin / Prime Minister of the Russian Federation	431	95.8	0	0.0	0	0.0	19	4.2
Deputy Prime Ministers of the Russian Federation								
D.N. Patrushev / Deputy Prime Minister of the Russian Federation	433	96.2	0	0.0	0	0.0	17	3.8
D.N. Chernyshenko / Deputy Prime Minister of the Russian Federation	432	96.0	0	0.0	0	0.0	18	4.0
D.V. Manturov / First Deputy Prime Minister of the Russian Federation	431	95.8	0	0.0	0	0.0	19	4.2
D.Yu. Grigorenko / Deputy Prime Minister of the Russian Federation – Chief of Staff of the Government of the Russian Federation	378	84.0	1	0.2	55	12.2	16	3.6
A.V. Novak / Deputy Prime Minister of the Russian Federation	378	84.0	0	0.0	57	12.7	15	3.3
A.L. Overchuk / Deputy Prime Minister of the Russian Federation	378	84.0	0	0.0	57	12.7	15	3.3
V.G. Saveliev / Deputy Prime Minister of the Russian Federation	378	84.0	0	0.0	57	12.7	15	3.3
Yu.P. Trutnev / Deputy Prime Minister of the Russian Federation – Plenipotentiary Representative of the President of the Russian Federation in the Far Eastern Federal District	376	83.6	0	0.0	58	12.9	16	3.5
M.Sh. Khusnullin / Deputy Prime Minister of the Russian Federation	374	83.1	0	0.0	61	13.6	15	3.3
T.A. Golikova / Deputy Prime Minister of the Russian Federation	362	80.4	1	0.2	66	14.7	21	4.7
RF Ministers								
A.A. Alikhanov / RF Minister of Industry and Trade	430	95.6	0	0.0	0	0.0	20	4.4
O.N. Lut / RF Minister of Agriculture	429	95.3	0	0.0	0	0.0	21	4.7
R.V. Starovoit / RF Minster of Transport	429	95.3	0	0.0	0	0.0	21	4.7
A.O. Chekunkov / RF Minister for Development of the Russian Far East and Arctic	428	95.1	0	0.0	1	0.2	21	4.7
S.E. Tsivilev / Minister of Energy of the Russian Federation	375	83.3	0	0.0	57	12.7	18	4.0
M.A. Murashko / RF Minister of Healthcare	374	83.1	3	0.7	54	12.0	19	4.2
V.N. Falkov / RF Minister of Science and Higher Education	373	82.9	2	0.4	53	11.8	22	4.9
M.I. Shadaev / RF Minister of Digital Development, Communications and Mass Media	373	82.9	1	0.2	57	12.7	19	4.2
O.B. Lyubimova / RF Minister of Culture	357	79.3	61	13.6	13	2.9	19	4.2
I.E. Faizullin / RF Minister of Construction, Housing and Utilities	353	78.4	0	0.0	80	17.8	17	3.8
M.V. Degtyarev / RF Minister of Sport	350	77.8	0	0.0	79	17.5	21	4.7
A.A. Kozlov / RF Minister of Natural Resources and Environment	349	77.5	27	6.0	53	11.8	21	4.7
M.G. Reshetnikov / RF Minister of Economic Development	348	77.4	82	18.2	1	0.2	19	4.2
A.G. Siluanov / RF Minister of Finance	348	77.3	84	18.7	0	0.0	18	4.0
A.O. Kotyakov / RF Minister of Labor and Social Protection	348	77.3	27	6.0	55	12.2	20	4.5
S.S. Kravtsov / RF Minister of Education	345	76.7	9	2.0	71	15.8	25	5.5

* Ranked in descending order of the share of votes cast in favor of the candidate (in %).

Source: official website of the RF State Duma. Available at: http://vote.duma.gov.ru/?convocation=AAAAAAA8&from=13.05.2024&to=13.05.2024&sort=date_desc

By and large, the reason for the relevance of these issues is that **the head of state has not yet given an answer to the main question – which state are we building: a truly sovereign social state or a state of oligarchic capitalism with a "sovereign" face?**

This question has been raised in the expert community, in the media, and in society for many years. However, even despite, for example, the emergence of an updated Constitution of the Russian Federation during Vladimir Putin's previous presidential term (2018–2024)[47], the Law on strengthening traditional values[48], a new Foreign Policy Concept[49] and many other important strategic documents contributing to the strengthening of national sovereignty, its relevance continues to grow, **and today it sounds not only as a search for a national idea and a development goal, but also as a necessary condition for survival and Victory.**

N. Morozova (2006): **"When will we hear from the President the answer to the question: where is he leading Russia? There's not much choice. This is either the final descent of the country into the swamp of colonial capitalism, or the construction of a social (albeit not yet socialist) state... So isn't it time for the President to decide on his ideology?"**[50]

Zh.T. Toshchenko: **"... for most Russians, it is still unclear what kind of society Russia is building. Words like the welfare state, modernization are not enough, because they are too abstract, similar to the all-encompassing promises inherent in almost every modern country...** In other words, without programs that would serve as a powerful impetus for the elevation of man, it is impossible to imagine the further development of the country..."[51]

N. Starikov (2018): **"What is our political course? What are we building?** Here we come to the question of the national idea. **And we see, unfortunately, the lack of formulation of this idea, the lack of setting a strategic task. While the strategic task "what kind of state, what kind of society we are building" has not been formulated, we can argue that we are educating high-quality consumers** (as one of the ministers said)... Without the formulation of a political task, we cannot have a clearly formulated economic strategy"[52].

The question of what kind of state we are building sounds so acute today that it could no longer be ignored by the President and therefore became a key one during the plenary discussion at the 27th Saint Petersburg International Economic Forum, held in Russia on June 5–8, 2024.

[47] On the official publication of the Constitution of the Russian Federation as amended: Presidential Decree dated July 3, 2020. Available at: http://www.kremlin.ru/acts/constitution

[48] On approval of the fundamentals of the state policy for the preservation and strengthening of traditional Russian spiritual and moral values: Presidential Decree 809, dated November 9, 2022. Available at: http://www.kremlin.ru/acts/bank/48502

[49] On approval of the Foreign Policy Concept of the Russian Federation: Presidential Decree 229, dated March 31, 2023. Available at: http://www.kremlin.ru/events/president/news/70811

[50] Morozova N. There are contradictions between Putin and... Putin. Available at: https://kprf.ru/news/articles/politics/46592.html

[51] Toshchenko Zh.T. (2018). Precariat: From a proto-class to a new class: Monograph. Moscow: Nauka. P. 269.

[52] N. Starikov's interview on "Radio Rossii", September 2, 2018. Available at: https://nstarikov.ru/kakoe-gosudarstvo-my-stroim-96339?ysclid=lxrl1x2tvg153584835

Moderator at this discussion was S.A. Karaganov, Doctor of Sciences (Economics), political scientist, economist and public figure; we should emphasize that his choice for this role was not random, it was agreed with the Administration of the head of state. According to presidential press secretary Dmitry Peskov, "he [S. Karaganov] is a man of the widest horizons with his own point of view, **very authoritative in expert circles. This was the reason for choosing him**"[53].

"We are doing something, but we have not yet decided what we are doing ...; we are stuck in the old model and we do not know what model we are building", this is what the moderator said to Vladimir Putin. At the same time, S. Karaganov himself proposed the name for the "ideal model for Russia" – "**authoritarian social capitalism**" *(Insert 4)*.

"We are doing something – obviously, but it is quite clear that we have not yet decided what we are doing... I don't think we have a master plan... economists, unfortunately, most of them – I know them, I'm a former economist myself, although there are no former economists, of course – **are stuck in the old model... do we know what model we are building?** I would call **authoritarian social capitalism** the ideal model for Russia, **to make it clear where we are going. Because we are supposedly going the right way, supposedly we used to go the liberal way – I don't get it..."**[54]

Perhaps we can agree that "social capitalism" as a name for the general course of national development looks quite reasonable. In confirmation of this, we note that many appreciated the importance and severity of the questions posed by S. Karaganov, which really confirms their acuteness...

D. Golubovsky: "In its purest form, planned social capitalism is the **direct opposite of liberal capitalism, practically its dialectical reflection"**[55].

D. Grigoryev: "Social capitalism is a cumulative name for those models of capitalist economy that include a **developed system of social protection**. For example, affordable mass education, health care, control of the labor market, opportunities for horizontal and vertical mobility, and the like. **This is closely intertwined with the notion of the social state"**[56].

A. Makarkin: "In the model of "authoritarian social capitalism" **the word "capitalism" does not contradict the Constitution**, because it mentions market economy. **The word "social" does not contradict the Constitution either**, because this document characterizes Russia as a social state. But the Constitution is clearly democratic in nature, and the rights and freedoms that are spelled out there do **not correspond to the principles of an authoritarian state"**[57].

[53] Peskov explained why Karaganov was chosen to moderate the plenary session with Putin at the SPIEF. Available at: https://www.mk.ru/politics/2024/06/07/peskov-obyasnil-pochemu-karaganova-vybrali-moderatorom-plenarnoy-sessii-s-putinym-na-pmef.html

[54] The plenary session of the Saint Petersburg International Economic Forum (S. Karaganov's statement) on June 7, 2024. Available at: http://www.kremlin.ru/events/president/news/74234

[55] Golubovsky D. Social capitalism – the future of the world economy (expert of Kalita-Finans company, analyst at finam.ru). Available at: https://www.finam.ru/publications/item/social-kapitalizm-budushee-mirovoiy-ekonomiki-20090930-1212/

[56] What is social capitalism? (words of D. Grigoryev, an expert in economics, an employee of the Center for Economic Research at the Institute of Globalization and Social Movements). Available at: https://yandex.ru/q/question/chto_takoe_sotsialnyi_kapitalizm_5eaa8c3d/

[57] Should Russians expect authoritarian capitalism? A political scientist explained what is wrong with this idea (opinion of A. Makarkin, political scientist, vice president of the HSE Center for Political Technologies. Available at: https://dzen.ru/a/ZmMxXBgmbQup5YmC?ysclid=lxt0fixz5x539818871

Insert 4

S. Karaganov's comments on the situation in Russia (SPIEF 2024)[58]

1. We are doing something, obviously, but it is quite clear that **we have not yet decided what we are doing.** Moreover, we have started to develop the military-industrial complex in a big way, and **we are doing it by trial and erro*r***. I don't think we have a master plan... economists, unfortunately, most of them – I know them, I'm a former economist myself, although there are no former economists, of course – **are stuck in the old model… do we know what model we are building?** I would call authoritarian social capitalism the ideal model for Russia, to make it clear where we are going. Because **we are supposedly going the right way, supposedly we used to go the liberal way – I don't get it…** Vladimir Vladimirovich, I turn to the eighth point of your program, although you did not say where we are going, nevertheless all the points are wonderful.

2. We, people like me and like you, are "fed up" with the single communist ideology, so, of course, we do not want a communist ideology. **But a state, a great state, cannot exist without a national ideology, without a great idea. States that lost their national idea, national ideology, inevitably fell. The world is strewn with graves or shadows of such states. By the way, we fell twice too: once when we lost faith in the Tsar and the Fatherland, and the second time when we lost faith in communism. And we are now resisting the introduction of a rigid state ideology.** It is clear that it is very easy to formulate such an ideology; you yourself have already partially formulated it in your speeches. It is clear that such an ideology may not be mandatory, but it should be, **must be mandatory for those people who want to be the leaders of the country, who want to be the elite of the country. It is a code of honor… this code can be formulated**.

Why are we not formulating a code for everyone? These people want to live an ordinary life – let them live it, and that is fine. **But if you want to lead, if you want to succeed in society, you must adhere to absolutely clear rules, and these rules must be formulated.** I'm not going to formulate them now, so as not to occupy the audience, because it's quite easy to do. **But why are we still afraid? We don't need to change an article of the Constitution. Why are we afraid to introduce a single state ideology, mandatory for all those who want and are ready to serve the state and society?…**

Because of the death of communist ideology, that country died because we had a vacuum. So we need to fill this vacuum with certain things. If you order it, we'll do it. But only then you have to offer it to society, to the elite, and make it more or less mandatory. Then it will work. This is how, by the way, the communist ideology worked for us, which was obligatory for everyone and which for many years, which had many wonderful things in it, moved our country forward and **allowed us to win that terrible war. Therefore, ideology is necessary.**

[58] The plenary session of the Saint Petersburg International Economic Forum (S. Karaganov's statement) on June 7, 2024. Available at: http://www.kremlin.ru/events/president/news/74234

But the problem is that it is not up to S. Karaganov to formulate the course for Russia's national development. And the President in his answers (as the moderator of the discussion pointed out) **ultimately did not say where we were going** (citation: *"Vladimir Vladimirovich, I am referring to the eighth point of your program, although* ***you did not say where we were going***, nevertheless all the points are wonderful"[59])...

Meanwhile, the real situation in the country leads many experts to conclude that not "social", but "oligarchic" capitalism (or "capitalism for the few") at least for today, continues to dominate in our country.

It is for a reason that A. Prokhanov writes: **"The Russian patriotic consciousness is afraid of liberal revenge ... it is restless, full of suspicions, expects treachery and betrayal".**

G. Zyuganov: "I was very impressed by the discussion between Putin and Karaganov. Karaganov was at the forefront at all times. He knows how to adapt in time. However, **he asked Putin very tough questions that concern society. Are we on the right course? Where is our victory? Where is the national idea?"**[60]

V. Katasonov: **"No one disputes that oligarchic capitalism has been established in Russia today.** Oligarchic capitalism is a socio-economic model of the development of society and the state, based on total control of the production of goods and services **by private owners of the means of production,** on legalized exploitation, that is, the **unfair appropriation of almost all the results of wage labor"**[61].

"Patriotic philosophers, historians, literary critics, and metaphysicians create an ideal image of Russia in tune with the aspirations of the 21st century. But the Russian patriotic consciousness today is restless, **full of suspicion, and expects treachery and betrayal.** A Russian, going on a historical offensive, tightens his back, fears that the blade of a traitor will strike him in the back, and the process of great changes that began in Russia, the great Russian renaissance, **will be stopped, curtailed, and reversed. The Russian patriotic consciousness is afraid of liberal revenge..."**[62]

[59] The plenary session of the Saint Petersburg International Economic Forum (S. Karaganov's statement) on June 7, 2024. Available at: http://www.kremlin.ru/events/president/news/74234

[60] Official website of the Communist Party of the Russian Federation. News. June 11, 2024. Available at: https://mkkprf.ru/29548-ga-zyuganov-s-tribuny-gosudarstvennoy-dumy-velikih-stran-i-narodov-ne-byvaet-bez-velikih-idey.html

[61] Katasonov V. "Oligarchic collectivism" from the novel "1984" and today's world. Available at: https://reosh.ru/valentin-katasonov-oligarxicheskij-kollektivizm-iz-romana-1984-i-segodnyashnij-mir.html

[62] Prokhanov A. The third toast. Available at: https://izborsk-club.ru/25816?ysclid=lxt0kx4v2h78042209

The dominance of "crony capitalism" in the country is indicated, first of all, by the quality of Russian elites; the commonality of their values and priorities, in which **"wealth, power and stability"** prevail.

"There are two parts of the elite that are different in origin and essence. Some of them, who seized property in the 1990s, have inherited assets and a high level of passive income. The second ones who are "feeding at the public trough": officials of different levels, heads of state-owned companies. They (sometimes – on bribes and kickbacks) have accumulated huge amounts of capital (often – "black" and "gray") and are trying to influence state policy. **They also want a stable, predictable future for themselves and their descendants.** One of the solutions is to transfer the position (place of feeding) by inheritance – seems to be already beginning to materialize. **The value priorities of these groups are similar: wealth, power and stability (security) of their use"**[63].

And this is fully confirmed by concrete facts. For example, the reaction of big business to some management decisions made by the state, the decisions that are unprofitable for the business and that are largely dictated by necessity due to growing threats to national security. This was clearly demonstrated by the discussion that unfolded at one of the events ("Sber's business breakfast") within the framework of the Saint Petersburg International Economic Forum, during which the Head of the Board of Directors and the largest shareholder of PJSC Severstal A. Mordashov criticized the tax policy regarding the conditions created for running a large business. One of the major oligarchs of the country pointed out: "We see constant introduction of new levies... It has become fashionable to introduce turnover taxes – it's a nightmare..."[64].

For reference: according to Forbes "A. Mordashov and family" rank **4th on the list of Russian billionaires**.

In the period from 2022 to 2024 his fortune has almost doubled: in 2022 – 13200 million USD, in 2023 – 20900 million, in 2024 – 25500 million[65].

It is noteworthy that official representatives of relevant ministries, when responding to the claims from the oligarch *(Insert 5)*, clearly stated that all actions of the authorities regarding changes in the tax system were previously discussed with business; that they "were taken taking into account the financial and economic situation of companies"[66]; moreover, the state met Severstal halfway in 2022, when, **upon proving its guilt** for overstating prices for metallurgical products[67] "fines for metallurgists have been reduced tenfold, becoming less than minimum"[68]...

[63] Belkin S. Russian field of meanings. Available at: https://zavtra.ru/blogs/russkoe_pole_smislov?ysclid=lxt0mbqh2n184974512

[64] Mordashov proposed to fix taxes and levies for a year. Available at: https://www.rbc.ru/finances/07/06/2024/6662a5509a79479ec2e5b22a?ysclid=lx8uvr8n1n551349961

[65] 125 billionaires of Russia. Forbes Rating – 2024. Available at: https://www.forbes.ru/milliardery/510650-125-milliarderov-rossii-rejting-forbes-2024

[66] The Ministry of Finance responded to Mordashov's statement on tax stability (words of Deputy Finance Minister of the Russian Federation A. Sazanov). Available at: https://www.finam.ru/publications/item/minfin-otvetil-na-zayavlenie-mordashova-o-nalogovoy-stabilnosti-20240607-2123/

[67] FAS found metallurgists guilty of overestimating the prices. Available at: https://fas.gov.ru/publications/23531?ysclid=lxlepxzgfi797200485

[68] The Ministry of Industry and Trade of the Russian Federation considers Mordashov's statement about the tax burden on metallurgists strange (words of Deputy Head of the Ministry of Industry and Trade of the Russian Federation State Secretary V. Yevtukhov). Available at: https://mfd.ru/news/view/?id=2636911

We can only add that in today's conditions and when, first of all, large businesses (even without any laws) are required to understand and implement the principle of "everything for the front, everything for the Victory", the profits of PJSC Severstal are distributed mainly in the interests of key shareholders (dividends owners) against the background, for example, of a reduction in the share of charitable and social expenses, as well as lower tax revenues of the host region itself – the Vologda Region (which becomes obvious when analyzing the 'open' data of the company's reporting; *Insert 6*) ... And it seems quite reasonable to ask the President, the Government, the Federation Council: who created such conditions and why do they continue to persist in principle and especially against the background of the ongoing special military operation?

Perhaps no less resonant and even more revealing in terms of characterizing the real situation in the country was the scandal involving Herman Gref. A video spread on the Internet about the "meeting" of Sber Chairman with taxi drivers in Gorno-Altaisk[69] in June 2024 pointed out to many experts that "there is not even a gap, but a gulf between the elites and the common individual"...

D. Kobzev, Editor-in-chief of the Gorny Altai News information portal: "To say that the Gorny Altai rebelled against Gref would be a very big stretch. This is completely untrue. But I think that after this story, of course, order will be restored. **Whether the taxi drivers wanted it or not, but now it will be different, and it will be the way Gref wants it"**[70].

D. Drize (expert at the Kommersant newspaper): "Sberbank recently became the sole owner of the airport and intends to actually create a modern logistics center on its basis... in his [Gref's] own words, the current Gorno-Altaisk airport will have to be demolished, and a new one built in its place... **But is it possible to build an ideal "City of the Sun" in a particular region of Russia as Herman Gref sees it? And is it possible to re-educate the Russian people so that they can properly comply with all this?** Will the population accept universal automation, digitalization, KPIs, personal efficiency plans, corporate governance, impeccable appearance? All that came to us in many ways from the unfriendly West... **Actually, everything that happens is called the gap between the elites and the very common individual. Moreover, it seems that this is no longer a gap, but an abyss... It seems that this gap between the different classes of Russian society needs to be bridged somehow. So far, this has not been possible for many years. There were attempts, but all of them somehow failed.** But you can try to impose the "City of the Sun" by force, although this also happened, and the effect was, again, ambiguous"[71].

[69] A video appeared on the Internet, in which Herman Gref in a harsh form explains to Altai taxi drivers that they should look decent and not gather, as Gref put it, "in gangs" near the airport. The drivers, in turn, demanded that Gref arrange parking for them. The video caused a great resonance, including far beyond the borders of the republic... from the conversation it is heard that the chairman of the board of Sberbank, **who has recently become owner of the Gorno-Altaisk airport**, calls his last name, demands to disperse this gang and threatens that none of the drivers will work here anymore, because this is his airport: **"And you're not going to work here anymore. If you open your mouth again, you'll never be here again. I am the owner of this airport. And who are you? What's your last name? My last name is Gref, what's your last name?"**... After the publication of this video, two more videos appeared on the Internet. They show residents of Altai defiantly cutting the cards of Sber into pieces... (source: Business news portal of the radio station Business FM. June 10, 2024. Available at: https://dzen.ru/a/ZmcXfxgmbQupq-yo?ysclid=lxfyss42mj756353268)

[70] Ibidem.

[71] That's the kind of people we have. Available at: https://www.kommersant.ru/doc/6760853

Insert 5

Responses of representatives of ministries to A. Mordashov's claims regarding the introduction of new taxes

Response of the Ministry of Finance of the Russian Federation (Deputy Minister of Finance of the Russian Federation A. Sazanov): "Over the past six years, the basic parameters of corporate sector taxation have not changed". At the same time, a number of decisions were made on the point adjustment of taxation in connection with the formation of raw materials and economic rents for companies associated **solely with changes in market conditions** (commodity quotation or exchange rate). "Such instruments as exchange rate export duties, as well as **additional** taxation of rental industries, including the introduction of an excise tax on liquid steel, provided for the redistribution of additional income between business and the state, which companies generated **only due to sharp fluctuations in the exchange rate and surges in prices for raw materials…**

All previously proposed decisions were made taking into account the financial and economic situation of companies, so that even after an increase in the level of taxation, the profitability of companies exceeded 25%, which is more than twice the average economic indicators (10–12%)".

"If we talk about exchange rate export duties, the design proposed last year made it possible to ensure that the introduction of duties did not affect the plans of companies; through them only 25–30% of the increase in ruble revenue was redistributed to the budget, **in excess of companies' expectations at the beginning of the year. That is, the companies received approximately the same amount of ruble revenue as they expected and on the basis of which they planned operational and investment activities".**

The government discussed the introduction of all tax changes with business. In particular, the companies were provided with calculations analyzing the impact of adjustments on the financial and economic situation. Separately, we draw attention to the fact that the previously introduced excise tax on liquid steel **was initially provided for in the Tax Code on an indefinite basis. There were no restrictions on the period of its use.**

The proposed change in taxation of the corporate sector "provides for the replacement of export duties with **more profitable and understandable fiscal instruments for businesses** in the form of an increase in income tax and adjustments to rental taxes, in particular MET"[72].

Response of the Ministry of Industry and Trade of the Russian Federation (Deputy Head of the Ministry of Industry and Trade of the Russian Federation State Secretary V. Yevtukhov): "Metallurgy is an industry that has always enjoyed special attention and support from the state..." Two years ago, prices for metallurgical products increased significantly, then the FAS opened an investigation against a number of companies, including Severstal. **The guilt of the companies was proved,** and large penalties were imposed for this. **"At the same time, the state met Severstal halfway**, taking into account the general global situation, the loss of export markets, sanctions pressure and the need to find new partners – fines for metallurgists have been reduced tenfold, becoming less than minimum"... Also at SPIEF 2024, Severstal signed a SPIC [special investment contract], under which metallurgists will receive **over 40 billion rubles of tax benefits from the state…** After that, it is strange to hear Alexey Mordashov's statements that the government does not hear business, does not meet business halfway, and the state's fiscal policy lacks predictability"[73].

[72] The Ministry of Finance responded to Mordashov's statement on tax stability. Available at: https://www.finam.ru/publications/item/minfin-otvetil-na-zayavlenie-mordashova-o-nalogovoy-stabilnosti-20240607-2123/

[73] The Ministry of Industry and Trade of the Russian Federation considers Mordashov's statement about the tax burden on metallurgists strange. Available at: https://mfd.ru/news/view/?id=2636911

Insert 6

Some financial results of PJSC Severstal's activities for 2009–2023[74]

When evaluating the distribution policy of PJSC Severstal, it is clear how the favorable result of the company was more directed to satisfying the interests of owners against the background of a reduction in the share of charitable and social expenses.

Thus, the average annual dividend payments of PJSC Severstal on average for 2009–2013 to 2019–2023 **increased 18.3-fold (from 7.3 to 133.5 billion rubles),** and the share of expenditures on charity and social needs increased **only 2-fold (from 0.8 to 2.2 billion rubles;** *Tab. 1*).

Thus, on average, over the period from 2019 to 2023, the amount of dividends exceeded the amount of charitable and social expenses **by 59 times.** The share of dividends in the net profit of the organization for this period **amounted to 92%,** the share of charitable and social expenses – **2%.**

Table 1. Priorities of Severstal's distribution policy for 2009–2023

Period	Consolidated net profit	Dividend	Share of dividends in net profit	The ratio of dividends to the region's own revenue	Fortune of the key shareholder (A. Mordashov)	Charity and social expenses	Share of charitable expenses in net profit	Remuneration to the Board of Directors	Share of remuneration in net profit
	1	2	3 = 2/1	4	5	6	7 = 6/1	8	9 = 8/1
	million rubles		%		billion USD	million rubles	%	million rubles	%
On average for 2009-2013	**22252**	**7308**	**79.5**	**18.6**	**12.2**	**893**	**10.7**	**1059**	**13.4**
On average for 2014-2018	**71599**	**74203**	**85.9**	**123.3**	**14.1**	**1538**	**2.0**	**680**	**0.3**
On average for 2019-2023	**158174**	**133454**	**92.1**	**141**	**20.7**	**2243**	**1.6**	**700**	**0.5**
Source: compiled according to the IFRS of PJSC Severstal and the website Forbes.ru									

The volume of dividend payments of PJSC Severstal exceeds the tax revenues of the Vologda Region's budget.

Thus, for 2017–2022, the average volume of dividend payments of PJSC Severstal amounted to 124 billion rubles per year, **which is 61% more than the tax revenues of the Vologda Region** (77 billion rubles; *Tab. 2*).

For comparison, in the Irkutsk Region, the dividends of OK RUSAL (20.2 billion rubles per year) were significantly lower than the tax revenues of the region – about 11.2%, or 181 billion rubles. In the Krasnoyarsk Territory, the average annual dividends of PJSC MMC Norilsk Nickel for the same period amounted to 275 billion rubles per year, which is 3.5% less than the tax revenues of the region's budget (285 billion rubles).

Table 2. Comparative analysis of tax revenues and dividends of metallurgical corporations of the Russian Federation on average for 2017–2022

Indicator	Vologda Region (PJSC Severstal)	Irkutsk Region (OK RUSAL)	Krasnoyarsk Territory (PJSC MMC Norilsk Nickel)
1. Average annual tax revenues of the budget of the home region, billion rubles	77	181	285
2. Average annual dividends, billion rubles	124	20.2	275
3. 5 to 4 ratio, %	161	11.2	96.5
Source: compiled according to the data from the Federal Treasury and corporate financial statements.			

[74] Ilyin V.A., Pechenskaya-Polishchuk M.A., Malyshev M.K., Palkina D.S. (2024). Non-ferrous metallurgy in Russia: 30 years in search of a balance of private and public interests: Monograph. Vologda: VolRC RAS.

Moreover, this conclusion of the expert is clearly confirmed by the results of sociological research, indicating that the contradictions between "the rich and the poor", "government and people", "officials and citizens" are among the top three most acute social contradictions in the opinion of the population *(Figure)*.

The preservation of "crony capitalism", which, in a sense, is "hiding" under the mask of "social" capitalism is proved by the inconsistency of the implementation of one of the first, important and long-awaited reforms of the tax system, **but carried out in such a way that does not affect many aspects of the daily life of oligarchs and top managers:** foreign

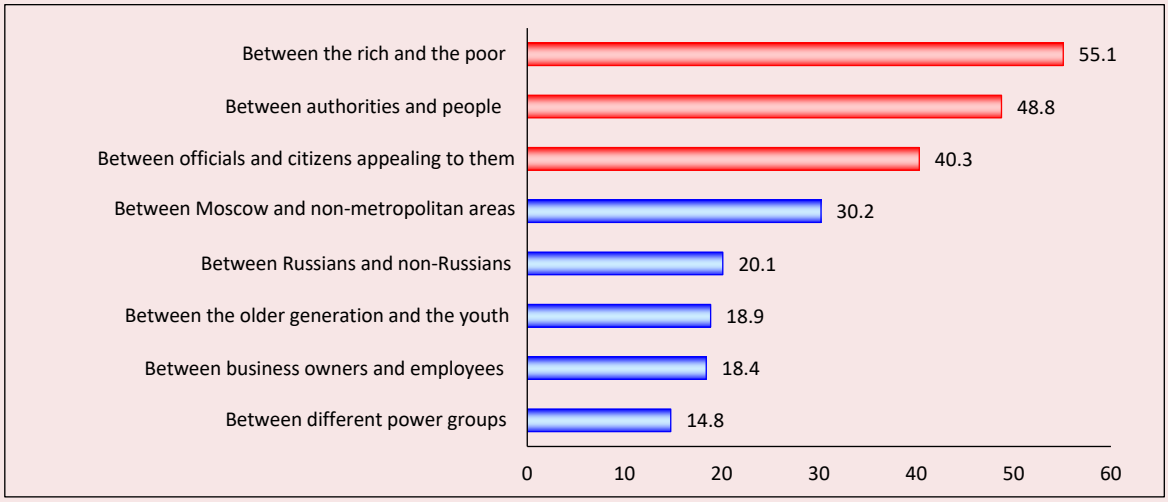
"The tax service's access to personal data should be expanded to **foreign tourism and transfers,** data on which is collected when crossing the border, and also to the purchase of air tickets. **It is the middle class and top managers who most often travel to foreign countries; and these individuals fall under the personal income tax progression, and one trip now costs hundreds of thousands of rubles.**

Another decent area of spending by the middle class and especially the rich is **the entertainment sector.** It is quite necessary to bring under tax control the expenses of individuals, say, from 5 thousand rubles per account (with splitting criteria). Moreover, cash payments should be limited in such cases, or substantial fees should be introduced for such payments...

Why is it, for instance, that the public catering service "Vkusno i tochka" pays VAT, but the restaurants on Rublevka or Patriarshchie Prudy don't?...

In addition to databases on purchases of real estate and vehicles, should we think about the potential of collecting information for the **repair of these objects of property**? Expensive repairs can amount to millions of rubles for an apartment and hundreds of thousands for a car. So far, collecting such personal data looks like a non-trivial task"[75].

"Between which groups of Russian society, in your opinion, there exist the most acute contradictions today?", % of respondents



Data for the Vologda Region on average for December 2023 – June 2024.
Source: VolRC RAS public opinion monitoring.

[75] Anureev S. Tax control of large expenditures of the rich, as declarations of officials. Otherwise, the answer to the progression of personal income tax will be the growth of shadow income. Available at: https://zavtra.ru/blogs/nalogovij_kontrol_krupnih_rashodov_bogatih_kak_deklaratcii_chinovnikov?ysclid=lxt1dq62y5379479454

tourism and bank transfers; expensive restaurants, nightclubs, beauty salons and boutiques; repair of expensive real estate and cars...

In general, these facts, expert assessments, and public opinion polls indicate that the situation not only around, but also inside Russia is still quite alarming and contradictory, despite the fact that **threats to national security for our country, on the contrary, are quite concrete and understandable...**

According to experts, "the main result of the SMO, the main task within Russia is the renewal of elites, moving away from cronyism to service class people"[76]... By and large, both the present and the future of Russia depend on solving this problem; as well as the result of the SMO, and the nature of a new Social Contract, the new "rules of the game" that will regulate life in the country after the end of the special military operation.

The fact that the President feels the urgency of the question "what kind of state are we building?" in society and was not afraid to bring it to the plenary discussion at the International Economic Forum gives hope that the head of state will give a clear and definite answer to it. But so far, it remains only a subject of discussion in the expert community and the subject of expectations of the general public...

> "What are we fighting for? Is it only for the lands that were torn away from the Russian world and for our humiliated brothers? Of course, not only for this. **The front of the SMO, while it is operating, generates a second front inside Russia, the front of self-purification. And this battle, no less important for our fate, is taking place in the depths of Russia, in its capitals... The main result of the SMO, the main task within Russia is the renewal of elites, moving away from cronyism to service class people"**[77].

So what will Vladimir Putin's fifth political cycle be for Russia: a continuation of "crony capitalism" or, after all, the beginning of the construction of "social capitalism"?

[76] Averyanov A. What we are fighting for. On the 10th anniversary of the Russian Spring. Available at: https://izborsk-club.ru/25702?ysclid=lx4fa2xiei532116915

[77] Ibidem.

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On the Ability of Regions to Adapt to Various External Shocks

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Abstract. In order for Russia to successfully respond to current challenges and to prepare for new challenges, it is important to analyze the contribution of regions to solving these tasks. The basis for assessing the sustainability of the Russian regions' economies can be their reaction to the shocks they have already experienced. The article examines economic development of the regions in the context of the 2009 crisis caused by the Great Recession and the 2020 crisis associated with the COVID-19 pandemic. The choice of these very different crises was determined by the aim of the study, which is to find out how universal the ability of regions to adapt to various external shocks is. The sustainability of a region is assessed by comparing its development indicators and data on the economy as a whole. The comparison is based on the dynamics of gross product and changes in innovation activity over periods that overlap the years of business downturn. Groups of regions with different levels of stability are identified and several characteristics of these groups are given. In contrast to the point of view available in the literature, it is shown that a very successful overcoming of one crisis by a region often cannot be repeated in a crisis of another origin. We identify a group of regions, which we can characterize as possessing a relatively universal dynamic stability in the sense of gross regional product growth. As for innovation sustainability, only some of the regions were able to maintain it in different types of crises. In general, for the period from 2008 to 2021, no connection was found between the growth of gross regional product and the regions' innovative activity estimated by the increase in the volume of innovative goods, works, and services.

Key words: dynamic stability, resilience, adaptability, external shocks, gross regional product, innovative activity.

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Introduction

The Russian economy has already faced four challenges in the 21st century: the Great Recession (2009), the first sanctions wave (2015), the COVID-19 pandemic (2020), and the second sanctions wave (2022)[1]. As we know, crisis is both dangers and opportunities to become stronger. In 2023, the Russian economy showed that it is able to grow faster than the economies of many countries that imposed sanctions against it. At the same time, Russia's GDP growth in 2023 and the overall favorable results of the previous tests hide their different results for individual regions. Analyzing these results is important for preparing for new unknown crises, so it is of great importance to identify regions that have shown the ability to adapt to the trials caused by very different reasons. From this point of view, it is useful to look at the experience of development of Russian regions under the influence of the Great Recession and the COVID-19 pandemic. It is worth taking into account two aspects of adaptation.

On the one hand, of importance is the sustainability of the dynamics of gross regional product (GRP). Regions that are more sustainable in this respect help the whole country to pass the test. However, how universal can the ability of regions to cope with different kinds of challenges be? In (Mikheeva, 2021), the conclusion that the resilience of regions does not depend on the nature of the crisis is based on the analysis of the development of regions in the 2009 and 2015 crises. In this case, for a region to be recognized as sustainable it was sufficient for its economy to reach its pre-crisis peak level during the period defined as the end of the crisis. This interpretation of sustainability is debatable from the point of view of economic development, since the recovery of the regional economy is enough for it. This article compares the GRP growth rates of regions for the period overlapping the crisis year with the growth rates of the Russian economy as a whole, and the stability of regions is assessed based on the results of such a comparison. We have found that the results of testing the region's economy by different crises can be radically different. At the same time, a group of regions is identified for which we can talk about relatively universal stability in terms of GRP growth.

On the other hand, the crisis is an opportunity for economic renewal, so adaptability appears as the degree of utilization of the opportunities. The preservation or even increase in innovation activity of the regions comes to the fore. Such activity, as economic theory suggests, may be accompanied by a temporary decrease in output (Helpman, Trajtenberg, 1998). It is important to determine whether the same regions are able to sustain innovation activity in different types of crises. The presence of such regions increases the chances for innovative overcoming of the next crisis situations.

For a country like Russia, having regions with different types of resilience is essential for a successful response to challenges that are different in nature. Shocks like a pandemic are one thing, while foreign economic restrictions aimed at weakening the country's position in technological competition are another. The problem of ensuring such combined sustainability of the Russian economy by the regions has not yet been considered in the literature.

[1] The years of decline in Russia's GDP are indicated.

The article analyzes the development of Russian regions in 2008–2010 (Great Recession) and in 2019–2021 (COVID-19 pandemic). For each crisis period, the groups of regions that showed growth rates higher than the all-Russian ones or innovation activity higher than the all-Russian ones at the end of the period are identified. Groups of regions with average and lower sustainability indicators were identified. We identified a group of regions with relatively high GRP growth rates during both crisis periods and a group of regions with relatively high innovation activity during both periods. The article presents a number of characteristics of different groups of regions.

Literature review

The number of publications on the problems of economic resilience under external shocks continues growing, but the generally accepted terminology has not yet been established. In recent years, resilience issues are often discussed within the concept of economic resilience. OECD literature refers to resilience as the ability to cope with and recover from shocks while positively adapting and transforming their structures and livelihoods in the face of long-term stresses, change and uncertainty[2]. It is not just about damping perturbations, but about the dynamic stability of the system, preservation of its development potential. The research (Akberdina, 2021) presents a brief sketch of the history of the very concept of "resilience". However, some researchers prefer to use the terms "sustainability" (Zubarevich, 2021), "shock resistance" (Zhikharevich et al., 2020; Pesotsky, 2021; Kuznetsova, 2022), "regional resistance to external shocks" (Mikheeva, 2021; Mikheeva, 2023).

The concept of resilience in its essence is close to the concept of dynamic capabilities developed in the early 1990s by D. Teece, G. Pisano and E. Schuen in their article "Dynamic Capabilities and Strategic Management" (Teece et al., 1997) as a firm's ability to engage in adaptation, integration and reconfiguration of internal and external organizational skills, resources and functional competencies in accordance with the requirements of a changing environment. In (Smorodinskaya, Katukov, 2021), the concept of economic resilience is correlated with the economic theory of complexity (Arthur, 2021). According to this theory, the sustainable functioning of complex nonlinear systems in a continuously changing environment requires both constant internal transformations and recombination of external relations. Since we are talking about the sustainability of socio-economic systems, an important angle of it is social resilience (Akvazba, Leonova, 2021; Romanova et al., 2022).

A significant place bongs to the discussion of resistance indicators in Russian and foreign literature (Vysotsky, 2022). The choice of such indicators is closely related to what is understood by resilience. If the pre-shock state is put at the center of attention, the characteristics of resilience can be the scale of deviation from this state, the rate of return to it after the shock. If the reference point is the initial trajectory of development, the most successful variant of resistance to shocks is the transition to the trajectory of faster growth (Akberdina, 2021).

For socio-economic systems, when analyzing resilience, orientation on their goals is justified. For example, resilience is related to the possibility of continuing its implementation for the participants of an investment project. In the conditions of innovation competition, an important aspect of resilience is the ability to use a common shock to break away from competitors. For instance, the oil shocks of the 1970s actually contributed to the acceleration of technological development of the USA and Japan in comparison with their European competitors.

[2] OECD, SIDA. (2017). Resilience systems analysis: Learning and recommendations report. Paris: OECD Publishing.

According to the analysis of several global economic crises, the opportunities opened during this time are successfully used by those countries that combine measures to overcome the negative effects of the decline in economic activity and preparations for subsequent economic development aimed at strengthening the country's position in the world economy. In other words, it is important not to postpone the formation of a new development trajectory to the post-recovery period. This is confirmed by the experience of corporate development. Companies that do not neglect innovation during the crisis gain an advantage over their competitors during economic recovery[3].

The concept of resilience refers to both reactive and proactive measures to disturbances in the economic environment (Martin, 2012). Proactive measures include investment in research and development, as this expands the range of available options for responding to the crisis. Resilience to technological challenges is on the agenda in a period of radical renewal of the technological base of the world economy. They are one of the components of the sanctions pressure on Russia. The policy to increase technological and financial sovereignty is not only a forced response to sanctions, but also a proactive preparation for new challenges. Technological sovereignty appears as another angle of analyzing the resilience, ensuring the economic sustainability (Peskov, 2022; Romanova et al., 2022).

The sustainability of territorial economies and sustainability factors are leading directions in studies on economic resilience. These studies contain both cross-country (Hafele et al., 2023) and interregional comparisons of the resilience of the considered objects. When assessing the impact of shocks on regional economies, the dynamics of gross regional product is a frequently used indicator of the resilience of these economic objects. This approach takes into account that the realization of many regional development goals, including the improvement of the welfare of the population, depends on the growth of GRP volume. According to (Vysotsky, 2022), in the course of interregional analysis, assessments of regions' resilience can be formed by comparing the speed of their economic development to that of the economic complex as a whole.

The publications include a very wide range of key factors promoting economic resilience of territories. A number of studies highlight the role of cities (Wang, Li, 2022), sectoral structure of the economy (Martin et al., 2016; Lazzeretti et al., 2019; Oprea et al., 2020; Akberdina, 2021), human capital, knowledge economy, regional innovation system (Christopherson et al., 2010; Oprea et al., 2020; Akberdina, 2021; Wang, Li, 2022), high level of trust between economic actors (Christopherson et al., 2010) as one of the leading factors.

Along with the importance of the industry structure, the research (Akberdina, 2022) shows the impact on the sustainability of regions of such factors as the possibility to carry out additional capitalization of regional industrial development funds and the availability of import substitution potential. The work (Smorodinskaya, Katukov, 2021) presents a different point of view on import substitution; it indicates that distributed production and trade in value-added rather amortize the crisis consequences of sudden global shocks than amplify them. In this regard, to realize Russia's chances to improve its position in distributed production in the globalization of the 2020s, it is suggested, in particular, to abandon import substitution, to increase intermediate imports for its own exports.

The paper (Malkina, 2024) assesses the impact of the pandemic and sanctions on the real sector of Russian regions using a stress index. The value of this index is the greater the lower the growth rate of the regional indicator and the greater their

[3] Bar Am J., Furstenthal L., Jorge F., Roth E. (2020). *Innovation in a Crisis: Why It Is More Critical Than Ever.* McKinsey Global Institute.

dispersion. Three private indicators were used to assess the stress of the real economy: the index of industrial production; the index of retail trade turnover in comparable prices; and the index of the volume of paid services provided to the population in comparable prices. It is argued that stress indices have a number of advantages over integral assessments of shock or stress resistance of economic systems. They make it possible to assess the growth and decline of stress in dynamics, which makes them suitable for forecasting crisis phenomena. On average, the most vulnerable to shocks were the subjects of the North Caucasian Federal District, while the regions of the Siberian Federal District showed the greatest resilience. The study revealed that the important factors concerning resilience of the regional real economies to a pandemic shock are the industry structure and income level in the region, and to sanctions shocks – also its spatial location.

The paper (Mikheeva, 2021) analyzes the resilience of regional economies to the crisis shocks of 2009 and 2015. Regions that did not experience a decline in GRP and regions in which the pre-crisis peak level recovered during the period defined as the end of the crisis were identified as resilient. Based on the fact that most of the regions that were resilient in the 2009 crisis turned out to be so in the 2015 crisis, it is concluded that the resilience of regions does not depend on the nature of the crisis. However, attention is drawn to the fact that depending on the nature of the crisis, the contribution of regional factors changes not only quantitatively, but also qualitatively. During the 2009 crisis, such factors as the share of urban population, market size, pre-crisis dynamics of the region, and investment growth rate were statistically significant for the dynamics of sustainable regions. In the 2015 crisis, the statistically significant drivers of sustainability were market share, presence of a large agglomeration, export quota of the region and educational composition of the labor force. Regressors characterizing the innovativeness of regions were not statistically significant for the sustainability of Russian regions.

The 2023 study (Mikheeva, 2023) applied the already tested approach to assess the regions' resilience to specific shocks in 2020 and 2022. This time, along with GRP, a new indicator for regional statistics – the index of output of basic economic activities (BEA) – was used. The authors identified the specialization of regions as an important factor in their sustainability. The regions with a high share of agriculture and manufacturing industries related to the defense industry in the production structure turned out to be sustainable. Among the extractive regions, only some Far Eastern regions, where new capacities were commissioned, were included in the group of sustainable regions.

However, the sustainability criterion used in (Mikheeva, 2021; Mikheeva, 2023) (preservation or restoration of the GRP level) does not exclude subsequent stagnation of the regional economy. From this point of view, such a criterion is not evidence of the dynamic sustainability of the region. It is reasonable to judge dynamic sustainability by the rate characteristics of indicators (Tretyakova, Osipova, 2016). In the future, it is proposed to assess the dynamic stability of the region by comparing the results of the crisis period (GRP of the post-crisis year to GRP of the pre-crisis year) by the region and the country as a whole.

Data and methods

The study (Pyankova, Kombarov, 2023) discusses the resistance to sanctions pressure in connection with the analysis of the dependence of expenditures on the national economy of the federal budget and regional budgets on the volume of their revenue part. This dependence is considered in the form of a linear regression $Y = a + bX$. The attention is focused on the coefficient at the exogenous variable X. However, the actual sensitivity of expenditures on the economy with a decrease in the revenue part of the budget can

be judged not by the absolute, but by the relative change in the value of expenditures, i.e. by the ratio: $(Y_1 - Y_2)/Y_1 = b(X_1 - X_2)/Y_1$. As a result, if the value of parameter a is many times larger than the value of parameter b (such a ratio between them was shown by the calculations in (Pyankova, Kombarov, 2023)), then there are no sufficient grounds for the conclusion about strong sensitivity.

When analyzing the resilience of economic systems, the extent of decline in the activity under the influence of a shock and the activity of the subsequent "rebound" are often considered separately. The level of decline in business activity is a static assessment of the vulnerability of the objects under consideration. In a severe recession, the rates of recovery growth, rebound, may be high. As a result, these rates will not give an adequate representation of the dynamic stability of an economic system.

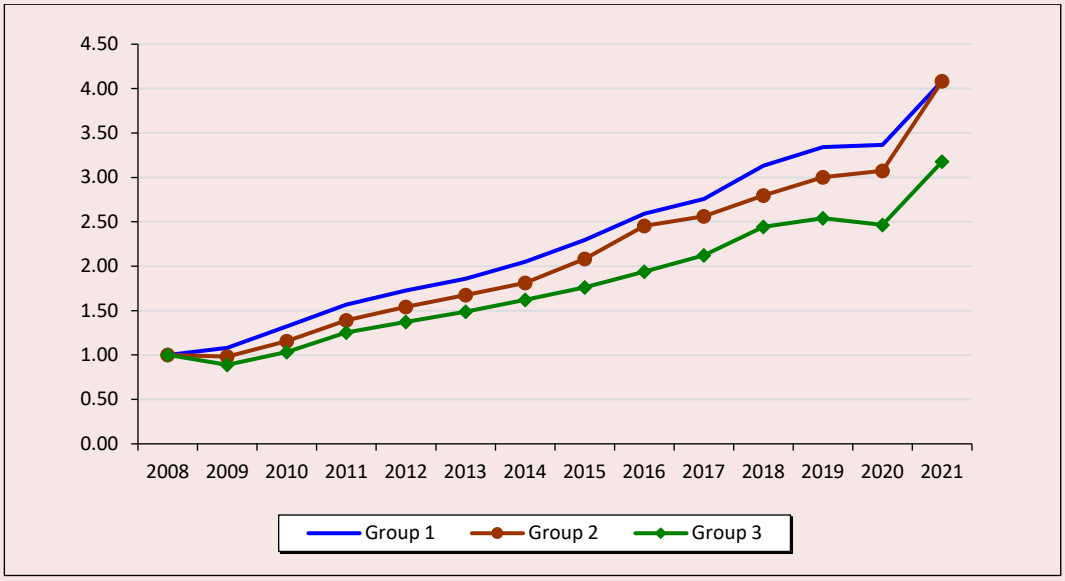
The following sections of the article, when analyzing the sustainability of constituent entites of the Russian Federation, consider the growth of their economy as a whole over the period covering both the decline in business activity and its recovery. A similar approach is used to determine the innovation sustainability of regions.

We used regional statistics of Rosstat (socio-economic indicators in the context of constituent entities of the Russian Federation) as a data source. The paper considered constituent entities of the Russian Federation without identifying intra-regional autonomous districts.

Russian regions: Test of the Great Recession

Gross regional product (gross value added in current basic prices) for all constituent entities of the Russian Federation grew 1.11-fold in 2010 compared to 2008. GRP growth in 26 regions amounted to 124.4 to 148.7% over this period (Group 1). GRP growth in 27 regions ranged from 111.4 to 122.2% (Group 2). These two groups of regions showed higher dynamic stability compared to the economy as a whole. The remaining 27 regions showed an increase from 89 to 111% (Group 3). *Figure 1* presents the growth of aggregate GRP (gross value added in current basic prices) by the three groups of regions in the period 2008–2021.

Figure 1. Growth of total GRP by groups of regions 1–3 in 2008–2021



According to: Rosstat data.

Table 1. Characteristics of groups of regions 1–3 with different dynamic stability in terms of GRP growth

Group of regions	Average GRP by group, 2008, million rubles	GRP growth, 2010 to 2008	GRP growth, 2021 to 2019	Growth of gross capital formation, 2010 to 2008	Share of fully depreciated fixed assets, 2010, %	Fixed capital investment per capita, 2010
Group 1	214257.7	1.322	1.22	1.33	10.1	81,441
Group 2	310730.9	1.156	1.36	1.05	12.3	44,664
Group 3	738826.7	1.034	1.25	0.98	15.6	57,531
				$R^2 = 0.187$	$R^2 = 0.111$	

Group of regions	Share of urban population, 2008, %	Growth of consumer expenditures per capita, 2010 to 2008	Volume of paid services per capita, 2010, rubles	Number of small enterprises per 10,000 people, 2010	Growth in the volume of innovative goods, 2010 to 2008	Rising research and development costs, 2010 to 2008
Group 1	69	1.308	32,454	99	0.8	1.16
Group 2	67	1.221	25,344	103	1.2	1.25
Group 3	71	1.197	30,001	110	1.1	1.22

Group of regions	Share of manufacturing industry in GRP, 2008, %	Share of manufacturing in GRP, 2010 %	Growth of exports to non-CIS countries, 2010 to 2008	Growth of imports from non-CIS countries, 2010 to 2008	Growth of debt of legal entities on credits in foreign exchange, 2010 to 2008
Group 1	44.7	42.4	1.139	0.833	1.81
Group 2	57.7	61.3	0.699	0.979	1.74
Group 3	47.8	47.6	0.820	0.813	1.61

According to: Rosstat data.

As we can see, Group 1 is the leader in terms of dynamic stability (in terms of GRP growth) from the point of view of the whole period under consideration. However, the situation began changing at the end of the period, during the COVID-19 pandemic. *Table 1* gives a number of parameters of the selected groups of regions.

According to the data of Table 1, the growth of gross capital formation could have a positive impact on the GRP dynamics of the first group of regions, which is associated with the low level of the share of fully depreciated fixed assets. The growth of production of goods and services in this group of regions was supported by both internal and external demand. The averaged indicators for Group 1 indicate its leadership in terms of the volume of paid services per capita, growth of consumer expenditures of the population, and growth of exports to non-CIS countries.

For many indicators there is no linear relationship between their values and the growth of group GRP. For example, the regions of Group 2 have worse dynamics of aggregate exports to non-CIS countries than the regions of Group 3. A similar situation with per capita investments in fixed assets, with the volume of paid services to the population was observed in 2010. As a result, the possibilities of regression analysis of the factors of dynamic stability of the regions are limited. The relationship between the growth of group GRP and the growth of gross capital formation ($R^2 = 0.187$), the specific weight of fully depreciated fixed assets in 2010 ($R^2 = 0.111$) is found, albeit weak. The coefficient of determination was determined for the whole set of regions.

It is noteworthy that with a slightly higher share of urban population in Group 3 as a whole, it is inferior to the other groups of regions in terms of sus-

tainability in the period under review. Structural shifts in favor of manufacturing industry did not provide Group 2 with leadership in terms of GRP growth rates.

As the descriptive statistics presented in Table 1 show, Group 1 that best survived the Great Recession fared worse than the other groups in the COVID-19 pandemic.

Russian regions: Test of the COVID-19 pandemic

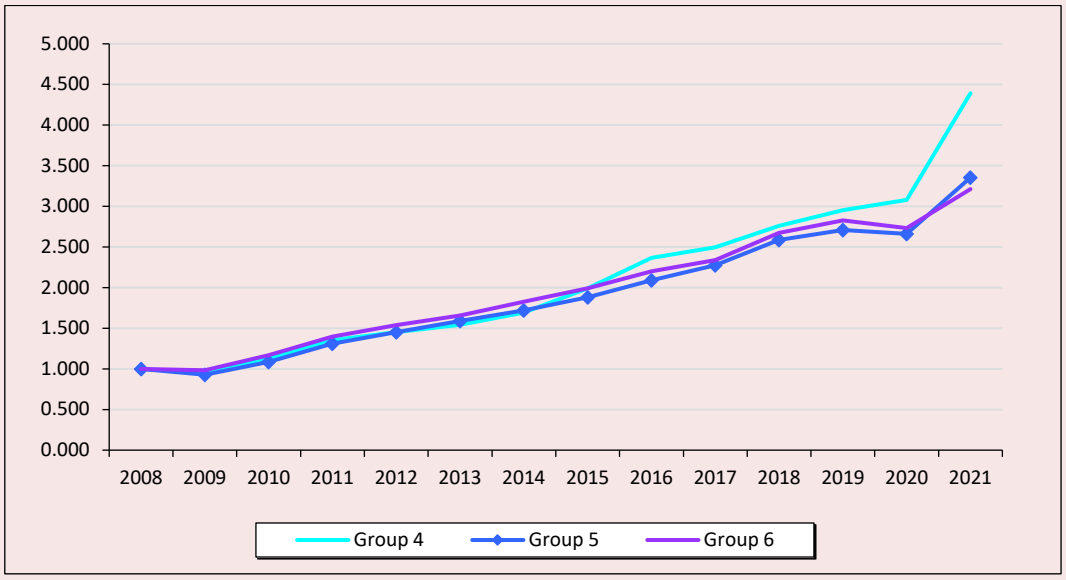
A new grouping of regions is used to analyze dynamic sustainability in the period 2019–2021. The benchmark for grouping is the growth of GRP (in current basic prices) in 2021 in relation to 2019. Group 4 includes 22 regions that are leaders in terms of GRP growth (from 128.2 to 182%). Group 5 includes 30 regions (growth from 119.6 to 126.8%). Group 6 includes 30 regions (growth from 104.7 to 119.3%). *Figure 2* shows the growth of aggregate GRP by the new groups of regions in the period 2008–2021. *Table 2* presents a number of parameters of these groups.

As in the previous case, the leadership in dynamic stability is combined with the growth of consumer expenditures per capita, with the increase in exports to non-CIS countries, with a smaller share of fully depreciated funds, with superiority in the amount of investment in fixed capital per capita, with a larger volume of paid services per capita.

Unlike the shock of the Great Recession, during the pandemic period the group of regions with the smallest average size, with the smallest number of small enterprises per 10,000 population turned out to be less resistant to the new shock. Despite its epidemic character, a positive relationship between dynamic resilience and the share of urban population was evident. The most pandemic-resistant group of regions has now become the leader in the growth of innovative goods.

As before, there is no linear relationship between their values and the growth of group GRP for several indicators. Such indicators include growth of investments in fixed capital, growth of expenditures on research and development, the share of manufacturing industry in GRP, growth of imports from non-CIS countries, growth of legal entities' debt on loans in foreign currency.

Figure 2. Growth of total GRP by groups of regions 4–6 in 2008–2021



According to: Rosstat data.

Table 2. Characteristics of groups of regions 4–6 with different dynamic stability in terms of GRP growth

Group of regions	Average GRP by group, 2019, million rubles	GRP growth, 2010 to 2008	GRP growth, 2021 to 2019	Growth of investments in fixed assets, 2021 to 2019	Share of fully depreciated fixed assets, 2021, %	Fixed capital investment per capita, 2021	Patients diagnosed with COVID-19 per 1,000 persons, 2020	Doctors per 10,000 people, 2020
Group 4	993,252	1.123	1.487	1.154	17.2	224,384	35.3	50.2
Group 5	1,799199	1.087	1.238	1.241	18.8	140,641	32.1	47.7
Group 6	641,105	1.167	1.136	1.152	23.6	99,601	32.6	48.5
						$R^2 = 0.1$	$R^2 = 0.012$	$R^2 = 0.051$

Group of regions	Share of urban population, 2019, %	Growth in consumer spending per capita, 2021 to 2019	Volume of paid services per capita, 2021, rubles	Number of small enterprises per 10,000 people, 2020	Growth in the volume of innovative goods, 2021 to 2019	Rising research and development costs, 2021 to 2019
Group 4	75	1.139	69,234	126	1.36	1.139
Group 5	70	1.124	69,251	125	1.31	1.164
Group 6	67	1.119	51,167	99	0.96	1.112
	$R^2 = 0.128$	$R^2 = 0.011$	$R^2 = 0.113$	$R^2 = 0.086$		

Group of regions	Share of manufacturing in GRP, 2019, %	Share of manufacturing industry in GRP, 2021, %	Growth of exports to non-CIS countries, 2021 to 2019	Growth in imports from non-CIS countries, 2021 to 2019	Growth of debt of legal entities on loans in foreign currency, 2021 to 2019
Group 4	61.3	61.2	1.294	1.173	0.971
Group 5	42.4	46.4	1.118	1.246	1.065
Group 6	57.9	55.4	1.159	1.002	0.939

According to: Rosstat data.

According to Rosstat data, there is no significant relationship between GRP dynamics and the number of doctors of all specialties per 10,000 population, the number of patients with the first registered diagnosis of COVID-19. A weak relationship is also observed between the growth of GRP (2021 to 2019) and the capacity of outpatient and polyclinic organizations per 10000 population in 2020 ($R^2 = 0.094$).

When resilience leaders under one type of shocks lose their positions under another type of shocks, it is important to find out the characteristics of regions that have been relatively successful in passing both tests.

Characteristics of regions with universal stability with respect to GRP growth

The constituent entities of the Russian Federation that did not fall below 40th position in two dynamic sustainability ratings (for the Great Recession and for the COVID-19 pandemic) were identified as regions of universal sustainability in terms of GRP growth. There were 18 such regions (Group 7). Two thirds of them are border regions. Almost half of the regions represent the Far Eastern Federal District *(Tab. 3)*.

Table 4 shows a number of characteristics of both this group of regions and the totality of the constituent entities of the Russian Federation as a whole.

We can conclude that the resilience of the regions of Group 7 to different types of challenges was ensured not at the cost of slow growth rates, since the aggregate GRP of this group in the period 2008–2021 grew 4.8-fold (the total GRP of the regions increased only 3.6-fold). The high level of per capita investment in the group under consideration helped to avoid a prolonged decline

Table 3. List of regions of universal sustainability by GRP growth

Republic of Sakha (Yakutia)	Altai Terrotiry
Transbaikal Territory	Irkutsk Region
Primorye Territory	Saratov Region
Khabarovsk Territory	Stavropol Territory
Amur Region	Krasnodar Territory
Magadan Region	Republic of Adygea
Jewish Autonomous Region	Vladimir Region
Chukotka Autonomous Area	Voronezh Region
Saint Petersburg	Belgorod Region

Table 4. Characteristics of the group of regions of universal sustainability by GRP growth and Russian regions as a whole

Group	GRP growth, 2021 to 2008	GRP growth, 2010 to 2008	GRP growth, 2021 to 2019	Share of fully depreciated fixed assets, 2010, %	Share of fully depreciated fixed assets, 2021, %	Fixed capital investment per capita, 2010	Fixed capital investment per capita, 2021
Group 7	4.775	1.249	1.436	10.6	14.9	75,398	233,568
All regions	3.574	1.111	1.274	13.5	21.7	64,068	159,323

Group	Share of urban population, 2008, %	Share of urban population, 2019 г., %	Growth of consumer spending per capita, 2010 to 2008	Growth of consumer spending per capita, 2021 to 2019	Growth of exports to non-CIS countries, 2010 to 2008	Growth of exports to non-CIS countries, 2021 to 2019
Group 7	68.2	70.2	1.296	1.141	0.764	1.171
All regions	73.5	74.7	1.197	1.126	0.855	1.194

According to: Rosstat data.

in production. At the same time, resources were spent less than in other regions on prolonging the operation of fully depreciated funds. The growth of domestic demand played a more noticeable role in damping shocks against the background of all RF constituent entities, which is especially important when external demand declines.

Dynamic sustainability of regions: Innovation aspect

The response to the crisis reduction in demand can be a change in the structure of supply, an increase in the volume of innovative goods and services. It is possible to single out the regions that most actively used such an option of actions during the crises under consideration. In the Russian economy as a whole, the volume of innovative goods, works and services grew by 12.7% in 2010 compared to 2008 (hereinafter in current prices). However, 37 regions demonstrated higher rates of its growth. In 2021 compared to 2019, the total volume of innovative goods, works, services increased by 23.4%. Thirty-five constituent entities of the Russian Federation had higher growth rates of this indicator. At the same time, 21 regions were ahead of the all-Russian increase in the output of innovative products in both periods under consideration. In relation to these regions alone we can speak about their universal stability in terms of innovation activity *(Tab. 5)*. At the same time, more than a third of the regions that demonstrated innovation sustainability during one crisis could not maintain it during another crisis, so there is no reason to believe that the innovation sustainability of regions in general has a universal character.

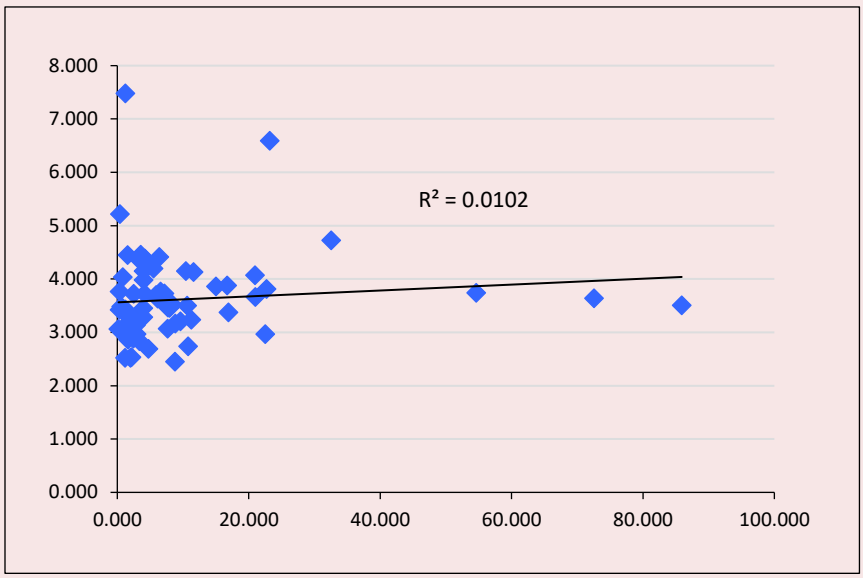
Table 5. List of regions of universal sustainability by innovation activity

Republic of North Ossetia-Alania	Karachayevo-Circassian Republic
Kamchatka Territory	Omsk Region
Arkhangelsk Region	Novosibirsk Region
Saint Petersburg	Kaluga Region
Murmansk Region	Republic of Bashkortostan
Tula Region	Saratov Region
Republic of Altai	Moscow
Republic of Dagestan	Khabarovsk Territory
Leningrad Region	Republic of Tatarstan
Republic of Mordovia	Rostov Region
Republic of Karelia	

Another question is how the innovation activity of the regions is combined with the dynamics of their GRP. Let us compare the increase in GRP of the regions in 2008–2021 and the growth in the volume of their innovative products over the same period *(Fig. 3)*.

The actual lack of relationship between the variables under consideration can be explained by the fact that the share of innovative products in GRP was and remains very low. In 2021, only in 11 regions it exceeded 10%, and in 23 regions it was less than 1%.

Figure 3. Relationship between GRP growth (Y-axis) and increase in innovative products (X-axis) in 2008–2021, based on data on 72 regions of the RF



According to: Rosstat data.

Conclusion

The analysis of GRP dynamics under external shocks of different nature (the Great Recession and the COVID-19 pandemic) shows that the regions that coped best with one challenge may be outsiders under tests of another nature. From this perspective, regional resilience to external shocks is not universal, which is at odds with the conclusion in the literature (Mikheeva, 2021).

At the same time, it is noteworthy that the regions that were not leaders in adapting to either of the shocks, but coped quite well with both shocks. In the case of such regions it is acceptable to say that their relative stability has a universal character. A similar situation is with innovation activity of the regions. In general, it is not universal, but some regions manage to maintain innovation activity under different shocks.

The assessment of dynamic qualities did not analyze the sustainability of regions for a fuller range of trials that fell to Russia in the 21st century (the Great Recession, the first sanctions wave in 2014–2015, the COVID-19 pandemic, the second sanctions wave in 2022). We can draw attention to the fact that in Figure 2 it is after 2014 that the trajectory of the most pandemic-resistant group of regions deviates from the general trend of their development. On the other hand, the fact that the group of regions, which best passed the crisis of 2009, retained the leadership in growth rates in the period 2014–2015, testifies to its successful adaptation to the sanctions of the first wave.

We can hardly claim to reveal the secret of regions' adaptability to shocks using very aggregate characteristics. However, in this way it is possible to identify the regions, which can be analyzed in more detail to further search for the dynamic sustainability factors.

The regions with adaptability to several types of shocks are quite heterogeneous. This suggests that the universal resilience of a particular region is achieved through a combination of both some universal and unique factors for a given region. The identification of both specific factors concerning resilience and vulnerability requires a detailed analysis of the regional economy, its sectoral structure, prehistory of development, Russian and foreign economic specialization, interaction with other regions, place in global value chains, ability to quickly localize the falling links of these chains. It is necessary to take into account the role of public authorities (federal and regional) in ensuring the sustainability of the regional economy in shock situations.

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Digital Inequality between Urban and Rural Population

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Abstract. Digitalization can transform social inequality between urban and rural population into a digital divide. This issue in the "city–village" context is not given due attention by scholars and is mainly limited to the country level. Interregional inequality in scientific publications is considered, as a rule, outside of this context. The study seeks to eliminate this gap. The aim is to identify features, trends and quantitative parameters of digital inequality (divide) between urban and rural population at the national and interregional level and identify ways to address the issues that arise. The tasks are to establish trends in the formation of a digital divide in the levels of Internet access and digital competence of users, in obtaining state and municipal services and ordering goods/services; to assess the reasons for the rural population's refusal to use the Internet and identify ways to solve this problem. The study was based on a combination of calculation of coefficients of variation and grouping of regions. We used the data of the federal statistical observation. Results: the hypothesis was confirmed that there are trends at the national level to reduce the gap in Internet access, the growth of the gap in the level of users' digital competence and the use of digital technology; we found out the presence of a positive trend toward reducing the interregional gap in obtaining public and municipal services via the Internet and its growth in the implementation of orders of goods/services; we put forward measures to fulfill the needs of the rural population in using the Internet, increase the level of their digital skills; we conclude that it is necessary to provide budget support for socially vulnerable families when connecting to the Internet, to establish social tariffs for low-income households; mechanisms of public-private partnership and support for initiatives of local communities are proposed aimed at increasing high-speed Internet coverage in rural areas. Further study

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of the digital divide requires in-depth sociological research and taking into consideration the data from mobile operators and Internet service providers.

Key words: digitalization, digital divide, type of settlement, region, Internet, households, users' digital competencies.

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Introduction

The Internet is increasingly being used by organizations and households in urban and rural areas of various Russian regions, which leads to the inclusion of digital technologies in the production process and daily life of the country's population. The pace of digitalization, the level and depth of penetration of digital technologies into urban and rural areas, as well as between regions of the country, differ significantly.

With the expansion of digitalization, urban areas and regions possessing high socio-economic potential receive a new impetus for their development, and rural areas and regions with depressed economies become digitally vulnerable. This problem is global and it affects all countries of the world.

Even Europe has marginal rural areas with socio-economic and cultural decline, characterized by unemployment, emigration, population aging, depopulation, poverty and social isolation (Wiesinger, 2007; Chatzichristos et al., 2021). As a result, there is a problem of digital inequality (gap) between urban and rural areas, between regions of the country with different development potential, which is also due to differences in technical connection conditions, economic opportunities for network access, and demographic factors (Salemink et al., 2017; Haefner, Sternberg, 2020).

In the Russian Federation, in the process of digitalization of society, "with the exception of quite rare cases when indicators stabilize (sometimes at marginally low borders), the village lags behind the city by 5–6 years" (Salnikov, 2021, p. 129). Digital inequality between cities and villages is becoming a barrier to their further balanced development and overcoming the existing social distance between urban and rural population. Digital inequality between urban and rural residents has a slightly different content than the digital gap between individuals or their groups, which is determined by one or another attribute (income level, education, age, etc.) in urban or rural areas. The digital divide between urban and rural population is formed under the influence of a combination of factors. These are inequalities in social status and access to power, income and education, age structure, Internet accessibility and the possibility of using digital technologies in the fields of public and municipal services, education, medicine, trade, etc. At the same time, it is not the digital inequality between individuals that is important, but the digital gap between the urban and rural population as a whole, as well as between regions.

Interregional digital inequality creates prerequisites for further strengthening the process of socio-economic differentiation of regions, exacerbating the existing unevenness of spatial development, since digitalization creates many opportunities for innovation, which are still used predominantly by urban regions with higher innovation potential, thanks to a wide variety of specialized companies and supporting stakeholders (Haefner, Sternberg, 2020).

Despite the severity of the problems of digital inequality between cities and villages and the digital divide between regions, these issues have not been studied enough, and "identifying the essence and causes of the digital divide in Russian regions is a poorly developed and debatable problem" (Selishcheva, Asalkhanova, 2019, p. 232).

The severity of the problem of digital inequality between urban and rural areas and the insufficient level of its knowledge regarding the situation in the Russian Federation determine the relevance, aim and objectives of the study.

The aim of this study is to identify features, trends and quantitative parameters of the formation of digital inequality (gap) between urban and rural residents at the national and interregional levels and identify ways to solve the problems that arise. The study aims to confirm or refute the hypothesis of reducing the gap in the level of Internet access, the growth of the gap in the level of user's digital competence, their digital literacy and the use of digital technologies in people's lives by the example of obtaining state and municipal services and online ordering of goods/services.

Thus, based on the analysis of the dynamics of indicators for 2014–2022, the following tasks were formulated and addressed.

1. Trends in the formation of the digital divide have been identified in: a) the level of access to the Internet and information and communication technologies (ICT) in quantitative parameters and ways of accessing the network; b) the involvement of rural and urban residents in obtaining state and municipal services and ordering goods/services online.

2. Trends in the formation of a digital divide in the level of users' digital competence and their digital literacy, including the presence of Internet user skills, and the use of the Internet in obtaining state and municipal services and ordering goods / services, have been established.

3. We assess reasons why rural residents refuse to use the Internet, which cause the growth of the digital divide with the urban population, and we propose ways to solve this problem.

Scientific novelty of the research findings lies in establishing the features, trends and quantitative parameters of the formation of the digital divide in the "city–village" context at the level of the Russian Federation, its regions and in the interregional context, confirming the hypothesis of reducing the gap in the level of Internet access and its growth, both in digital competence and digital literacy of users, and in their use of digital technologies in their daily activities. For the first time, the results of grouping regions by the digital gap between urban and rural residents were obtained, and RF constituent entities with a gap in favor of the village were identified.

An interdisciplinary scientific contribution consists in the results of projecting existing theoretical views on the problem of digital inequality on a global scale onto the digital divide in the "city–village" context at the national and interregional levels.

Proposals to eliminate the identified causes of rural households' refusal to use the Internet and digital technologies and to bridge the digital divide are of practical importance.

Theoretical background of the study

In English, digital inequality is denoted by the terms "digital divide" and "digital gap". "Digital divide" is interpreted by the Organization for Economic Cooperation and Development (OECD) as the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities[1].

[1] OECD (2001). Understanding the Digital Divide. In: *OECD Digital Economy Papers*, 49, OECD Publishing, Paris. Available at: http://dx.doi.org/10.1787/236405667766

There is no generally accepted definition of the term "digital inequality", most often it is used as a synonym for "digital divide" (Revenko, Revenko, 2022). At the same time, there are attempts in the scientific literature to distinguish them, while the difference between digital divide and digital inequality is seen as the difference between a form of differentiation and a new form of social inequality (Social Inequality..., 2021).

We note that it would be more reasonable to talk not about digital, but about the social inequality that the digital divide leads to. L.S. Revenko and N.S. Revenko (Revenko, Revenko, 2022, p. 376) note that the terms "digital divide" and "digital inequality" are quite close, but they only make some distinction between them, saying that "digital inequality" is unequal access to economic and social benefits due to the inability to adequately use the achievements of digital technologies. However, according to the concept of three levels of digitalization (Salemink et al., 2017; Gruzdeva, 2020; Korovkin et al., 2020; Yanovskaya et al., 2022; Vlasyuk, 2023), this is the third level of the digital divide.

Given the methodological incompleteness in distinguishing the terms "digital divide" and "digital inequality", the lack of a generally accepted interpretation of the latter, in our study we take the side of the majority and use these two concepts as synonyms, recognizing that their negative dynamics "do not lead to the elimination of the problem of social inequality, but strengthen it and develops new forms (Dobrinskaya, Martynenko, 2019).

Officially, the problem of bridging the digital divide was reflected in the Okinawa Charter on Global Information Society, adopted by the Heads of State and Government of the Group of Eight on July 22, 2000: "Everyone should have the opportunity to access information and communication networks... We also welcome the fact that both industry and civil society are increasingly inclined to recognize the need to bridge this gap"[2].

Formulated in the late 1990s, the concept of digital divide was understood as unequal access to the Internet (Castells, 1996), as inequality in access to digital information channels by various social groups (Korovkin et al., 2020).

From the very beginning of the emergence of the term "digital divide" and to the present time, it has been used mainly in the sense of inequality of social groups of the population (strata), distinguished by various criteria (gender, age, income, education, etc.), in access to the Internet, ICT and the realization of opportunities to use them.

At the same time, it is indicated that rapid digital development negatively affects socially vulnerable groups (children, youth, women, the elderly, the sick, people living in remote areas), since poorly educated, illiterate people with little experience in using ICT are vulnerable to exclusion from digital developments, which further increases their isolation and marginalization in real life (Salemink et al., 2017).

Many authors note the growing inequality between people who can access the Internet and those who cannot (Holmes, Burgess, 2022); between those who are included in digital systems as consumers of information and services provided by these systems and those who are excluded – do not have access to them (Heeks, 2022, p. 697); and between those who can easily use and access digital technologies and those who cannot (Sanders, Scanlon, 2021, p. 131).

The emergence of the Internet in the consumer space has aroused great interest in studying the causes and implications of the digital divide between urban and rural areas by researchers from various disciplines (Salemink et al., 2017).

[2] Okinawa Charter on Global Information Society. Available at: http://www.kremlin.ru/supplement/3170

Studying digital inequality is a starting point for understanding the essence of the social landscape of the 21st century (Robinson et al., 2015). The presence of a certain level of digital divide is an objective factor, but with the achievement of a certain value "it becomes socially and politically unacceptable". At the same time, "a situation is unacceptable when the digital divide becomes fundamentally insurmountable so that representatives of information-poor regions or social groups find themselves in a "different universe" in terms of their economic and social opportunities" (Korovkin et al., 2020, p. 12). The paradox of digitalization arises when rural regions, most in need of improved digital connectivity, are least connected to the Internet and least involved in the use of digital technologies to improve life (Salemink et al., 2017).

Most countries are concerned about the digital divide between urban and rural residents, and this is a global problem. The article by the authors from the UK, in particular, notes that though digitalization opens up numerous opportunities for rural areas, they still lag behind cities in terms of access to Internet services and their implementation. As of September 2020, 96% of residential premises in urban areas of the UK were provided with broadband, compared with 81% in rural areas, where 10% of users could not access the Internet even with low download speeds. According to the European Commission, at the beginning of 2019, 10% of rural settlements in the European Union did not have access to any fixed broadband network, and the gap in the use of this network between rural and urban settlements was 15% (Gerli, Whalley, 2021).

Various approaches to the study of the digital divide are found in publications that fit into the concept of three levels of digitalization (Salemink et al., 2017; Gruzdeva, 2020; Korovkin et al., 2020; Yanovskaya et al., 2022; Vlasyuk, 2023):

1) level of access to the Internet and ICT;

2) level of digital competence of users and their digital literacy;

3) level of social benefits that users receive from the correct and sufficient use of digital technologies in their professional and private lives.

According to representatives of the Skolkovo Innovation Center, researchers generally note that the digital gap of the first level is shrinking, while the gap of the second level may grow. As a result, there is a possibility of a catastrophic increase in the gap of the third level and it is quite possible that a vicious circle may emerge when "the rich get richer and the poor get poorer" (Korovkin et al., 2020, p. 13).

The first-level digital inequality still exists even in developed countries such as the United States, where as of 2014 about 14% of American adults still did not use the Internet. The second-level digital inequality related to skills, participation and efficiency, and affects an even larger portion of the American population, even those who are nominally considered "users" (Robinson et al., 2015). In 2015, 69% of rural residents reported using the Internet, compared with 75% of urban residents. This gap is 6–9 percentage points (p.p.), it is quite constant and persists for a long time[3]. The level of broadband access in urban areas of the United States in 2020 reached almost 98%, while in rural areas only two thirds of residents had it[4].

Russian authors' articles on the digital divide in the "city–village" context consider various issues: reasons for digital inequality at the regional level due to differences in its shaping factors (Bannikov et al., 2020); impact on digital

[3] Carlson E., Goss J. (2016). The State of the Urban/Rural Digital Divide. *An official website of the United States government*. Available at: https://www-ntia-gov.translate.goog/blog/2016/state-urbanrural-digital-divide?_x_tr_sl=en&_x_tr_tl=ru&_x_tr_hl=ru&_x_tr_pto=sc (accessed: April 17, 2024).

[4] Cooper L. (2023). The stakes are too high to not solve the rural digital divide. *Human-I-T*. Available at: https://www-human--i--t-org.translate.goog/why-bridge-rural-digital-divide/?_x_tr_sl=en&_x_tr_tl=ru&_x_tr_hl=ru&_x_tr_pto=sc (accessed: April 17, 2024).

inequality of the availability of ICT tools and the possibilities of their effective use depending on population density and population concentration (Bylina, 2019). At the same time, the digital divide is considered at the national level, while the spatial aspect is not affected.

The article (Kirilova et al., 2021) attempts to assess the contribution of three factors (availability of broadband services, affordable Internet prices, ICT skills) to the reduction in the digital gap between urban and rural residents differentially across three classes of small settlements in the Nizhny Novgorod Region. But the authors do not address the issues of the digital divide between regions in the "city–village" context, but explore the problem within their region.

D.A. Gainanov and T.F. Sharifyanov consider overcoming digital inequality between urban and rural settlements conceptually by creating a differentiated network infrastructure at different network localities in the settlement system, without reference to any region (Gainanov, Sharifyanov, 2015).

A typical approach to studying the digital divide between urban and rural residents is to compare quantitative indicators reflecting the penetration and use of ICT by the corresponding types of settlements in the Russian Federation as a whole (Safiullin, Kuksin, 2022).

T.D. Sannikova considers digital inequality from the standpoint of its negative impact on the well-being of rural residents, including the availability and quality of services received in electronic form: educational, banking, government services, etc. (Sannikova, 2018).

The problems of an interregional digital divide between urban and rural residents in the level of access to the Internet and ICT, as well as their application in human life, are practically not considered in the scientific literature. Research papers deal with the digital divide between regions, without taking into account the division of the population by type of settlement.

Most of the Russian scientific publications consider the first or the first and second levels of digital inequality. Thus, M.A. Gruzdeva considers the digital inequality between Russia's regions in terms of differences in the penetration and use of the Internet by residents (Gruzdeva, 2020). Besides, attempts are being made to study the gap at all three levels of digital inequality, when, in addition to considering accessibility of the Internet and digital technologies, scholars investigate the effectiveness of their use in the economy (Vlasyuk, 2023, p. 61).

Some publications study the factors contributing to the digital divide: uneven socio-economic development of regions (Selishcheva, Asalkhanova, 2019; Dudin et al., 2021; Kostyaev, 2023); high cost of deploying infrastructure in rural areas; level of education of Internet users and the experience of using ICT; difference between regions in the ratio of urban and rural population, its density; population density in rural settlements and the distance between them (Salemink et al., 2017); differences in age and gender structure, income, and education (Vallušová et al., 2022).

Many publications present a quantitative assessment of the degree of digital inequality in terms of digital divide between regions (Kuznetsov, Markova, 2014; Bakhtizin et al., 2017; Gubanova, Klesch, 2018; Batrakova, 2021; Shatalova, Kasatkina, 2022; Vallušová et al., 2022).

Upon reviewing publications on digital inequality in urban and rural areas, we have revealed that researchers have not yet engaged in studying this problem in an interregional aspect, identifying groups of RF constituent entities with different levels of the digital divide. To a large extent, this is explained by the scarcity of differentiated statistical indicators on the digitalization of urban and rural settlements by region, as well as by the fact that different authors methodologically consider "the need to identify three types of digital divide: global, national and individual" (Social Inequality..., 2021, p. 155); as for interregional digital divide, it is not touched upon, as well.

Methodology, methods and materials

The key element in the methodology of the digital divide research in the context of the formulated goal and highlighted tasks is a multidimensional concept of "differentiation", used in almost all branches of science with appropriate content. In our case, we are talking about social and territorial (spatial, interregional) differentiation.

Social differentiation is of particular importance in studying stratification in general, and it becomes a critical methodological problem (Robinson et al., 2015). According to P. Sorokin's definition, the basis and very essence of social stratification "consists in the uneven distribution of rights and privileges, duties and responsibilities, social benefits and deprivations, social power and influence among members of a particular community" (Sorokin, 1927, p. 9). These attributes of social distance, formed by social differentiation, are fully inherent in the relations between urban and rural communities. Social inequality manifests itself to varying degrees in different regions of the country due to the heterogeneity of the demographic situation in them, people's living standards and educational and professional qualities; all this in the context of digitalization becomes a prerequisite for the formation of a digital divide between RF constituent entities.

Thus, there is a territorial differentiation of social inequality, hence digital inequality. In this case, we consider the essence of the concept of "differentiation" in two aspects: "as a process contributing to the division of socio-economic space and as a result of this process, expressed by the heterogeneity of rural areas" (Kostyaev, Nikonova, 2021, p. 153). Moreover, "differentiation as a process" is a cause, and "differentiation as a result" is a consequence, which should be considered in dialectical unity, when one consequence can become the cause that entails another consequence. As a result, there emerges a "vicious circle", when digital inequality slows down regions' development; and "depressed regions lag behind in the development of ICT due to insufficient rates of economic growth and socio-economic development in general" (Dudin et al., 2021, p. 964).

To determine the degree of interregional heterogeneity, various statistical indicators are used: range of variation, polar values discontinuity coefficient, decile coefficient, variation coefficient, oscillation coefficient, Gini coefficient, Theil index, etc. (Bakhtizin et al., 2017; Gubanova, Klesch, 2018; Batrakova, 2021; Shatalova, Kasatkina, 2022).

To study inequality ($X_1 < X_2$) in the "city–village" context within one socio-economic unit (country, region, district, etc.), the gap indicators ($R_{1.2}$) between them are defined as the difference between higher and lower values for each of the considered indicators ($R_{1.2} = R_2 - R_1$).

When studying inequalities between regions, they are distributed in an ordinal sequence according to the considered indicators in the direction from the minimum to the maximum value:

$$X_1 < X_2 < X_3 < X_4 < X_5 < X_6 < X_7 < X_8 \ldots < X_n.$$

Based on the obtained ordinal scales, we determined the gap between the regions within the whole population using statistical indicators: range of variation (K_1), polar values discontinuity coefficient (K_2), oscillation coefficient (K_3), decile coefficient (K_4):

$$K_1 = X_n - X_1;\ K_2 = X_n / X_1;$$
$$K_3 = \frac{X_n - X_1}{\overline{X}};\ K_4 = \sum_{n-10}^{n} X \Big/ \sum_{1}^{10} X.$$

The variation coefficient, the Gini coefficient, and the Theil index are more effective for studying the degree of heterogeneity of a particular population as a whole; as for determining the digital divide within the framework of the tasks at hand, they were redundant and were not used in this work. Instead, to identify trends in interregional inequality in dynamics, along with the calculation and analysis

of the proposed statistical coefficients K_1, K_2, K_3 and K_4, we used the grouping method: RF constituent entities were grouped depending on the size of digital divide.

We used data from Federal Statistical Observation 1-IT "Questionnaire of a selective federal statistical observation on the use of information technologies and information and telecommunication networks by the population", available at the Rosstat website[5].

When researching the digital divide in the "city–village" context we carried out calculations at the national level, at the regional level and at the interregional level.

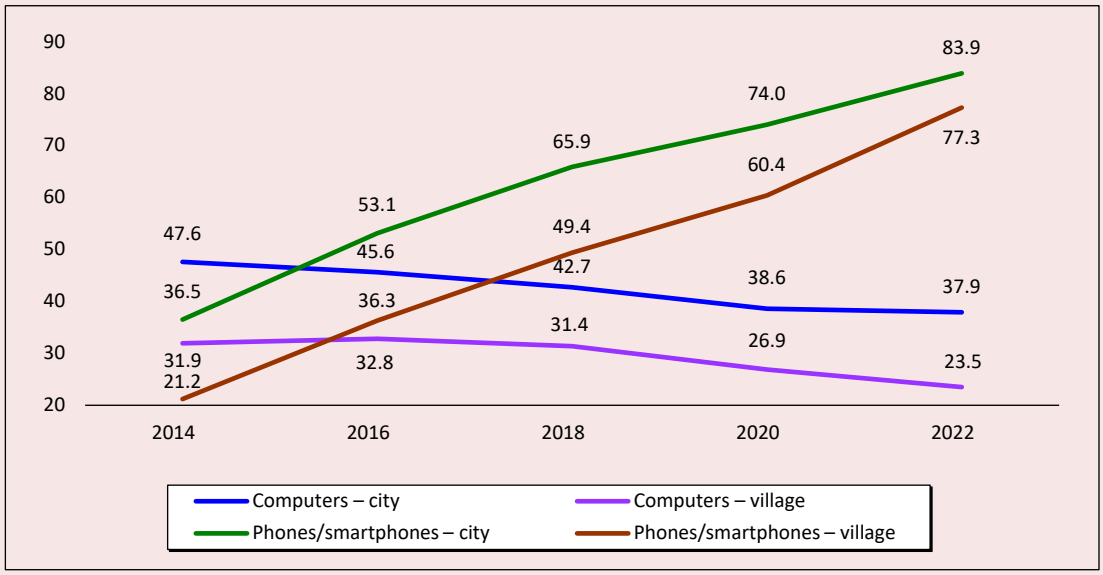
Research results

Digital urban–rural inequality at the national level

Urban and rural households use three main groups of devices to access the Internet: desktop (stationary) computers; tablet computers and other mobile devices (phones, smartphones, e-book readers, etc.). Stationary computers and mobile phones/smartphones are used more often. At the same time, the trends of their use for Internet connection differ significantly. The trajectory of the use of desktop computers is downward with the growth of the digital divide between urban and rural areas since 2018, which reached 14.4 percentage points by 2022. At the same time, the use of mobile phones/smartphones for these purposes is increasing rapidly, and the digital gap between urban and rural areas is decreasing (2014 – 15.3 percentage points; 2022 – 6.6 percentage points; *Fig. 1*).

The reasons for the above dynamics are obvious: mobile devices have clear competitive advantages over desktop computers both in terms of price and the ability to connect to the network everywhere, where cellular communication is available.

Figure 1. Proportion of Russian households with Internet access using desktop computers and mobile phones / smartphones, % of all households



Compiled according to: Federal Statistical Observation 1-IT.

[5] Data from Federal Statistical Observation 1-IT "Questionnaire of a selective federal statistical observation on the use of information technologies and information and telecommunication networks by the population". Available at: https://rosstat.gov.ru/free_doc/new_site/business/it/ikt22/index.html

Probably, this explains a reduction in the digital gap in terms of the frequency of Internet use: in terms of daily Internet use (2014 – 17 percentage points, 2022 – 7.8 percentage points), as well as a decrease in the share of the rural population who have never used it (from 39.6% in 2014 to 10.6% in 2022). Broadband access is of particular importance for the penetration of digital technologies into rural areas, which, due to the implementation of the federal project "Eliminating digital inequality"[6], is rapidly spreading across Russia's rural areas.

The implementation of the first stage of the project (2014–2020) made it possible to establish Internet access points at a speed of at least 10 Mbit/second in settlements with a population of 250–500 people, and at the second stage (2021–2030) it is planned to provide mobile communications and Internet to settlements with a population of at least 100 people.

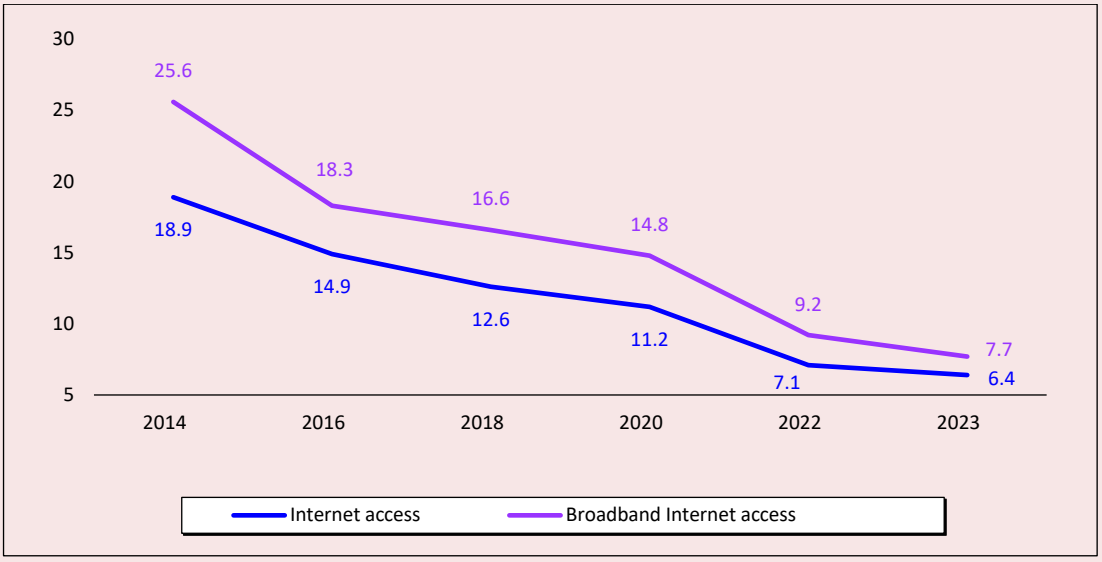
The rate of reduction of the digital gap between urban and rural areas in terms of broadband Internet access is higher than in terms of Internet access in general *(Fig. 2)*.

The reserve for reducing the digital divide is found in eliminating the reasons why rural households and rural populations refuse to use the Internet. At the same time, the directions and rates of dynamics of the indicators of the reasons for rural households' refusal to use the Internet, presented in the Federal Statistical Observation data, are fundamentally different from those for the rural population.

However, among the reasons for refusal in both cases, the main ones are the lack of need, desire and interest in using the Internet; lack of skills to work on the Internet.

The share of rural households that do not use the Internet due to the "lack of need, desire and

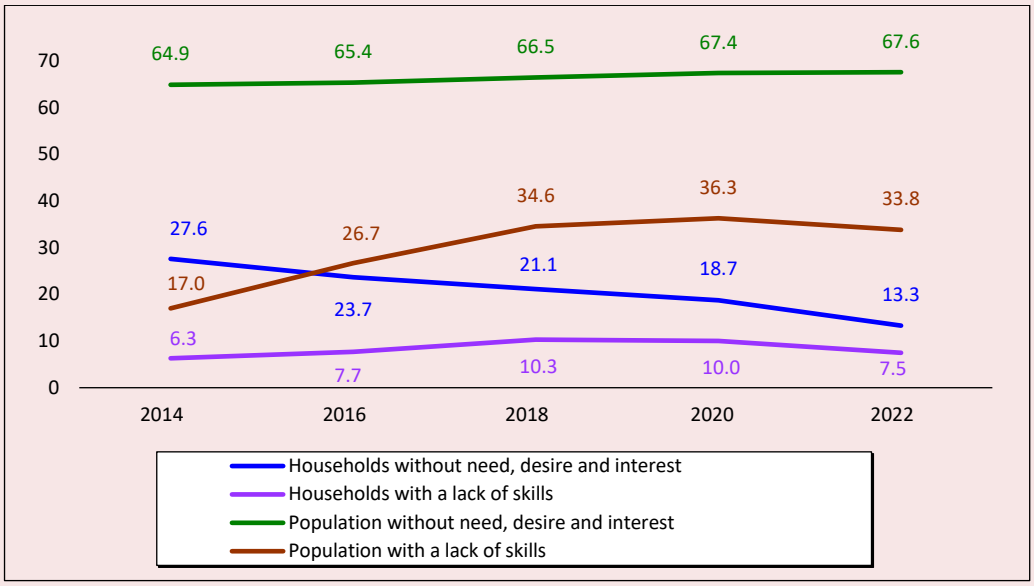
Figure 2. Dynamics of reduction in the digital gap between urban and rural households in Russia in access to the Internet, p.p.



Compiled according to: Federal Statistical Observation 1-IT.

[6] Adopted and implemented in accordance with Federal Law 9, dated February 3, 2014. Available at: https://www.consultant.ru/law/podborki/federalnyj_proekt_ustranenie_cifrovogo_neravenstva/

Figure 3. Proportion of households in rural areas and the share of the rural population in Russia who do not use the Internet, broken down by main reasons of non-use*, %



* The proportion of households in rural areas is given as % of all households, and the proportion of the rural population as % of the population that did not use the Internet or used it more than a year ago. The age was taken in 2014 and 2016 in the range of 15–72 years, and in 2018, 2020 and 2022 – 15–74 years.

Compiled according to: Federal Statistical Observation 1-IT.

interest" has been steadily declining since 2014; and since 2018 it has also begun to decline due to the "lack of skills". For the rural population, the former indicator was very high in 2014 and increased slightly by 2022, while the latter increased very significantly during this period, although a downward trend has been observed since 2020 *(Fig. 3)*.

In our opinion, the indicators for the rural population are more informative, since they are correlated with the number of people who did not use the Internet, while households are correlated with the total number of households.

In 2022, 51.2% of the rural population aged 15 and over had a low level of digital skills and only 6.5% had a level above basic. The interconnection and interdependence of these causes should be noted: rural residents with a lack of skills do not have the desire and interest to use the Internet, and if there is no need and desire, there is no need to acquire appropriate skills.

Thus, the problems under consideration should be solved comprehensively, while conducting educational activities for the rural population regarding the possibilities of using digital technologies and large-scale work to improve Internet skills.

Other reasons hindering the promotion of digital technologies in rural areas and the use of the Internet by the rural population are very significant, but the positive trend in their solution inspires some optimism *(Tab. 1)*.

When digitalizing rural areas, undoubtedly, economic and technical problems should be solved, but, as the data in Figure 3 and Table 1 show, they are not the most important in this matter, given their high resource intensity.

When working to improve the Internet skills of rural residents, it is important to pay attention to the fact that the digital gap between urban and rural Internet users in 2014–2022 increased in percentage

Table 1. Proportion of the rural population of Russia who named economic and technical reasons for refusing to use the Internet, in 2014–2022, % of the total rural population who did not use the Internet

Reasons for not using the Internet	2014	2016	2018	2020	2022	2022/2014, p.p.
High Internet connection costs	11.5	12.3	16.1	16.0	6.8	-4.7
Lack of technical connectivity to the Internet	8.5	8.6	9.5	9.1	6.4	-2.1
Compiled according to: Federal Statistical Observation 1-IT.						

points in all major positions: working with a word processor – from 16.8 to 18.4; copying or moving a file – from 13.2 to 16.2; working with spreadsheets – from 11.9 to 13.5; file transfer between a computer and peripheral devices – from 12.7 to 13.2.

People's skills and capabilities in using the Internet to obtain state and municipal services and ordering goods and/or services are very important, as well as reducing the digital gap in these indicators in the "city–village" context. During the period from 2014 to 2022, the share of the population receiving state and municipal services via the Internet, as well as ordering goods and services online, has increased significantly. However, the growth rates of these indicators for the rural population were noticeably lower, which led to an increase in the digital divide in both cases *(Tab. 2)*.

The data in Table 2 confirm the thesis that the digital divide is growing between those who have more opportunities to access to the Internet and those who have fewer such opportunities.

The main directions of using the Internet to receive state and municipal services in 2022 were as follows:

1) getting information (62.4%);

2) making mandatory payments online (53.6%);

3) obtaining the results of state and municipal services in electronic form (45%)[7].

When ordering goods online, rural residents prefer three main groups of goods: a) clothing, shoes, sporting goods (69%); b) household items (41.9%); c) cosmetics and perfumes (33.4%). At the same time, a significant proportion of Russia's rural residents do not use the Internet for obtaining public services (about 40%) and ordering goods (almost 54%).

To manage the process of including rural residents in receiving state and municipal services and ordering goods and/or services online, it is necessary to eliminate the reasons for refusing to do so.

Table 2. Involvement of the Russian population in obtaining state and municipal services and ordering goods and/or services online in 2014–2022

Indicator	2014	201	2018	2020	2022	2022/2014, p.p.
Proportion of the population receiving state and municipal services, % of the total population surveyed						
Urban population	12.7	32.1	58.3	63.5	74.5	61.8
Rural population	4.0	18.8	43.1	44.3	60.1	56.1
Digital divide, p.p.	8.7	13.3	15.2	19.2	14.4	5.7
Proportion of the population who ordered goods and/or services out of the total population who used the Internet during the last 12 months						
Urban population	28.0	33.1	44.5	50.4	62.0	34.0
Rural population	14.4	19.7	30.9	32.2	46.1	31.7
Digital divide, p.p.	13.6	13.4	13.6	18.2	15.9	2.3
Compiled according to: Federal Statistical Observation 1-IT.						

[7] Percentage of the total rural population aged 15–72 years who used the Internet to receive state and municipal services.

Analyzing the data of the Federal Statistical Observation 1-IT, we see that the reasons for not using the Internet for contacting state and municipal authorities, as well as making online purchases, are motivational factors. Thus, respondents choose a personal visit and personal contacts with representatives of state and municipal authorities (55.8%); and online orders are not popular because residents prefer to make purchases themselves (54.5%) or they do not have the need (desire, interest) (35.3%) or trust (9.9%) in such kind of shopping.

Another group of problems is the lack of skills or knowledge to use the Internet to obtain services (20.1%), as well as to order goods online (7.4%). In this regard, 19.3% of respondents turned to other people (friends, relatives) to receive state and municipal services.

Thus, in order to reduce the growing digital gap between urban and rural areas at the level of the Russian Federation, it is necessary to solve the following problems:

– motivational, aimed at promoting people's needs in using the Internet, including for obtaining state and municipal services, as well as ordering goods and/or services; to increase confidence in online transactions;

– educational, aimed at improving rural residents' digital skills for working on a computer and surfing the Internet, teaching methods for obtaining state and municipal services, and implementing online trading opportunities;

– economic, such as reducing the cost of users' connecting to the Internet;

– technical, aimed at expanding the coverage area of rural areas with cellular communications and high-speed wireless Internet.

Interregional digital divide

Due to the fact that the Rosstat website lacks data on Internet access for rural households, the assessment of the digital gap between Russia's regions according to this indicator was carried out without identifying the type of settlement. Calculating the indicators showing an interregional gap in household access to the Internet in dynamics from 2014 to 2022, we conclude that it shows a general downward trend *(Tab. 3)*.

Table 3. Digital divide indicators for Russia's regions in terms of household access to the Internet in dynamics from 2014 to 2022

Digital divide indicator	2014	2016	2018	2020	2022
Range of variation	39.2	29.9	36.0	32.0	25.2
Polar values discontinuity coefficient	1.75	1.49	1.58	1.50	1.34
Oscillation coefficient	0.56	0.40	0.47	0.40	0.29
Decile coefficient	1.75	0.84	0.60	1.00	1.22
Compiled according to: Federal Statistical Observation 1-IT.					

Table 4. Grouping of Russian regions by indicators of the share of household access to the Internet in dynamics from 2014 to 2022, % of all households

Group of regions		201	2016	2018	2020	2022
1.	Under 70	53	26	17	7	-
2.	70–80	23	46	44	42	16
3.	80.1–85	2	5	14	19	26
4.	85.1–90	2	4	4	8	20
5	Over 90	1	1	3	6	20
Total		81	82	82	82	82
Compiled according to: Federal Statistical Observation 1-IT.						

The grouping of Russian regions by this indicator confirms this conclusion: in 2014–2022 their number in the groups with household access to the Internet up to 80% had a steady downward trend, and with access above 80% – upward trend *(Tab. 4)*.

The division between urban and rural areas regarding the indicators of public and municipal services received by residents and ordering goods/services via the Internet allows us to determine trends in the interregional digital divide for rural residents.

Having calculated statistical coefficients, we revealed that the scope of variation in both cases increased in 2022 relative to 2014, but the remaining indicators of the digital divide between regions had a general downward trend, although their values fluctuated over the years *(Tab. 5)*.

These conclusions are confirmed by the results of grouping Russia's regions according to the digital gap in the receipt of state and municipal services by rural residents *(Tab. 6)*.

It is noteworthy that the number of regions with a negative digital divide (0) has changed slightly; the number of regions with a small gap (up to 20 percentage points) has increased sharply, and the number of regions with a gap of more than 20 percentage points have significantly decreased, which indicates a positive trend in reducing an interregional digital divide.

Table 5. Digital gap between Russia's regions for the rural population receiving state and municipal services and ordering goods/services via the Internet, in dynamics from 2014 to 2022

Indicator	2014	201	2018	2020	2022
State and municipal services					
Range of variation	61.1	73.4	62.1	67.4	68.5
Polar values discontinuity coefficient	77.38	50.33	3.19	3.46	3.48
Oscillation coefficient	3.92	2.01	0.95	0.95	0.86
Decile coefficient	21.13	23.58	6.10	4.99	4.87
Ordering goods and services					
Range of variation	34.0	46.8	67.8	66.4	62.7
Polar values discontinuity coefficient	19.89	12.14	29.25	12.45	7.21
Oscillation coefficient	4.10	3.63	3.11	2.77	1.67
Decile coefficient	8.82	4.63	4.08	4.37	3.72
Compiled according to: Federal Statistical Observation 1-IT.					

Table 6. Grouping of Russia's regions according to the digital gap in the use of the Internet by rural residents when obtaining state and municipal services in dynamics from 2014 to 2022, p.p.

Divide, p.p.	2014	2016	2018	2020	2022
Number of regions with a gap in favor of the village*					
< 0	7	3	9	9	5
Number of regions with a gap in favor of the city					
0.1–10.0	14	15	20	29	40
10.1–20.0	19	22	25	28	29
20.1–30.0	19	24	23	8	4
30.1–40.0	11	15	4	5	3
Over 40	11	3	1	3	1
Total	81	82	82	82	82

* In 2022, this group included the Bryansk and Sakhalin regions, Kabardino-Balkarian Republic, Republic of North Ossetia–Alania, and Khanty-Mansi Autonomous Area.
Compiled according to: Federal Statistical Observation 1-IT.

Table 7. Grouping of Russian regions by digital gap in the use of the Internet for ordering goods/services in the "city – village" context from 2014 to 2022

Divide, p.p.	2014	2016	2018	2020	2022
Number of regions with a gap in favor of the village					
< 0	5	9	7	3	10
Number of regions with a gap in favor of the city*					
0.1–5.0	19	11	16	9	10
5.1–10.0	31	18	12	13	8
10.1–15.0	11	21	20	13	12
15. –20.0	12	14	15	19	15
Over 20.0	3	9	12	25	27
Total	81	82	82	82	82

* This group in 2022 included the Ryazan, Voronezh, Kaliningrad and Murmansk regions, republics of Mordovia, North Ossetia–Alania and Crimea, Khanty-Mansi and Chukotka autonomous areas.
Compiled according to: Federal Statistical Observation 1-IT.

Regarding the digital gap in ordering goods/services, the situation is ambiguous among regions. Despite the relatively favorable overall dynamics of changes in the coefficients of variation reflecting a decrease in the digital divide of Russia's regions, their grouping reveals a slightly different picture *(Tab. 7)*. From 2014 to 2022, the number of regions in the group with a digital gap in favor of the village doubled, in the group with the maximum gap (more than 20 percentage points) – by 9 times, and in groups with a gap of up to 10 percentage points – decreased by 2.8 times. The number of intermediate groups of regions has remained virtually the same.

The share of regions with a gap of more than 20 percentage points in the use of the Internet for ordering goods/services by rural residents increased from 3.7 to 30%, and in receiving state and municipal services, these values were 50.6 and about 10 %, respectively.

This situation directly affected the indicators of the general level of involvement of Russia's population in ordering goods/services and receiving state and municipal services online. In 2022, online orders for goods/services were carried out by 53.7%; and 86.6% of all residents of the country received state and municipal services online.

Thus, at the interregional level, the digital gap in ordering goods and services online tends to grow, and in receiving state and municipal services online it tends to decrease.

Discussion

The digital divide in any of its manifestations in the era of digitalization of the economy and households creates prerequisites for increasing socio-economic inequality. A special place is occupied by the gap between urban and rural areas. The programmatic task of overcoming significant differences between city and village was laid down in the works of the classics of Marxism–Leninism, and then it was addressed during 13 five-year plans in the USSR. The processes that took place in the national economy since 1991 have exacerbated the gap in the socio-economic development of urban and rural areas.

In the context of the digital transformation of the entire Russian society and under its influence the existing socio-economic differences between urban and rural areas can either be smoothed out or intensified. Unfortunately, there is still no consensus among scientists on the trend of the impact of digitalization on regional socio-economic development. According to M.N. Dudin and co-authors, some researchers "note the positive impact of ICT on economic growth and economic

efficiency, while others believe that digital inequality leads to a deterioration in the regions' socio-economic development" (Dudin et al., 2021, p. 963).

In any case, the growing digital inequality between urban and rural areas, both at the national level and between regions, creates problems for nationwide socio-economic development. Evaluating the findings of our research from these positions, we should note ambiguous dynamics of the digital divide indicators. A positive trend is characterized by the reduction of the digital gap between urban and rural areas in terms of Internet access and broadband Internet access, especially with the use of mobile phones/smartphones for these purposes; and a negative trend is manifested in the growth of inequality regarding the level of digital competence of users and their digital literacy. This confirms the conclusions that have been made by other researchers regarding the first and second levels of digitalization (Korovkin et al., 2020, p. 13).

The digital gap between the skills of urban and rural Internet users in 2014–2022 increased in all major positions: more than half of the rural population aged 15 years and older had a low level of digital skills, and therefore 67.6% of rural residents did not have the need, desire and interest to use the Internet.

To solve these problems, it is necessary to implement a number of measures:

– promote people's needs to use the Internet through various kinds of PR companies, psychological trainings, online seminars, etc.;

– improve the level of digital skills in users by conducting training seminars, master classes aimed at certain age, gender, professional groups, etc.

System-wide work to improve the digital skills and competencies of rural residents, along with solving a set of motivational problems, will contribute to reversing the trend of the growing digital gap between city and village in obtaining state and municipal services and ordering goods/services online.

The combination of the use of variation coefficients and the grouping method revealed a steady tendency toward reducing the digital gap between regions in terms of household access to the Internet and in the use of the Internet for the rural population to receive state and municipal services. Applying the grouping method, we revealed that using only the coefficients of variation in conditions of insufficient development of the system of ordering goods/services via the Internet does not allow us to make an unambiguous conclusion about the trend of changing the interregional digital divide. Grouping regions depending on the level of the digital divide in Internet usage between urban and rural areas made it possible to draw a final conclusion about the growth of the digital divide.

Along with the above, in order to reduce the digital divide, it is necessary to solve a number of economic and technical problems.

Reducing the cost of connecting to the Internet can be achieved by providing budget targeted subsidies to low-income and large or single-parent families, using social tariffs for broadband and data transmission for low-income households.

In order to expand the coverage area of rural areas with cellular communications and high-speed wireless Internet in such socially problematic regions as the Non-Chernozem region, the lower limit for connecting settlements within the framework of the federal project "Eliminating digital inequality in Russia" should be set to 50 people; moreover, public-private partnership mechanisms should be used, as well as support for local communities' initiatives.

Conclusion

The digital divide in any of its manifestations, between social and age groups, between urban and rural areas, and between regions negatively affects socio-economic development in any country; this requires more attention to its study on the part of researchers of various profiles. Such studies on

identifying trends in the "city–village" context are especially relevant, since the traditionally existing socio-economic inequality between urban and rural areas can significantly increase with the formation of a trend with a growing digital divide.

Research on digital inequality is in its infancy, but is rapidly developing along with its subject, especially in foreign countries. At the same time, it is not yet clear which inequalities will increase, what new inequalities will arise and which forms of inequality will be mitigated in the era of the digital economy (Robinson et al., 2015). This requires significant comprehensive research.

Few scientific works on the digital divide in the "city–village" context are carried out in Russia under an acute shortage of official statistics, especially in the context of the country's regions; this fact makes it difficult to identify the problems of digital transformation for rural areas. In this regard, it seems necessary to identify indicators for village in all positions of the "Federal statistical observation on the use of information technologies and information and telecommunication networks by the population" and present them in full to the scientific community for research.

To expand the information base, it is advisable to use not only the indicators of official statistics, but also the results of sociological research, data from mobile operators (2G–5G mobile network coverage areas), Internet service providers, etc. For example, our analysis of "Coverage Area Maps" by Megafon, MTS, Beeline and Tele-2 operators for the Vologda, Leningrad and Novgorod regions revealed a significant gap in the density of the cellular network between urban and rural settlements and its decrease with the remoteness of the districts from the center of the regions.

There is also a need for sociological research (questionnaires, interviews) to identify and study in more depth the reasons for people's distrusting online operations and the peculiarities of motivational behavior of users who refuse to receive state and municipal services online, order goods/services online and perform other online operations.

Quantifying the factors that determine the digital divide and the degree of influence of the digital divide on the socio-economic development of regions is very important for future researchers, since currently the majority of studies present only theoretical approaches to this issue.

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Technological Sovereignty Projects as a Tool for Innovative Development of the Russian Economy

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Abstract. Currently, in the new geopolitical context and amid external restrictions imposed by the West, the achievement of technological sovereignty is becoming the most important feature of a new emerging development model for Russia. In this regard, there is a need to find new and most effective ways and tools to address this problem. Our work considers the issue of implementing the project approach and the transition to a full innovation cycle economy through the formation of technological sovereignty projects that are pointed out as the main tool for ensuring technological independence as stated in the Concept for Technological Development of the Russian Federation up to 2030. Special attention is paid to the development of scientific and methodological approaches to the formation of such a tool in the context of analyzing the existing accumulated experience in the implementation of projects of a full innovation cycle, primarily comprehensive scientific and technological programs and projects implemented in the light of the objectives contained in the Strategy for Scientific and Technological Development of the

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Russian Federation adopted in 2016. We point out the importance of defining the boundaries of the full innovation cycle, which is interpreted by researchers in different ways. Since technological sovereignty projects are designed to turn into a tool for building their own reproduction chains, they should not end with the introduction of new technology; rather, they should enter mass production and contain a detailed investment component for the creation and reconstruction of production facilities. In this regard, we analyze the procedure for selecting priority areas for the development of technological sovereignty projects and their resource provision; we assess the effectiveness of state tools for supporting such projects; and propose measures to improve the organization of the process of formation and implementation of technological sovereignty projects. The implementation of the package of measures we put forward should help accelerate scientific and technological development and reduce Russia's technological dependence.

Key words: technological sovereignty, full innovation cycle, innovative development model, national innovation system, critical and end-to-end technologies, integrated scientific and technological programs, technological sovereignty projects.

Introduction

Shifting to an innovative development model in Russia has been discussed at least for the past two decades. However, over the years, the country has failed to create a national innovation system that ensures effective interaction between science and industry. The current export-raw material development model has limited both the demand for technological innovations and their supply. This problem has become system-wide, hindering the transformation of the Russian economy toward the formation of a competitive innovation-oriented economic system.

At the state level, it has not been possible to work out mechanisms for attracting business to scientific and technological development. With free access to technology imports from abroad and the opportunity to make quick profits, businesses did not have sufficient motivation to make risky investments in R&D and bring their results to market. "Throughout the pre-crisis period, Russia has been actively importing the results of foreign R&D as part of imports of finished goods, that is, the results of R&D expenditures in other countries ("import of expenditures" on R&D amounting to about 1–1.5% of GDP per year)" (Belousov, 2023). In fact, these funds could be spent on conducting own R&D in the country. At the same time, despite the fact that Russia has a significant scientific reserve, it is rather poorly used and is being transformed into an increase in high-tech exports. According to estimates (Klepach, 2023), today more than 60% of technologies are bought abroad. And the country's position in the global high-tech market has been extremely low for a long period of time (the share does not exceed 0.3%[1]). Many scientific achievements, which have not been embodied in a specific product within the country, go abroad in the form of sales of research and development results. We should point out that it is R&D agreements that form a surplus in Russia's balance of payments.

All this points to the weakness of the national innovation system that has developed in the country, which continues to be "open-ended" in terms of using its own developments for the needs of the domestic economy (Lenchuk, 2023). In such conditions, the most important task of the national scientific and technological complex is not just to increase the scale of research activity, but to increase

[1] Indicators of the development of Russian science: A comparative analysis (2023). Issue 5. Moscow: IPRAN RAN. P. 122.

its effectiveness by orienting the research and development sector to the needs of the real sector of the economy and innovative business, in particular, reducing barriers between producers and consumers of knowledge (Simachev, Kuzyk, 2021).

At the same time, the current geopolitical situation requires fundamentally new solutions in the field of scientific and technological development. The restrictions imposed on investments and technology exports to Russia deprive the country of the most important drivers of economic growth and objectively determine the need to rely on its own scientific and technological potential and strengthen technological sovereignty to build its own production chains. Thus, the research and development sector should be focused on the needs of the real sector of the economy and innovative business in particular.

In the Address to the Federal Assembly of the Russian Federation on February 29, 2024, the President of the Russian Federation noted that we "need to achieve technological sovereignty in cross-cutting areas that ensure the sustainability of the entire economy of the country. These are means of production and machine tools, robotics, all types of transport, unmanned aviation, marine and other systems, data economics, new materials and chemistry"[2]. It is also necessary to create products based on our own developments that can compete in global markets, primarily in such areas as space, new energy, and nuclear technologies. The solution of these tasks involves, first of all, the establishment of internal cooperation chains that ensure the implementation of a full innovation cycle in the creation of new technologies and products. Technological sovereignty projects should become a tool for organizing such interaction. Acting as an engine for updating the technological base of Russian industry, they should ensure that the Russian economy can embark on the path of sustainable development.

However, given that in conditions of unprecedented external pressure, this task will be solved with extremely limited financial resources, it becomes necessary to develop a clear organizational scheme for the formation of projects of a full innovation cycle in the development and implementation of products critical for the development of the country. In turn, this requires clarifying some conceptual approaches to determining the essence of technological sovereignty projects, as well as developing scientific, methodological and organizational approaches to their formation and implementation. The search for an answer to these questions determines the aim of this study.

On some definitions and concepts

The process of creating innovative products is widely considered in the scientific literature (Freeman, 1996; Perez, 2002; Groot, Franses, 2005; Golichenko, 2006; Khlebnikov, 2016) and, as a rule, is interpreted as a set of stages of the scientific and technological cycle of innovations, including a sequence of steps: fundamental research – experimental design – prototype – introduction of new products or technologies into mass production. In other words, the innovation cycle of product creation refers to the path from the birth of a new idea to its implementation into a finished product capable of entering a competitive market (Khairulin, 2015; Vasetskaya, 2020). However, a comparative analysis of the available approaches to the definition of innovation cycles indicates that there is no unity among researchers in the interpretation of this concept. The essence of the discrepancies is the boundaries of the innovation cycle, the number and content of the stages that the authors include in the innovation lifecycle.

[2] Presidential Address to the Federal Assembly of the Russian Federation. Available at: http://www.kremlin.ru/events/president/transcripts/73585

The boundaries and stages change depending on the implemented approach of researchers to determining the life cycle of innovation: product, process, marketing approaches, etc. For example, it is noted that " a product-based approach usually includes analysis of the introduction of competitive products of innovative goods or services into the innovation lifecycle" (Vasetskaya, 2020), whereas within the framework of a process-based approach, the innovation cycle does not go beyond the stage of bringing new products to market.

At the same time, the problem of ensuring Russia's technological sovereignty significantly expands the boundaries of considering the innovation cycle. According to the definition given in the Concept for Technological Development of Russia for the period up to 2030, technological sovereignty is understood as "the presence in the country (under national control) of critical and end-to-end technologies of its own development lines and production conditions based on them, ensuring a sustainable opportunity for the state and society to achieve their own national development goals and realize national interests"[3]. At the same time, we are talking not only about the development and implementation of new technologies, but also about the organization of large-scale production on their basis, which in fact means the transition to the economy of a full innovation cycle, ensuring the creation of products based on own development lines. In this context, the life cycle goes beyond the introduction of products to the market and also includes stages from market development up to obsolescence of products and abandonment of their production.

Thus, technological sovereignty projects should not be limited only to the stage of development of new technologies, but should also extend to the introduction of these technologies at national enterprises with subsequent production of products that are competitive, at least in national markets (Yurevich, 2023).

Such a new macroeconomic approach is planned to be implemented through the further development of the project-based approach by using technological sovereignty projects, which are becoming the most important tool for building their own reproduction chains at the present stage. However, before considering the main methodological approaches to the development and implementation of such projects, it is necessary to analyze the existing experience in the formation of projects and programs of the full innovation cycle.

On the experience of forming projects and programs of the full innovation cycle

The focus on the need to strengthen state policy toward the formation of mechanisms for business interaction with the domestic scientific and technological complex was manifested in the Strategy for Scientific and Technological Development of Russia (hereinafter referred to as the Strategy) adopted in 2016. This document for the first time outlined the need to develop comprehensive scientific and technological programs and projects (CSTP) of the full innovation cycle, which were to act as the main mechanisms for the implementation of scientific and technological priorities outlined in the Strategy. The CSTP received further regulatory consolidation within the framework of the Rules for the development, approval, implementation, adjustment and completion of complex programs, complex projects, approved by RF Government Resolution 162, dated February 19, 2019 (hereinafter referred to as the Rules), as well as the Rules for issuing grants in the form of subsidies from the federal budget for the implementation of complex scientific and technological programs of the full innovation

[3] Concept for Technological Development of Russia for the period up to 2030: RF Government Resolution 1315-r, dated May 20, 2023. Available at: http://government.ru/docs/all/147621/ (accessed: January 15, 2024).

cycle and complex scientific and technological projects of the full innovation cycle approved by RF Government Resolution 1439, dated September 15, 2020.

According to the Rules, comprehensive scientific and technological programs and projects of the full innovation cycle are defined as a set of coordinated activities or a set of works linked by tasks, deadlines and resources, including scientific research and stages of the innovation cycle before the creation of technologies, products and services. Initiators of such complex projects and programs can be interested public authorities, members of the Council for Priority Areas of Scientific and Technological Development of the Russian Federation, organizations of the real sector of the economy, development institutions, etc.[4] The Rules also established a mechanism for the development and adoption of such projects, which includes many stages of approval (Shepelev et al., 2021). At the same time, a special role in the formation of such projects was assigned to the Ministry of Education and Science of the Russian Federation, acting as responsible for the entire process of preparing the CSTP.

We should note that the experience of developing complex projects and programs of the full innovation cycle, accumulated in 2018–2022, has been studied in some detail, and the results are presented in scientific papers (Vasetskaya, Fedotov, 2020; Shepelev et al., 2021); therefore, within the framework of this study, we will briefly focus only on the most critical bottlenecks in the organization of the process the development and implementation of the CSTP and the reasons for their "stalling", which did not allow them to turn into an effective tool for solving important problems of scientific and technological development.

The main work on the selection of projects was entrusted to the Councils for Priority Areas of Scientific and Technological Development of the Russian Federation, which in the period 2019–2021 reviewed 132 applications, but only five projects were approved by the Presidential Council for Science and Education and sent to the Ministry of Education and Science of the Russian Federation for submission to the Government of the Russian Federation. In turn, the Government of the Russian Federation approved four projects, the implementation of which began in 2022–2023. These are projects for launching the production of domestic protein components for infant formula; creation of environmentally safe industrial productions of basic high-tech chemical products for various industries; development and implementation of a complex of environmentally friendly technologies in the fields of exploration and extraction of solid minerals; creation of new composite materials5. The main objectives, expected results and the amount of funding for ongoing projects are shown in *Table 1*.

These data indicate the general orientation of the implemented projects towards import substitution, a high level of expected results and a significant amount of attracted extra-budgetary financing. At the same time, it is quite difficult to assess the effectiveness of the implementation of these projects at the moment, since the projects went through a long process of signing bilateral agreements between all project participants, financing of the first three projects began only in 2023, and the fourth in 2024, and in much smaller amounts than planned. According to VEB experts, the approved state program of scientific and technological development for the current

[4] Rules for the development, approval, implementation, adjustment and completion of complex programs, complex projects, approved by RF Government Resolution 162, dated February 19, 2019. Available at: https://base.garant.ru/72184148/

[5] Report on the implementation of the state scientific and technological policy in the Russian Federation and on the most important achievements made by Russian scientists (2023). Moscow: RAS. Pp. 83–84.

Table 1. Implemented comprehensive scientific and technological projects of the full innovation cycle

Project	Execution period	Goals	Expected results	Financing and structure (budget / extra-budget), million rubles
1. Infant dry milk formulas	2021–2024	Development and production of effective and economical integrated technological solutions for the industrial production of carbohydrate and protein components of breast milk substitutes to provide children with domestic adapted dry milk formulas for the first 6 months of their life	Creating the Russian production of carbohydrate-protein components of breast milk substitutes with improved (compared to Western analogues, for example Prolacta) characteristics for the manufacture of breast milk substitutes	1500 (300/1200)
2. Petrochemical cluster	2022–2027	Import substitution and reduction of the burden on the environment through scientific and technical development and industrial development of complex economically highly profitable and environmentally advanced petrochemical technological processes and products based on them	Creating a technological base and mastering a new generation of advanced complex and environmentally advanced petrochemical processes; obtaining 26 patents and know-hows; transfer of 10 new technologies for the introduction; annual turnover of production of products developed within the framework of the CSTP will amount to 16.9 billion rubles and provide more than 16 billion rubles of budget revenues by 2030, which will many times exceed the budget costs for the implementation of the project	5080 (980/4100)
3. Clean coal – green Kuzbass	2022–2026	Creation of a complex of technologies that increase the efficiency of coal mining and coal refining, a high level of industrial safety and ecology, reduce the risks of occupational diseases, as well as the formation of an effective management system for research, innovation, production and market launch of new products	Creation and implementation of systems and technologies that increase the efficiency of coal mining and coal refining, as well as effective mining of hard-to-recover reserves of coal seam deposits; creation and implementation of technology and equipment to improve the efficiency of degassing of hazardous coal seams; creation and implementation of a comprehensive technology for processing waste from coal mining and coal refining with the release of rare and rare earth elements, etc.	3594 (1654,8/1949,1)
4. New composite materials	2023–2027	Ensuring technological sovereignty and scientific and technological leadership of the country by creating advanced technologies for the production of composite materials and products made from them to meet the growing demand of key sectors of the Russian economy (nuclear, transport and construction industries, energy)	Development and implementation in strategic industries of at least 42 technologies that correspond to global market trends; ensuring technology transfer to the real sector of the economy and organizing mass production of a wide range of composite materials, their chemical components and products based on them – 45 new types of modern products with revenue from their sale of 8.1 billion rubles in 2030.	6797,6 (3398,8/3398,8)

Source: own compilation based on information available at https://kntp.ntr.ru/

period has cut the funding for the CSTP to 2.3 billion rubles per year (10 times less than the initial passport of the national project "Science"), which does not allow even the already approved programs to be considered as powerful drivers of the full scientific and technological cycle (despite the fact that the possibility of extra-budgetary financing by the participants of the CSTP, as a rule, is provided)[6].

Evaluating the established algorithm of the procedure for the selection and approval of complex scientific and technological programs and projects as a whole, we cannot but note a number of weaknesses. One of the most important problems is that the subject of the CSTP was formed "from below" on the basis of proposals from research organizations and various business entities, outside the structured process of its coordination and alignment with the goals and objectives of the development of the main sectors of the national economy and industry, which does not provide an end-to-end process of developing and implementing (bringing to market) promising technological innovations. In other words, the process of forming complex scientific and technological projects took place outside the logic of the overall strategic planning process. The proposed projects were mainly aimed at solving narrowly sectoral non-systemic problems of individual economic sectors and focused on creating scientific and technological reserves, prototypes, without mass production development of innovative technologies. In particular, this is confirmed by the targets and expected results of the four ongoing projects.

We should note that the CSTP projects submitted to the councils for scientific and technological areas, as a rule, had a weak elaboration of financial support issues, assessment of promising markets for new products, payback periods, etc. Business clearly showed caution, continuing to live in the paradigm of "everything can be bought abroad", instead of launching a production based on our own developments.

From an organizational point of view, the process of selecting and approving the CSTP was multi-stage and unnecessarily complicated; thus, its implementation took too long. Some researchers also noted the lack of legally binding documents regulating the relationship between the parties in the process of implementing the CSTP; differences in the level of scientific and technical groundwork; lack of information to assess the risks and effectiveness of a project or program (Shepelev et al., 2021).

In order to overcome the identified shortcomings, a number of amendments were made to the CSTP training system, which were reflected in Presidential Decree 143, dated March 15, 2021 "On measures to improve the effectiveness of state scientific and technological policy" and Presidential Decree 144 "On certain issues of the Presidential Council for Science and Education". These decrees were supposed to help remove the identified barriers to the formation of the CSTP and improve the organizational mechanism for their preparation and implementation, which, in turn, was supposed to increase the effectiveness of interaction between the state, science and business. However, the geopolitical and geo-economic situation in the country that changed in 2022 required new solutions.

A new stage in the formation of projects of the full innovation cycle

In 2022, with the introduction of unprecedented sanctions by the West against Russia, the need to form end-to-end projects of a full innovation cycle has increased even more, but this process has

[6] Economics of scientific and technological breakthrough and sovereignty. Interdepartmental Working Group on Technological Development under the Government Commission on Modernization and Innovative Development; VEB Institute for Research and Expertise (2024). Moscow: RUDN. 140 p. Available at: https://inveb-docs.ru/attachments/article/2024_04/Ekonomika-nauchno-tehnologicheskogo-proryva.pdf (accessed: April 20, 2024).

received a slightly different content. Restricting exports to the Russian Federation from Western countries of a wide range of high-tech products, technologies and components, limiting the supply and maintenance of software was primarily aimed at impeding Russia's technological and economic development in order to strengthen its lag behind the technology leaders.

The situation was complicated by the degradation of production and scientific and technological potential in most civilian sectors of the domestic industry that occurred in the post-Soviet period, which resulted in a high dependence of various sectors of the Russian economy (up to 70–80%) on imports of technologies, equipment, and software. For example, according to RANEPA calculations, on the eve of 2022, machine tool construction was import-dependent by 95.3%, microelectronics – by 92%, pharmaceuticals – by 87.9%, chemical industry – by 53%, shipbuilding – by 64.7%, medical industry – by 60.1%, aircraft industry – by 52.8%7. In the context of increasing sanctions pressure, such dependence poses the threat of an increase in a new wave of large-scale reductions in production capacity and output in various sectors of the Russian economy.

The RF Government understands the need to overcome technological dependence as soon as possible; this is evidenced by the approval of the *Concept for Technological Development for the period up to 2030* (RF Government Resolution 1315-r, dated May 20, 2023; hereinafter – the Concept), which was supposed to update the Strategy for Scientific and Technological Development of the Russian Federation adopted in 2016. The document emphasized that the main challenges and threats for Russia in the current decade are its lagging behind the most developed countries in terms of innovation-oriented economic growth, which is determined by low motivation of developers of technological solutions to create appropriate industries, weak protection of technological entrepreneurs, lack of financial resources and relatively small capacity of the domestic market of high-tech products, as well as disruption of the functioning of production systems (disruption of production chains) under the influence of sanctions restrictions in the field of technology. It was emphasized that in conditions of high dependence on imports of machinery and equipment, there is a "threat of degradation of production systems in a wide range of industries"[8].

In order to address the current challenges to the scientific and technological development of the country, the Concept provides for the transition to a new stage of technological development of the Russian economy, the goal of which is to achieve technological sovereignty based on its own lines of development of high-tech technologies and the organization of production based on them. We are talking about achieving three key goals by 2030 *(Tab. 2)*.

First of all, we are talking about achieving technological sovereignty in the field of critical technologies for various sectors of the national economy, where it is expected to achieve parity with the leading countries; as well as in the field of end-to-end technologies, where a more ambitious task is set – to achieve technological leadership. However, in the conditions of existing severe restrictions in financial, human and material resources, as well as in the field of scientific reserves, it is impossible to solve this task without forming a system of scientific and technological priorities defining groups of technologies that are critically important for the development of the real sector of the economy and ensuring sustainable economic growth of the country.

All three goals outlined in the Concept are

[7] *Vedomosti*. March 19, 2024.

[8] Concept for Technological Development of Russia for the period up to 2030: RF Government Resolution 1315-r, dated May 20, 2023. Available at: http://government.ru/docs/all/147621/ (accessed: January 15, 2024).

Table 2. Key goals of ensuring Russia's technological sovereignty

No.	Goal	Indicators of achievement of the goal by 2030
1.	Ensuring national control over the reproduction of critical and end-to-end technologies	Achieved level of technological sovereignty by product types; achieved level of development of critical and end-to-end technologies (in accordance with the established list); reduction of the coefficient of technological dependence by 2.5 times; increase in internal research and development costs (at comparable prices) by at least 45 percent
2.	Transition to innovation-oriented economic growth; strengthening the role of technology as a factor in the development of the economy and the social sphere	Increase in the level of innovative activity of organizations by 2.3 times; increase in the cost of innovative activity (in comparable prices) by 1.5 times; increase in the volume of innovative goods, works, and services (in comparable prices by 1.9 times); increase in the number of patent applications by 2.4 times; increase in the number of registered large technology companies by 5 times, including small ones by 2.3 times; 3-fold increase in the growth rate of private investments in small technology companies
3.	Technological support for sustainable operation and development of production systems	Growth of non-primary non-energy exports (1.5 times in comparable prices); increase in the share of manufacturing organizations engaged in technological innovations (1.6 times); increase in the share of high-tech industrial products produced on the territory of the Russian Federation in the total volume of consumption of such products (up to 75 percent); achieving a share of goods produced using best available technologies (up to 100 percent at industrial facilities that have a negative impact on the environment, classified as category I)
Compiled according to: Concept for Technological Development for the period up to 2030 (RF Government Resolution 1315-r, dated May 20, 2023).		

planned to be achieved by activating the tools of the project-based approach – development and implementation of "technological sovereignty projects", which mean "projects of a full innovation cycle for the production of high-tech products based on own development lines using critical and end-to-end technologies, covering all stages of the innovation cycle, including personnel and regulatory aspects" (Vasetskaya, 2020). However, in order for these projects to be really aimed at ensuring technological sovereignty, it is necessary to conduct comprehensive *studies of scientific and methodological approaches* to their formation.

The implementation of an integrated approach to the formation of a full innovation cycle economy involves, first of all, designing priority *projects of technological sovereignty* in key economic sectors, which should include coverage of the entire life cycle of the creation and use of end-to-end and critical technologies and products based on them – from the stage of R&D to mass implementation of the results in industrial production. We should note that expanding the boundaries of the innovation cycle constitutes the fundamental difference between technological sovereignty projects, enshrined in the Concept, and complex scientific and technologi-cal programs and projects that were developed within the framework of the Rules in 2019–2021. Therefore, technological sovereignty projects should contain a detailed investment component for the creation of new or reconstruction of existing production facilities necessary for the large-scale development of new types of products.

At the same time, in order to obtain the status of a technological sovereignty project, the project must meet certain requirements and criteria that are set out in RF Government Resolution 603 "On approval

of priority areas for technological sovereignty projects and projects of structural adaptation of the Economy of the Russian Federation"[9] and in the Regulation on the conditions for classifying projects as projects of technological sovereignty and projects of structural adaptation of the economy of the Russian Federation. Such projects will be provided with government support measures, including in terms of investment support.

On scientific and methodological approaches to the development and implementation of technological sovereignty projects

The initial and core element of the entire scientific and technological development management system is the definition (and occasional clarification) of technological priorities. According to the Concept, the source of technological priorities in terms of end-to-end technologies is a scientific forecast (foresight); in terms of critical technologies, the country's needs for the production of systemically important types of high-tech products, such as microelectronics, machine tools and equipment, turbines, etc.[10] It worth mentioning that the development of a long-term forecast of scientific and technological development is provided for by Federal Law 172 "On strategic planning in the Russian Federation". Like a long-term forecast of socio-economic development, it should form the basis for the entire system of strategic planning documents. We should note that the last time such a forecast was developed in 2014 and has not been updated since then. Besides, the development (or updating) of a long-term forecast of scientific and technological development should be organically integrated into the general cycle of formation of the entire package of strategic planning documents and take into account not only current global trends, but also the situation in the Russian economy, both in the context of the current level of technological development of the main economic sectors, and common tasks and directions of socio-economic development of the country (Lenchuk, 2023). In this context, it is advisable to supplement the forecast with the results of a technological audit of the most important sectors of the Russian economy in terms of their compliance with the advanced achievements of technological progress and an assessment of their dependence on imported technologies.

Based on such an analysis and forecast, proposals should be formed for the development of promising end-to-end technologies (can be implemented in the format of a "National technology initiative"), as well as proposals for a set of priority critical technologies necessary for the development of the most important sectors of the national economy, forming the basis for the development of technological sovereignty projects. We should note that RF Government Resolution 603 "On approval of priority directions of technological sovereignty projects and projects of structural adaptation of the economy of the Russian Federation", dated April 15, 2023, contains a list of such technologies, but the genesis of their formation is not clear. The format and scale of their implementation remain open in the absence of strategies for the development of relevant industries updated for new conditions.

The launch and successful implementation of technological sovereignty projects require addressing a number of organizational issues, including the procedure for the formation of projects, selection of qualified customers and lead performers, definition of requirements for organizations involved in the implementation of projects; procedure for monitoring and control over implementation, formation of requirements for technological maps and passports of such a project.

[9] On approval of priority areas for technological sovereignty projects and projects of structural adaptation of the Economy of the Russian Federation: RF Government Resolution 603, dated April 15, 2023.

[10] Concept for Technological Development of Russia for the period up to 2030: RF Government Resolution 1315-r, dated May 20, 2023. Available at: http://government.ru/docs/all/147621/ (accessed: January 15, 2024).

We should note that the approach to organizing the process of formation and implementation of technological sovereignty projects can be carried out in two formats: first, centralized, when qualified customers and lead performers are determined at the state level, and relations between lead performers and performers are built in the format of state orders. Another format is decentralized, in which the head contractor of the project is selected on a competitive basis; in the future an open platform is formed for those who want to participate in the implementation of the project on a contractual basis.

In both cases, the most important task for the head contractor is to form a cooperative chain of a full innovation cycle for the development of critical technologies and production of high-tech products, within which all participating organizations of the project will be united on a contractual basis. It is also possible for participants in the chain to join consortia or holdings. Scientific and technological support of the project is in the area of special responsibility of the head contractor; in this regard, within the framework of the project, they can form an order for research and development of appropriate technologies.

Resource provision is one of the central issues that should be determined already at the stage of project formation. In terms of financial support, technological sovereignty projects can be supported by both budgetary and extra-budgetary funds.

Speaking about budgetary financing of technological sovereignty projects, it is important to note that the financial costs of their implementation should be prioritized already at the stage of forming the federal budget for the next year and the corresponding planning period. Technological sovereignty projects can also be carried out within the framework of investment projects included in the relevant register of such projects.

Financial support for technological sovereignty projects in the field of end-to-end technologies with a high share of the research component can be carried out on the basis of *grant funding* in the form of subsidies from the federal budget for research and development work, provided that extra-budgetary co-financing is at least 50% of the total financial support for a comprehensive project. In this regard, it is advisable to rely on the above-mentioned Rules for issuing grants in the form of subsidies from the federal budget for the implementation of complex scientific and technological programs of the full innovation cycle and complex scientific and technological projects of the full innovation cycle, approved by RF Government Resolution 1439, dated September 15, 2020.

In relation to technological sovereignty projects aimed at creating critical technologies, financial support mechanisms may be more diverse. Along with receiving subsidies from the federal budget, projects can be funded by private companies and financial development institutions.

In order to attract extra-budgetary financing, the state also creates certain preferential conditions for business. In particular, the above-mentioned RF Government Resolution 603 approved a list of projects that meet the requirements of technological taxonomy, that is, structured to meet the challenges of ensuring technological sovereignty and structural adaptation of the economy. They are provided with the possibility of obtaining bank loans at more preferred rates by lowering risk coefficients[11]. This should make it possible to finance technological sovereignty projects from the domestic banking sector, which, with a total asset volume of about 120 trillion rubles (76% of the total assets of the country's financial market), allocates no more than 2 trillion rubles for investment loans (Aganbegyan, 2022).

[11] RF Government Resolution 603, dated April 15, 2023. Available at: http://goverment.ru/docs/all/147043/

The Bank of Russia has adopted its own regulatory documents on the application of special measures to support technological sovereignty projects. According to the regulator, the burden on capital as a result of the application of special measures can be reduced from 10 to 70% of the standard credit risk on a loan, depending on the category of project and the quality of loan. The Bank of Russia estimates a possible total increase in the amount of loans due to the taxonomy of projects to 10 trillion rubles. Reducing the risk coefficients for projects should ensure a reduction in the lending rate by 0.5–1 percentage points. compared to the market rate. At the same time, we cannot but agree with some researchers who note that such a reduction in the lending rate in conditions when the actual rate reaches 20% and above is unlikely to provide the necessary economic attractiveness for technological sovereignty projects (Nikolaev, 2023).

In fact, the increase in the key interest rate in Russia has reduced incentives for banks to invest in technological sovereignty projects – the "savings" on capital that creditors can receive when providing financing under the taxonomy are offset by the increased cost of money in the market. According to VEB's forecast, in the second year of the taxonomy (in 2024), the amount of financing will reach 350–400 billion rubles. Previously, it was assumed that after the launch of the taxonomy tool, incentive measures to form a loan portfolio for technological sovereignty projects would allow attracting 1–2 trillion rubles in the first year[12].

Currently, VEB plays a special role in the formation and implementation of technological sovereignty projects, which performs the functions of maintaining a register of projects that meet the requirements of the taxonomy of technological sovereignty projects. At the beginning of 2024, the register contained 11 projects that were credited on special conditions, the total amount of loans was 234 billion rubles[13]. The largest part of the technological sovereignty projects selected are related to mechanical engineering, shipbuilding and port infrastructure, the rest of the projects are quite heterogeneous, related to instrument engineering, energy and infrastructure.

Along with the taxonomy, there are other potentially effective credit and financial instruments aimed at increasing the volume of investments in technological sovereignty projects: for example, new measures of state support for private business such as cluster innovation platform, project finance factory, etc. (Sokolov, Filatov, 2023). In particular, the "project finance factory" tool, when money loans are allocated on the basis of syndicated loan agreements with commercial banks, is already used in the practice of lending to technological sovereignty projects. In addition, in some cases, VEB itself acts as a manager within the syndicate, while simultaneously providing loan funds to borrowers. To date, VEB has funded three projects totaling 79 billion rubles[14].

We think that building a full-fledged interaction of instruments among themselves can significantly reduce the cost of credit funds attracted for the implementation of technological sovereignty projects, increase the activity of private investors and the banking sector in the investment process.

Conclusion

The main scientific and methodological approaches proposed in the framework of this study to the formation and implementation of technological sovereignty projects, as the most important tools at a new stage of scientific and technological development in Russia, determine only the general outline of this process and, undoubtedly, need further specification. The success of the case will largely depend on the system-wide

[12] Available at: https://www.rbc.ru/finances/17/06/2024/666c46609a7947be98fa25af?from=from_main_1

[13] Available at: https://www.rbc.ru/economics/22/12/2023/6582d8c79a7947bea7950a13?ysclid=lsn6bv7tgm660792629

[14] Ibidem.

work on the part of all participants in this process, as well as on the quality of management decisions made by public authorities in this area.

We consider it extremely important not only to identify the priority areas in which technological sovereignty projects should be formed, but also to bring them to specific projects within the framework of a cross-cutting scientific, technological and innovative vertical. As noted above, the selection of priorities and projects should be based on qualitative forecasts and technological audit of industries. Moreover, we should note that the requirements for technological sovereignty projects stated in the Concept in terms of ensuring parity or leadership in technology with leading countries today may look overly ambitious. In the context of severe sanctions pressure, the implementation of less ambitious scientific and technological projects that ensure sustainable functioning of the Russian economy may become extremely relevant for Russia. In addition, the need to rank projects according to the degree of importance and relevance is dictated by existing budget constraints in the current situation, as well as other resource constraints, including those related to personnel. Forming an effective system of tools to support technological sovereignty projects remains an equally important issue.

In the organizational and methodological aspect, it is necessary to address the issue concerning the authorized executive authorities ensuring the development and implementation of projects of a full innovation cycle. For projects related to the development of end-to-end technologies, such bodies may be the Ministry of Education and Science of Russia, relevant ministries and state corporations; for projects in the field of critical technologies – the Ministry of Industry and Trade of Russia, state corporations. At the same time, comprehensive and integrated management of technological sovereignty projects in the future requires creating a permanent supranational body overseeing this work. In Soviet times, such functions were performed by the State Committee for Science and Technology, which united the work of all departments and made comprehensive decisions.

Effective interaction of all participants in the full innovation cycle project requires a special information and analytical digital platform that provides end-to-end project support, monitoring and control over the implementation of all its stages from development to introduction into production. All information on the progress of the project should be accumulated on the platform, and summary reports on its implementation should be reflected.

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Import Substitution as a Factor in the Development of Domestic Digital Technology

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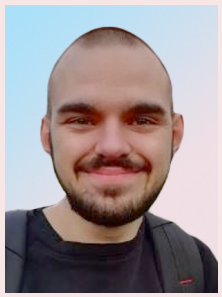

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Abstract. According to global economic development trends, digital technology is a necessary factor in increasing competitiveness, labor productivity, reducing resource costs and optimizing business processes. In Russia, its development is one of the factors that drive the economy. As a result of the changing geopolitical situation, large foreign companies operating in the field of digitalization have begun to withdraw from the Russian market since 2022. This has brought to the fore the problem of import substitution (development of own digital and information technology) at the state and corporate level. Addressing the issue of import substitution will not only reduce imports, but also increase the production of high-tech goods and support domestic producers. In this regard, the aim of the study is to identify barriers to and opportunities for import substitution of digital technology in Russia. Based on the systematization and review of scientific works in the field of import substitution, we highlight approaches to its implementation. The article substantiates the need to implement the third approach in the context of Russian reality. We analyze the volume of high-tech exports of Russia as compared to other countries. We assess the high-tech export trajectory pursued by constituent entities of the Russian Federation in the context of commodity groups that promote digitalization. We highlight trends and problems of import substitution in the field of digitalization and investigate support measures and state policy aimed at import substitution in the field of digital technology and developments. As a result of the research, we have designed a toolkit to support the development of domestic digital technology based on import substitution. Using the toolkit helps to present the contribution of economic entities and its specifics in the field of information technology. Proposals have been prepared for the formation of an import substitution strategy in the field of digital technology, taking into account industry specifics. The results of the study can be applied by the state authorities of constituent entities of the Russian Federation in the field of digitalization.

Key words: import substitution, domestic developments, digital technology, development, territories.

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Introduction

The rapid pace of scientific and technological progress in the world dictates the need to change the economic management principles. One of the most pressing global trends in current economic development is digital transformation. The Second Johannesburg Declaration, adopted at the BRICS Summit in 2023, outlines "the active role of the digital economy in promoting global economic growth"[1], as well as the role of digitalization in education and culture in the BRICS countries.

The digital transformation process in Russia is regulated primarily by the Presidential Decree "On the National Development Goals of the Russian Federation for the period until 2030"[2], which establishes the achievement of "digital maturity" of key sectors of the economy and social sphere, including healthcare and education, as well as public administration. At the same time, the growth of investments in domestic information technologies up to 2030 is four times compared to the value

[1] The Second Johannesburg Declaration. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://d-russia.ru/wp-content/uploads/2023/08/bricsdeclaration-2023.pdf

[2] Decree on Russia's National Development Goals until 2030. Available at: http://www.kremlin.ru/events/president/news/63728

of the indicator in 2019. In addition, since 2019, the national project "Digital Economy"[3] is being implemented in the country, aimed at creating and supporting information infrastructure, as well as the introduction of digital technologies in production and public administration. Another document regulating digital transformation is the Information Society Development Strategy in the Russian Federation for the period 2017–2030.

The increasing relevance of issues related to digitalization is also due to the need to solve the problem of import substitution in a deteriorating external environment, namely the application of sanctions by the world's leading economies (Europe, the United States, Canada, Australia) against the Russian Federation. It is against the background of fierce competition and external restrictions that import substitution opportunities in the field of digital technologies should be activated not only at the country but also at the regional level.

The introduction and further use of digital technologies play a key role in ensuring digital transformation. Hereinafter in the study, digital technologies are understood as technologies for collecting, storing, processing, retrieving, transmitting and presenting data in electronic form.

Digital transformation is also being implemented at the regional level. By September 2021, all constituent entities of the Russian Federation have approved regional strategies for digital transformation of key economic sectors, social sphere, and public administration in fulfillment of point 2 of the RF President's list of instructions Pr-2242, dated December 31, 2020[4].

Implementation of digital transformation can occur both through the import of digital technologies and through the introduction and use of digital technologies created in Russia. The development of Russian digital technologies has a number of advantages:

– first, it allows solving the issue of information security;

– second, it ensures economic independence from foreign counterparties;

– third, it contributes to creating a new industry.

At the same time, the development of digital technologies only through import substitution processes may be associated with some negative effects, namely the emergence of artificial restrictions on the market. It is about the lack of necessary assortment and other offers, the possibility of choice, which in the end can contribute to the formation of coping strategies in the field of digital technologies[5].

Import substitution and digital sovereignty began to influence the IT market in Russia in 2022 and 2023. Before that, most Russian enterprises used foreign technologies and services, making the transition to Russian hardware and software a priority. The departure of the majority of large suppliers of information technologies and equipment from the Russian market has led to the need to develop domestic developments and increase investment in this industry. Moreover, the driver for developing own products in the field of information technology was not only the demand from business, which was deprived of the opportunity to choose an IT product, but also the government, which demanded the development of Russian software for the needs of official structures.

[3] Digital economy of the Russian Federation. Available at: https://digital.gov.ru/ru/activity/directions/858/

[4] List of instructions of the President of the Russian Federation, dated December 31, 2020. Available at: http://www.kremlin.ru/acts/assignments/orders/64859/print

[5] Suppression of competing activities.

It is crucial to identify the most promising areas of import substitution of digital technologies and concentrate the available financial resources on them in such conditions (Zimovets, Klimachev, 2022; Glaziev, Tkachuk, 2023; Krylova, 2023).

In this regard, the aim of the research is to identify barriers and opportunities for import substitution of digital technologies in Russia. We solve the following tasks to achieve the aim:

1) to analyze Russian experience concerning the development of import substitution of digital technologies;

2) to summarize promising areas of import substitution of digital technologies in Russia;

3) to identify trends and problems of import substitution in the sphere of digital transformation and information technologies, which have an impact on the development of digital technologies;

4) to identify priority areas of support in the sphere of information technologies and features of implementation of the state import substitution policy to develop digital technologies and applications.

The hypothesis of the study is the assumption that the development of digital technologies is possible through the import substitution policy, which is implemented on the basis of stimulating the production of competitive high-tech world-class goods in the country and regions, which can help to create new and develop the existing high-tech industry areas in the digital economy.

Theoretical aspects of the research

Our study considers import substitution as a certain economic strategy, the main goal of which is to protect domestic producers by replacing imported industrial goods, services and technologies with domestically produced products. The aim of implementing import substitution processes is to increase the competitiveness of domestically produced goods. This aim is achieved by stimulating business modernization processes and increasing the productivity of enterprises. In addition, it is important to create and implement fundamentally new technologies for the production of products with high added value (Bereznev, Kulpina, 2022; Borobov, Mindlin, 2022; Mo et al., 2021).

Russian academic economists divide the import substitution policy into three directions. The first direction is to increase the volume of domestic finished goods and services sold in the Russian market by reducing or slowing down the growth of sales of similar imported products (Gulin et al., 2015; Gotovskii, 2021; Abdikeev, 2022; Irwin, 2021; Zhang et al., 2023). The implementation of this direction involves the development of new types of products; improving the competitiveness of products manufactured in the country; increasing domestic production; and stimulating food production in the conditions of counter-sanctions (Gotovskii, 2021; Glaziev, 2022; Glaziev, Tkachuk, 2023).

The second direction is associated with increasing the share of components, raw materials and materials produced in the Russian Federation in the structure of output products for the subsequent production of domestic products based on them, as well as with stimulating demand for them. In addition, it consists in stimulating demand for such goods (Gotovskii, 2021; Gulin et al., 2015; Zimovets, Klimachev, 2022). This direction includes accommodation related to operations of technological nature; replacement of raw materials and materials of imported origin with domestic analogs; deepening of industrial cooperation (Boldina et al., 2022; Borobov, Mindlin, 2022; Rudenko et al., 2022; Khomenko et al., 2022; Bottega, Romero, 2021).

The third direction includes the so-called export-oriented import substitution. It is based on the active promotion of import substitution measures, in which products characterized by

greater localization are sold in both Russian and foreign markets, i.e. simultaneously sold domestically and exported (Gulin et al., 2015; Gotovskii, 2021; Lenchuk, 2022; Makarycheva, 2022; Krylova, 2023; Zhou, Fan, 2023). At the same time, an additional effect is achieved for the Russian economy as a whole due to increased localization and higher added value created by enterprises. This may contribute to economic growth and allow overcoming the low dynamics of external demand (Abdikeev, 2022; Gotovskii, 2021; Zimovets, Klimachev, 2022; Krivenko, Epaneshnikova, 2020; Rodrigues, 2010; Carrasco, Tovar-García, 2021).

In a number of scientific works, the issues of development of import substitution of the high-tech sector and digital technologies in Russia in the new economic conditions include the following points:

– the state relies on technological sovereignty under external pressure, i.e. the introduction and replication of Russian technologies and their use in the creation of new industrial enterprises and serial production (Abdikeev, 2022; Glaziev, 2022; Lymar et al., 2022); in this case, it is not only about import substitution, but also about the production of competitive products compared to Western analogues (Gulin et al., 2015; Dubkov, Noskov, 2022; Zimovets, Klimachev, 2022);

– it is emphasized that success in achieving technological sovereignty largely depends on the support of small and medium-sized high-tech companies, as well as on the availability of financing for them (Boldina et al., 2022; Borobov, Mindlin, 2022; Khomenko et al, 2022); however, it is worth noting that the venture capital market in Russia is still at an early stage of development, and further breakthroughs require the support of the state, which will assume the risks (Kuznetsova, Tsedilin, 2019; Makarycheva, 2022; Shavtikova et al., 2022; Menon, 2023);

– it is argued that the need for large-scale import substitution in many industries is a condition for providing project finance for twenty years (Lenchuk, 2022; Makarycheva, 2022; Glaziev, Tkachuk, 2023; Meral, 2021). This is one of the key needs of most major investors. It is worth noting that additional changes to the "project finance factory"[6] mechanism will contribute to increasing the role of this instrument in Russia's economic recovery in the coming years (Bereznev, Kulpina, 2022; Glaziev, 2022; Sycheva, 2022).

The development of own digital technologies plays a key role for technological change in the country (drawing on the research of the W. Jia, A. Collins, W. Liu, A. Goldfarb, C. Tucker, academician S.Yu. Glaziev, etc.). The process of miniaturization, with microchips replacing entire machines, means that more and more digital technologies and developments are required to drive the digital economic transformation (Glaziev, 2022; Jia et al., 2023; Goldfarb, Tucker, 2019).

The development of the technological conjuncture of world exports and the inclusion of countries in high-tech markets is based on long-term benefits. For instance, one of the indicators for assessing the competitiveness of technological civilian products in the export market is the "share of high-tech exports in the world" (Zhou, 2008; Reinert, 2020; Irwin, 2021; Matthess, Kunkel, 2020). Countries, by developing their high-tech specialization, can increase the productivity of available resources and thus increase the volume of technological products produced, forming long value chains (Bon, 2021). At the same time, technological exports should be understood not only as analytical groups of civilian goods, but also as the system of interconnectedness of building long value chains

[6] Financing of investment projects in priority domestic economic sectors.

based on the model of "strategic alliances" (Harris, Schmitt, 2020; Cooke, Watson, 2011). The category of "high-tech" includes technically complex products, for the production of which complex technological processes (advanced technologies) are used, based on the results of not only applied but also fundamental scientific research (Oviatt, McDougall, 1994; Bruton, 1998; Sestu et al., 2018;).

Consequently, the reviewed scientific studies allow highlighting the following characteristics of import substitution:

1) a forced process to prevent economic decline in the context of tightening external restrictions in order to develop own goods (similar to foreign ones) and partly to develop and produce new products in the high-tech sphere, including digital technologies;

2) a necessary stage and basic component of a country's technological sovereignty, related to the development and implementation of its own digital technologies to create a domestic sector capable of fully satisfying the needs of the domestic market;

3) a catalyst for creating of new industries and sectors for the development and production of digital technologies that will be used to solve domestic problems and have a competitive advantage in the foreign market;

4) it is also worth paying attention to the fact that under the existing conditions, specific products and services are needed for Russia's technological sovereignty and structural adaptation of its economy, including digital products and technologies, underdeveloped in Russia.

Research methods

We used the integrated approach principles as a methodological basis of the research. The solution of the research tasks was based on the analytical review of modern scientific and technical, regulatory, methodological literature, touching upon the research problem.

The information base is the works of Russian and foreign scientists, statistical data and analytical studies, normative-legal acts of public authorities and management bodies, as well as materials of periodicals.

In the world practice, the existing approaches to the assessment of high-tech exports can be divided into three groups depending on the degree of their application (Reinert, 1999; Chaudhuri, Chakraborty, 2010; Ketels, 2015):

– sectoral (by economic activity type);

– product-based (by end product and its knowledge-intensity) with a breakdown into 9 groups;

– patent (on high-tech patents).

These approaches are used by government agencies of most countries, as well as in the analytical activities of many major organizations (OECD, World Bank, UN statistical office, Eurostat, national statistical services).

We propose the following step-by-step algorithm to achieve the aim and the tasks of the study.

1. Determination of Russia's share in global exports and imports of goods, which reveals the country's position on the world stage in comparison with foreign countries. Calculation of Russia's high-tech export volumes in comparison with foreign countries (including determination of: export volumes, billion dollars; share in world export volumes, %; share in volumes of all supplies of the country to foreign markets, %).

2. Determination of quantitative and qualitative characteristics in the development of digital technologies through the assessment of high-tech export trajectory in the constituent entities of the Russian Federation. Determination of the high-tech orientation of the RF constituent entities by assessing the high-tech export trajectory of the subjects by commodity group ("Computers

and office equipment, electrical equipment and scientific instruments"; "Electronics and telecommunications"). This makes it possible to systematize the regions (by the volume of exports by commodity group, million US dollars; by the region's share in total exports). This allows systematizing the regions (by export volume by commodity group, million US dollars; by the region's share in the total export volume, %), as well as to identify the leading regions according to the high-tech export trajectory index. The assessment of the high-tech export trajectory helps to better understand the key drivers of digital technology development.

3. Grouping the trends and challenges occurring in import substitution in digital transformation and information technology, which have an impact on the development of digital technologies.

4. Development of proposals for the formation of support measures for the import substitution strategy in the field of digital technologies, taking into account industry specifics.

Such an algorithm is justified by the use of both sectoral and product approach in the development of high technologies. This, in turn, constitutes the research significance.

Key finding of the research

Import substitution for Russia is not an absolutely new period of the country's economic development. The process began after the devaluation of 1998, when the share of Russian products in the consumer basket became higher than that of foreign products. In 1998, the amount of imported goods decreased by 20% (74 billion US dollars), and in 1999 – by another 28% (to 53 billion US dollars) (Bereznev, Kulpina, 2022; Gulin et al., 2015). However, the demand, which strongly increased in the post-crisis period, was satisfied rather quickly and without much difficulty, which was facilitated by the extensive development of idle production capacities. Thus, one of the main economic growth factors was the reduction of imports caused by devaluation. The most significant impact of import substitution as a factor of economic growth was on manufacturing production in 1999–2000. Some economists note that GDP growth and increase in industrial production in 1999 were 25% due to import substitution (Glaziev, 2022; Gulin et al., 2015).

According to the 2021 results, the Russian Federation ranked 13th (8th in 2012) among the world exporters of goods and 22nd (17th in 2012) in the world ranking of importers of goods. The share of the Russian Federation in 2021 in world exports amounted to 1.9%, in imports – 1.3%. Russia is the leading exporter of raw materials, semi-finished products, as well as products of primary forms and simple products *(Tab. 1)*. It remains a "passive" exporter in the supply of engineering products, pharmaceuticals, mass market goods used for household and other purposes, special purpose products (photo and movie goods).

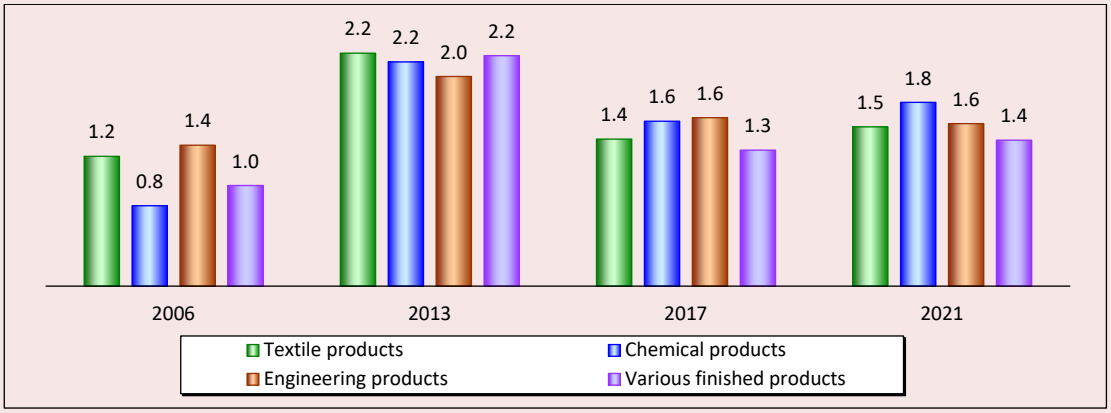
In the share of world imports, the list of the main "growing" commodity items of Russia in 2021 included textile products – 1.8%, goods of the chemical industry – 1.6%, engineering products – 1.5%, miscellaneous finished goods – 1.4% *(Fig. 1)*. The increase in the share in world imports for these commodities over the period from 2006 to 2021 ranges from 0.2 to 1%. In addition, in the same commodity groups, the value volumes show growth from 2.5 to 3.5 times for the same analyzed period.

Currently, the volume of the global market of high-tech products is estimated by the World Bank at 3 trillion US dollars (energy market – 0.7 trillion US dollars). Meanwhile, Russia's share in global high-tech exports in 2021 was 0.4%. For comparison, China – 33.5%, Germany – 7.4%, the USA – 6.0%, the Republic of Korea – 5.8%, Singapore – 5.7%, Japan – 4.1%, Malaysia – 3.9%, France – 3.5%, UK – 2.4% *(Tab. 2)*.

Table 1. Russia's share in the value of world exports of goods, %

Product item	2006	2013	2017	2021	2021 to 2006, p.p.
"Leading" exporter					
Fertilizers	14.1	13.8	14.1	14.9	0.7
Fuel and energy products	10.9	11.3	8.9	8.3	-2.6
Nickel and its products	22.5	13.9	10.5	6.7	-15.8
Wood and wood products; charcoal	6.0	5.6	5.9	6.3	0.4
Cereals	3.1	3.8	7.2	6.0	2.9
Ferrous metals	5.4	5.1	5.0	5.2	-0.3
Fish and crustaceans	0.8	2.7	2.9	4.4	3.5
Other non-precious metals, metal ceramics and products thereof	6.2	4.7	4.8	3.7	-2.5
Precious stones, precious metals and articles thereof	1.5	1.6	1.7	3.7	2.2
Aluminum and its products	5.1	4.4	3.9	3.6	-1.5
"Passive" exporter					
Nuclear reactors, boilers, equipment and mechanical devices and parts thereof	0.31	0.43	0.41	0.43	0.12
Pharmaceutical products	0.08	0.12	0.14	0.30	0.23
Furniture; bedding, mattresses, mattress bases, sofa cushions	0.28	0.21	0.21	0.28	0.01
Means of land transportation (except railway or streetcar rolling stock)	0.24	0.36	0.24	0.25	0.01
Instruments and apparatus for optical, photographic, cinematographic, measuring, controlling purposes	0.21	0.28	0.32	0.25	0.04
Tools, devices, knives, spoons and forks made of non-precious metals and parts thereof	0.21	0.28	0.32	0.25	0.04
Electrical machinery and equipment and parts thereof; sound recording and reproduction equipment	0.15	0.22	0.17	0.18	0.03
Sports equipment and its parts and accessories	0.08	0.12	0.12	0.16	0.08
Clothing and textile products	0.01	0.05	0.07	0.12	0.10
Photo and movie products	0.04	0.04	0.06	0.10	0.06
Based on the data from the International Trade Center digital platform. Available at: https://www.trademap.org/					

Figure 1. Russia's share in the value of world imports of goods, %



Source: based on the data from the International Trade Center's digital platform. Available at: https://www.trademap.org/ (accessed: May 30, 2024).

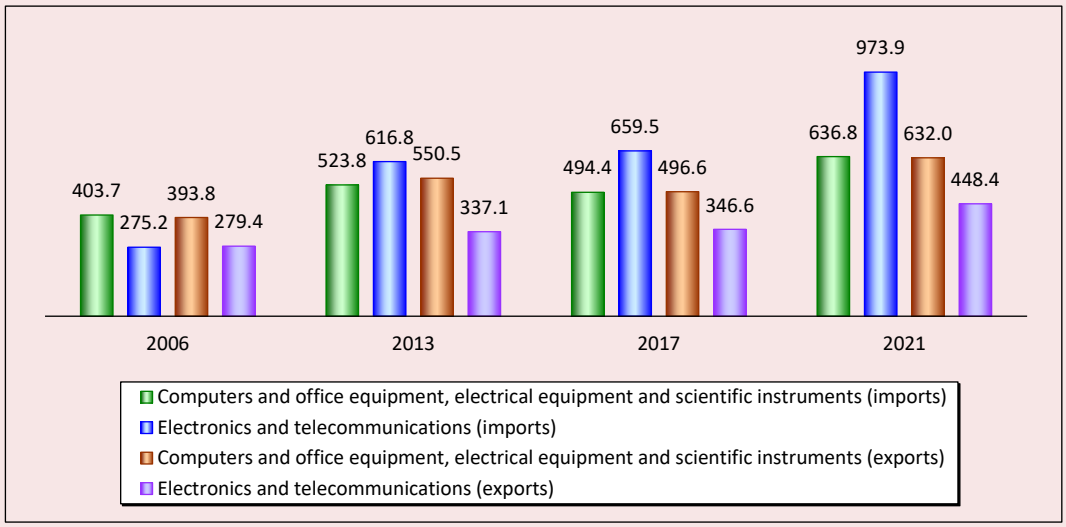
Table 2. Volumes of Russia's high-tech exports in comparison with foreign countries

Country	2006			2013			2017			2021			Dynamics, %		
	V	S (W)	S (C)	V	S (W)	S (C)	V	S (W)	S (C)	V	S (W)	S (C)	2021 to 2006	2021 to 2013	2021 to 2017
China	273.1	14.9	28.2	655.9	28.3	28.0	654.2	24.5	29.2	942.3	33.5	29.7	345.0	143.7	144.1
Germany	163.2	8.9	14.7	209.3	9.0	12.9	195.2	7.3	13.2	209.7	7.4	14.5	128.5	100.2	107.4
USA	219.0	12.0	21.3	169.2	7.3	9.6	154.5	5.8	9.9	169.2	6.0	10.7	77.3	100.0	109.5
South Korea	93.4	5.1	28.7	143.5	6.2	25.4	166.7	6.3	32.0	164.0	5.8	25.6	175.6	114.3	98.4
Singapore	124.7	6.8	45.9	143.3	6.2	35.0	146.8	5.5	44.1	159.9	5.7	34.9	128.3	111.6	109.0
Japan	129.2	7.1	20.0	111.1	4.8	15.4	106.2	4.0	16.0	116.5	4.1	15.5	90.2	104.9	109.7
Malaysia	63.5	3.5	39.5	67.1	2.9	36.3	74.1	2.8	39.3	108.7	3.9	29.4	171.2	162.0	146.6
France	81.5	4.5	16.4	118.7	5.1	16.7	108.8	4.1	17.8	97.5	3.5	20.4	119.7	82.2	89.7
UK	119.4	6.5	26.5	74.7	3.2	14.3	73.7	2.8	14.6	66.7	2.4	13.7	55.9	89.3	90.5
Switzerland	31.1	1.7	21	54.3	2.3	10.1	29.8	1.1	9.2	38.2	1.4	15.2	122.8	70.3	128.0
Canada	26.7	1.5	6.9	32.2	1.4	5.8	26.94	1.0	6.5	29.09	1.0	7.0	108.9	90.4	108.0
Russia	3.9	0.2	1.3	9.2	0.4	2.1	10.4	0.4	2.0	10.6	0.4	1.8	270.6	114.7	101.9

Note: V – export volumes, billion US dollars; S (W) – share in world export volumes, %; S (C) – share in volume of all supplies of the country to foreign markets, %.
Source: based on The World Bank Group data. Available at: https://data.worldbank.org/topic/private-sector?view=chart

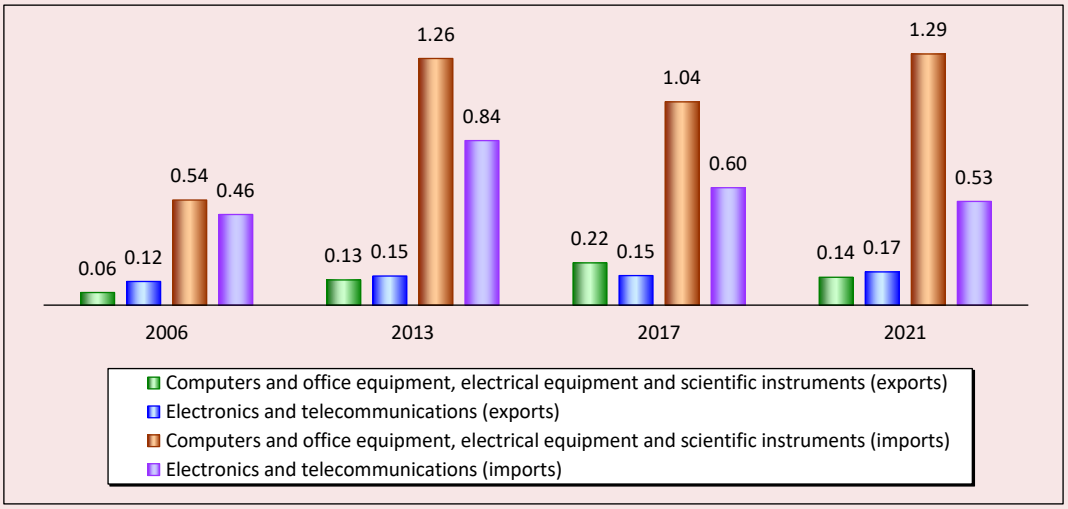
The world high-tech product market is analyzed from the perspective of segment groups that are associated with the development of digital technologies *(Fig. 2)*. The value of the world import market for the fifteen-year period for the two product items included in the high-tech segment increased by 157.7% and 3.4 times, respectively, and their share in 2021 amounted to 2.8 and 4.3%. For these commodity groups, the world export market value increased by 160.4% and 3 times, and the share of these goods in exports in 2021 amounted to 2.9 and 3.6%.

Figure 2. Value of high-tech goods in world trade, billion US dollars



Source: based on the International Trade Center's digital platform data. Available at: https://www.trademap.org/ (accessed: May 30, 2024).

Figure 3. Russia's share in global trade in high-tech goods, %



Source: based on the International Trade Center's digital platform data. Available at: https://www.trademap.org/ (accessed: May 30, 2024).

The development of digital technologies is directly related to the global high-tech product market. Russia's position in the global trade in "high-tech" products reflects the mirror opposite of exports and imports *(Fig. 3)*. The share of Russian supplies in world exports for the two main product items of the high-tech sector for the period from 2006 to 2021 did not reach even 0.3%. However, the share of Russian participation in global imports of high-tech products over the same period varied in the range from 0.5 to 1.3%, which is almost ten times higher than exports in some years. This is undoubtedly due to the long elaboration in the state economic policy of the directions of development in the sphere of non-resource sector. In fact, tactical guidelines in the sphere of non-resource exports began to be formed with the adoption of the national project "International Cooperation and Export" in December 2018[7]. At the same time, the development of the high-tech sector as a necessary strategic benchmark in the economy and a factor ensuring technological sovereignty started only in 2022.

We analyzed the need for digital technologies in the Russian Federation. According to the ANO "Digital Economy", the potential of the market for digital solutions for smart cities and regions at the end of 2023 could amount to 840 billion rubles. Most of the demand for digital technologies was met by imports. However, due to the introduction of a large number of restrictive sanctions on the import of digital technologies to Russia by the USA, the UK, South Korea, Japan and other countries since February 2022, the problem of finding new sources to meet the demand for digital technologies has arisen.

[7] Passport of the national project "International Cooperation and Export". Available at: http://government.ru/info/35564/

A joint study by the HSE University and the Russian Union of Industrialists and Entrepreneurs shows that the share of information and communication technologies is less than 1% of Russia's GDP. For comparison, this indicator reaches 3% and more in Western European countries. It follows that Russia has significant growth potential in such segments of the IT market as IT services, software and cloud services[8].

Nevertheless, there are mixed estimates regarding this potential. According to an International Data Corporation study[9], a leading international IT research organization, the IT market in Russia will reach 31.2 billion US dollars in 2021. The growth rate reached 1.3%. However, according to the estimates of international research agencies[10], the Russian IT market volume decreased by 39% in 2022 (12.1 US billion dollars) and reached only 19.1 billion US dollars.

According to the Union of Innovation and Technology Centers of Russia, purchases of domestic laptops and software by state companies from 2021 to 2023 should be a share of 50% and above: in 2021, it was 50%, 2022 – 60%, 2023 – 70%[11]. However, the attitude to the presented data may differ because in the materials of the open analytics of Delovoy Profil Group it is stated that government customers were able to make purchases under the guise of domestic products of non-Russian equipment at the expense of the existing privilege, which also contributed to the expansion of the register of IT-companies[12].

The first important step in the process of developing the sphere of digital technologies should be the assessment of the high-tech orientation of the RF subjects, analysis of specialization, identification of opportunities for diversification of the economy under the influence of external environment risks.

Let us consider the trajectory in the sphere of high technologies in the international market of the constituent entities of the Russian Federation in the commodity group "Computers and office equipment, electrical equipment and scientific instruments" *(Tab. 3)*.

The highest value of the high-tech export trajectory coefficient for the commodity group "Computers and office equipment, electrical equipment and scientific instruments" is characterized by such regions as the Tomsk Region (specialization index was 28), Moscow (26.3), the Arkhangelsk Region (16.7), the Irkutsk Region (15.5), the Altai Territory (8.7). Saint Petersburg (9.8), the Novgorod Region (7.8), and the Novosibirsk Region (7.5) have high export trajectory coefficients for this commodity group, but their contribution to the total volume of high-tech exports is 0.02, 0.1, and 0.9%, respectively. A small share in the total volume of exports (5.3%) with a high export trajectory coefficient (26.3) is once again demonstrated by Moscow, which cannot be considered export-oriented in this commodity group either.

[8] How import substitution in IT is progressing. Available at: https://www.vedomosti.ru/partner/articles/2023/06/27/982631-kak-prodvigaetsya-importozameschenie-v-it

[9] IDC research. Available at: https://www.idc.com/cis/research

[10] Ministry of Digital Development, Communications and Mass Media of the Russian Federation. Industry statistics. Available at: https://digital.gov.ru/ru/activity/statistic/?utm_referrer=https%3a%2f%2fyandex.ru%2f

[11] Analysis of problematic sectors of the Russian economy + measures. Available at: https://ruitc.ru/news/analiz-problemnykh-sektorov-ekonomiki-rossii-meropriyatiya/

[12] Changing structure of the IT market by the end of 2022: Benefits, development, import substitution, market for IT specialists. Available at: https://delprof.ru/press-center/open-analytics/izmenenie-struktury-it-rynka-po-itogam-2022-goda-lgoty-razvitie-importozameshchenie-rynok-it-spetsia/; Digital Public Administration. Available at: https://digital.gov.ru/ru/activity/directions/882/

Table 3. High-tech export trajectory of Russian regions in the commodity group "Computers and office equipment, electrical equipment and scientific instruments" in 2021

No.	Leading regions by trajectory indicator*	Region's share in total exports, %	High-tech export trajectory index	Export volume by commodity group, million US dollars
1.	Tomsk Region	1.8	28	76.5
2.	Moscow	5.3	26.3	150.9
3.	Khabarovsk Territory	4.9	17.2	51.9
4.	Arkhangelsk Region	7.2	16.7	75.1
5.	Irkutsk Region	24.1	15.5	251.2
6.	Saint Petersburg	10.5	9.8	114.4
7.	Altai Territory	1.4	8.7	14.4
8.	Novgorod Region	1.8	7.8	19.7
9.	Novosibirsk Region	5.0	7.5	109.3
10.	Krasnoyarsk Territory	5.8	3.9	602.3
11.	Perm Territory	4.5	3.2	46.5
12.	Leningrad Region	5.3	2.1	55.2
13.	Sverdlovsk Region	4.7	1.1	58.7

* Regions ranked by high-tech export trajectory index.
According to: database of the Federal Customs Service of the Russian Federation. Available at: https://fedstat.ru/indicator/54389

Table 4. High-tech export trajectory of the constituent entities of the Russian Federation for the commodity group "Electronics and Telecommunications" in 2021

No.	Leading regions by trajectory indicator*	Region's share in total exports, %	High-tech export trajectory index	Export volume by commodity group, million US dollars
1.	Novosibirsk Region	10.1	11.9	42.9
2.	Chelyabinsk Region	10.5	10.3	40.0
3.	Krasnoyarsk Territory	14.2	9.5	55.2
4.	Belgorod Region	4.9	7.6	19.1
5.	Sverdlovsk Region	4.3	6.8	44.2
6.	Irkutsk Region	5.9	3.8	23.5
7.	Kemerovo Region	5.7	2.4	22.1

* Regions ranked by high-tech export trajectory index.
According to: database of the Federal Customs Service of the Russian Federation. Available at: https://fedstat.ru/indicator/54389

Let us analyze the trajectory of the RF constituent entities in the sphere of high technologies in the international market in the commodity group "Electronics and telecommunications" in 2021 *(Tab. 4)*.

Having calculated the export specialization coefficient for the "Electronics and Telecommunications" commodity group, we can draw the following conclusion. The seven RF constituent entities considered above (Novosibirsk Region, Chelyabinsk Region, Krasnoyarsk Territory, etc.) provide 68% of all electronics and telecommunications exports. Such regions as the Novosibirsk Region (the trajectory index amounted to 11.9), the Chelyabinsk Region (10.3), the Krasnoyarsk Territory (9.5), and the Belgorod Region (7.6) have high trajectory coefficients.

In this regard, support for scientific, technical and innovation activities in the implementation of industrial policy in Russia can be carried out by public authorities by:

– placement of assignments for research, development, experimental design and technological work under the state defense order;

– granting subsidies to subjects of activity in the sphere of industry to finance research, development and technological works carried out in the course of implementation of investment projects in the branches of industry not related to ensuring national defense and state security;

– stimulating innovation activity in business companies with state participation or in non-profit organizations created by the Russian Federation or a constituent entity of the Russian Federation by exercising the rights of the Russian Federation or a constituent entity of the Russian Federation as a participant (shareholder) of the respective business company or a founder of a non-profit organization;

– stimulating demand for innovative products, including through rationing in the sphere of procurement of goods, works and services for state and municipal needs;

– providing financial support to organizations engaged in innovative activities in the provision of engineering services, in the implementation of projects to improve the level of environmental safety of industrial production, including through the use of the best available technologies;

– creation of conditions for coordination of activity of subjects in the sphere of industry in realization of scientific, scientific-technical and innovative activity and for cooperation between subjects of the specified types of activity;

– stimulating activities to create or master the production of industrial products by introducing into production the results of intellectual activity related to priority areas of development of science, engineering and technology or critical technologies;

– stimulating activities on the use of the best available technologies in industrial production.

As we have already noted, Russia is the "leading" exporter in commodities, including supplies of mineral products. The world experience distinguishes two groups among the countries-exporters of fuel and energy complex commodities (Nakhli et al., 2021). The first group includes countries with an insufficient domestic market (due to low production volumes), and the second group includes countries that follow their own path in the industrialization strategy with a focus on import substitution. Russia is one of the representatives of the second group of countries. Iran belongs to the same group. Both states have similar underlying assets in the economy related to comparative advantage in international trade as well as in fighting the restrictive policies of the West. Many studies have examined the various effects of sanctions on Iran's economy (Ebrahimi, 2017; Nakhli, 2021; Kandil, Mirzaie, 2021). Import substitution was believed to be one of the ways to overcome the negative effects. We should say that about 82% of imports in Iran are used in various manufacturing sectors (Lotfalipour et al., 2021). Another important feature of Iranian industrialization was the lack of internal interconnections in the industrial sector and its heavy dependence on imported components (Kandil, Mirzaie, 2021). With the intensification of economic sanctions in Iran, importing intermediate and capital goods has become more difficult, and technology transfer issues have made it problematic for most industries to continue operating (Nejati, Bahmani, 2020; Kandil, Mirzaie, 2021). Faced with payment deficits and difficulties in expanding industrial exports, resource-rich Iran began limiting its own imports and hence encourage import substitution (Ebrahimi, 2017; Kandil, Mirzaie, 2021). The main goals for Iran were to increase income and diversify productive activities and reduce

dependence on natural resource extraction as the main source of income (Nakhli, 2021; Kandil, Mirzaie, 2021). Taking into account Iran's experience, the import substitution strategy in Russia should be used for both long-term and short-term goals, overcoming crisis situations, as well as strengthening potential non-resource and high-tech sectors of the economy closely linked to the development of digitalization.

In Russia, the task of implementing the digital transition based on Russian developments is enshrined in the text of the national project "Digital Economy"[13]. The targets specified in the project passport indicate the need to achieve an annual increase in the share of Russian software purchased or leased by the authorities by at least 5%. Thus, this indicator should increase from 70% in 2020 to 90% in 2024. For state corporations and companies with state participation, the share of Russian software should increase from 50% in 2020 to 70% in 2024[14].

According to the Presidential Decree on measures to support the IT industry, Russian IT companies are exempted from paying profit tax and from any inspections for three years[15]. They also have access to preferential loans of up to 3% per annum "for the continuation of work" and the realization of new projects. In addition, employees of Russian IT-companies have access to mortgages on favorable terms and deferment from service in the Russian army until the age of 27. This decision contributes to the reduction of staff outflow.

In addition, it is planned to increase the number of existing grants aimed at supporting the development of domestic solutions. The listed items (reduction of tax burden, grants for IT research, state support) constitute the first package of measures to accelerate the development of the Russian IT sector.

Active government support of IT development companies[16] in the following areas contributes to solving many of the problems identified in the field of import substitution:

1. *State regulatory measures:*

– legalization of parallel imports (to eliminate problems related to the shortage of hardware solutions);

– use of exclusively domestic software in government agencies and companies.

2. *Financial support for import substitution:*

– grant payments;

– implementation of development co-financing programs;

– preferential lending to businesses;

– ensuring the use of Russian software on favorable terms (discounted) –which can be used by small and medium-sized companies.

3. *Social and legal support for IT developers:*

– preferential mortgage programs;

– simplification of obtaining residence permits for foreign IT specialists;

– grants for implementing educational programs to train developers.

Two roadmaps were launched in the field of development of domestic information technologies and software at the end of 2022: the first one is "New Industrial Software", includes support measures for developers of design systems, application software (Product Lifecycle Management), BIM (specific technologies for the construction industry), etc.; and the second – "New System-wide Software" focuses on supporting developers of office applications and packages, and systems related to database management, etc.

[13] Digital economy of the Russian Federation. Available at: https://digital.gov.ru/ru/activity/directions/858/?utm_referrer=https%3a%2f%2fyandex.ru%2f

[14] Import substitution in IT industry. Available at: https://www.garant.ru/article/1542142/

[15] On measures to ensure accelerated development of the information technology industry in the Russian Federation: Presidential Decree 83, dated March 2, 2022. Available at: http://publication.pravo.gov.ru/Document/View/0001202203020001

[16] Import substitution as a driver of digital transformation. Available at: https://blogs.forbes.ru/2022/12/29/importozameshhenie-kak-drajver-cifrovoj-transformacii/

These roadmaps have been approved by the Ministry of Digital Development, Communications and Mass Media of the Russian Federation. The roadmaps include more than three hundred projects related to import substitution of foreign software. At the same time, a significant share of the projects is implemented by the company's own resources. In general, the total amount of these projects is more than 200 billion rubles. For most of these projects, agreements are to be concluded with the Russian Government in the future in terms of creating conditions to ensure guaranteed demand for the products. The following financial resources are expected to be attracted for other projects:

– loan funds (approximately 20 billion rubles);
– grant funds (over 23 billion rubles).

We should note that already in December 2022 (data from the website of the Government of the Russian Federation) there was information that the companies have reached the last stage of concluding a grant agreement with the Skolkovo Foundation and the Russian Foundation for the Development of Information Technologies[17]. It is also worth emphasizing that since 2015 the Unified Register of Russian Programs for Computing Machines and Databases has been operating in Russia[18].

In addition, the Ministry of Industry and Trade of the Russian Federation has established a unified register of Russian radioelectronic products and a unified register of telecommunications equipment of Russian origin, which relate to information and communication technologies and software products.

The development of Russian IT companies is facilitated by a number of measures implemented under the state program "Digital Economy". There are benefits for businesses (except for sole proprietorships) and for employees of companies. At the same time, there are some conditions required to receive the benefits[19]:

– share of revenue should be 70% of all revenues (including revenues from the development and sale of proprietary software or electronics);
– a company should have state accreditation with the Russian Ministry of Finance; it is worth emphasizing that this agency supervises two registers: accredited IT companies and the register of domestic software developers; at the same time, companies that plan to receive existing benefits for their business should take into account that the state accreditation of the Ministry of Finance is a prerequisite; in general, state accreditation is issued indefinitely, but the Ministry of Finance has the right to cancel it[20].

The following benefits are available to digital technology organizations through the end of December 2024[21]:

– zero income tax rate;
– VAT rate for software developers – 0%;
– tariff of insurance premiums with a reduced rate, which is 7.6%;
– inspections by state authorities have been canceled (including currency and tax inspections);
– providing loans with a reduced rate (3% maximum) until 2025;
– other benefits in the form of grants, as well as simplified recruitment of employees from abroad and simplified public procurement.

[17] Regulatory framework for the digital environment. Available at: https://digital.gov.ru/ru/activity/directions/862/; Digital technologies. Available at: https://digital.gov.ru/ru/activity/directions/878/

[18] Information infrastructure. Available at: https://digital.gov.ru/ru/activity/directions/870/

[19] Digital economy of the Russian Federation. Available at: https://digital.gov.ru/ru/activity/directions/858/?utm_referrer=https%3a%2f%2fyandex.ru%2f

[20] Information security. Available at: https://digital.gov.ru/ru/activity/directions/874/

[21] Benefits for IT companies and IT workers that apply in 2023. Available at: https://secrets.tinkoff.ru/bezopasnost-biznesa/lgoty-it/

Russia is implementing a project called Digital Professions[22] to develop the human resources component of the digital economy. It includes a variety of additional education programs for different audiences in terms of IT knowledge. This project operates within the framework of the federal project "Personnel for the Digital Economy". We should also emphasize that the Digital Professions project provides benefits for different categories. To make the project more informative, the website "цифровыепрофессии.рф" has been created. For 2022, training for more than 50 thousand people with a 100% discount has been planned. In addition, people with disabilities and unemployed citizens who are registered with the employment service have the right to be trained free of charge.

The import substitution support measures under consideration can be supplemented by initiatives of private companies, regional and municipal authorities, investors interested in investing in IT developments as an actively developing sector of the Russian economy.

Trends, problems in import substitution of domestic digital technologies and development proposals

The main trends of import substitution in Russia in the field of digital technologies include the following:

– domestic development has an opportunity for qualitative development;

– products developed by industry leaders can compete with foreign companies;

– acceleration of implementation projects (time costs – 2–4 months);

– freezing of implementation projects involving foreign vendors;

– appearance of new software classes in the Russian software classifier;

– a section of industry-specific application software will appear in the Russian classifier to solve industry-specific tasks.

The list of the main problems of Russian import substitution in the sphere of information technologies includes the following:

– the need for personnel for the digital economy, namely developers, analysts, and methodologists;

– the scarcity or even complete absence of integrated data networks;

– deficit of developments in the field of security (especially clearly in the direction of secure solutions);

– speed of replacing foreign solutions with domestic developments;

– there are no industry standards in terms of development.

According to expert estimates, import substitution in most areas in the field of digital solutions will be quite successful in the perspective of 4–5 years[23]. In addition, there are more than 16 thousand different solutions in the register of domestic software, and their number is increasing. Given such dynamics, there is every chance that in the coming years, basic business processes at enterprises in Russia will be reproduced through the use of domestic software products and technologies.

The analysis has shown that the priority of economic policy at the moment is to stimulate import substitution processes in the field of digital technologies, with the ultimate goal being the economic development of Russian territories. For this purpose, it is reasonable and necessary to work systematically to achieve an increase in the import substitution potential in the IT sphere.

[22] Ministry of Economic Development: Import substitution will be the main trend in the coming years. Available at: https://rg.ru/2022/05/31/otkryvaiutsia-vozmozhnosti.html

[23] Changing structure of the IT market by the end of 2022: Benefits, development, import substitution, market for IT specialists. Available at: https://delprof.ru/press-center/open-analytics/izmenenie-struktury-it-rynka-po-itogam-2022-goda-lgoty-razvitie-importozameshchenie-rynok-it-spetsia/

The launch and acceleration of processes aimed at import substitution in the field of digital technologies requires the implementation of comprehensive systemic steps. To successfully implement the import substitution policy at the initial stage, it is advisable to develop an Import Substitution Strategy. It should be based on the development of integration and cooperation both between companies in priority industries and with educational and research centers. The strategy goal is to create conditions for the replacement of digital technologies produced abroad with competitive domestic products that are not inferior in quality and price.

The main directions of the strategy should be the replacement of imported products and developments in the field of IT with those supplied by local companies; creation of own products and developments supplied to the domestic and foreign market.

Its implementation will lead to GDP growth by increasing the competitiveness of domestic products in the field of IT in both domestic and global markets; development, implementation, manufacture of new and unique products in the field of digital technologies by domestic manufacturers due to the application of the results of fundamental knowledge and applied work; formation of new basic sectors in the field of digitalization to solve industry problems and the emergence of promising market niches.

The formed direction of import substitution in the digital sphere will be able to attract new participants, which will affect the development of own products in the field of digital technologies, improve the quality of human resources. In addition, it will improve the efficiency of interaction between manufacturers and consumers, technical and technological equipment of import-substituting production facilities, expand the geography of sales of import-substituting products, as well as develop new and adjust existing methods and tools focused on stimulating and promoting import substitution for the development of domestic digital technologies.

Conclusion

In general, the opportunities for import substitution in the sphere of digital technologies in Russia at the current stage are quite large. The departure of many Western developers has freed up huge niches in the whole range of software solutions. These include system and application applications, cloud software, database management systems, solutions for computer-aided design, accounting and management. At the same time, the market demand for solutions for relevant purposes is high and continues to grow as the economy continues becoming more technologized and digitalized.

Thus, the key direction in the field of digital technologies in the coming years should be a gradual, systematic import substitution. It should be based on the establishment of an integral proprietary ecosystem that will promote the development, implementation and production of domestic products in the field of digital technologies. Active development in this direction will help ensure Russia's technological sovereignty, as well as become a driver for the formation of new industries, sectors and niches in the development of digital products and services. This will make it possible to produce in-demand, unique products both to replace foreign analogues and to provide specific advantages in the global market, and will increase motivation for the emergence of new domestic players in the digitalization market. All this will become the main catalyst for the activation of new types of economic activities, which will require the implementation of the solution of updated tactical tasks in the field of digital transformation.

The study presents an approach to identifying barriers and opportunities for import substitution of digital technologies in Russia, which takes into account both quantitative and qualitative characteristics to assess the high-tech sector. In

addition, a step-by-step algorithm for identifying import substitution opportunities in digital technologies has been developed, which takes into account industry specifics and proposes a conceptual framework for developing a strategic action model. Using the proposed approach, it becomes possible to present the contribution of economic actors and its specifics in the field of IT, which makes it possible to determine the prospects for further development of the region's economy and scientific and production cooperation. The research results confirm that the development of digital technologies is associated with such an import substitution policy, which will stimulate the development of existing high-tech industry segments and promote the formation of new areas focused on the production of competitive high-tech world-class goods in the country and regions.

The research contributes to the development of theoretical and methodological issues of digitalization of the economy and import substitution. Its results can be used to analyze the state policy in the field of digital technologies and in the assessment of measures to support the digital economy, as well as in the development of program-target documents in the conditions of digital economy development at the federal and regional levels.

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Forecasting the Indicators of Scientific, Technological and Innovative Development of the Region Using Recurrent Neural Networks

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Abstract. The article forecasts indicators of scientific, technological and innovative development of a constituent entity of the Russian Federation and regional institutions of innovative development using recurrent neural networks. Forecasting using neural networks has become widespread and is a relevant, high-quality and reliable way of making economic forecasts and is applicable within the framework of socio-economic analysis, including analysis of territories. However, when studying the scientific literature, it was not possible to find works in which the scientific, technological and innovative development of regions was predicted using the neural network method, which determines the scientific novelty of the research being carried out. The relevance of the study is due to the increasing attention on the part of regional authorities to the scientific, technological and innovative development of territories and the need to form state programs of the constituent entities of the Russian Federation in the field of scientific and technological development. The research hypothesis is that forecasting indicators of scientific, technological and innovative development of the region and the activities of regional institutions for innovative development using recurrent neural networks will give more accurate results than using the linear regression method, moving average model or the Holt – Winters method. As part of the study, a recurrent neural network model was formed based on a system of interconnection of indicators of scientific, technological and innovative development of a constituent entity of the Russian Federation and regional institutions of innovative development. As a result, a forecast of indicators of scientific, technological and innovative development of a constituent entity of the Russian Federation and the activities of regional institutions for innovative development was obtained, which correlates with the real situation in this area.

Key words: regional scientific and technological policy, innovative development institutions, recurrent neural networks, forecasting, scientific and technological development indicators, regional economy.

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Introduction

At present, when attempts at structural shifts are being made in the Russian economy; attention to scientific, technological and innovative development in the regions of the country is increasing, and the role of the authorities of constituent entities of the Russian Federation in creating conditions for the progressive growth of a technological component of regional economies is increasing (Altyner et al., 2022). Evidence of a growing interest on the part of the federal authorities includes a series of instructions from the President of the Russian Federation; the Concept of Technological Development of the Russian Federation adopted in 2023; revision of the Strategy of Scientific and Technological Development of the Russian Federation; launching state programs on scientific and technological development in the regions. The attention of regional authorities to this issue can be emphasized by decrees of the heads of constituent entities of the Russian Federation[1], which raise issues of creating conditions for scientific, technological and innovative development. These

[1] On additional measures to stimulate investment activity in the Krasnoyarsk Territory and technological development of the region: Decree 283-ug of the Governor of the Krasnoyarsk Territory, dated September, 23, 2022; On declaring 2024 the year of scientific and technological development in the Republic of Tatarstan: Decree 639 of the Rais of the Republic of Tatarstan, dated September 14, 2023.

issues are also related to the activities of regional innovative development institutions, which have recently begun to be created in Russian regions (Dezhina, 2021; Golova, 2022; Myslyakova, 2022; Vasilieva et al., 2023; Egorov, Kovrov, 2023; Kuznetsova, 2023).

Forecasting scientific, technological and innovative development of Russian regions becomes relevant in the formation of regional state programs for scientific and technological development, as well as assessments of the performance of regional innovative development institutions (Shirov et al., 2016; Aganbegyan, 2019). The aim of the study is to design and test a technique for forecasting region's scientific, technological and innovative development using recurrent neural networks. A neural network is a mathematical model that is based on the principles of how the brain of living organisms works; that is, it consists of nodes (neurons) and their communication channels, each of which affects the result. A distinctive feature of a recurrent neural network compared to other architectures is that when predicting neurons, they take into account not only the current input, but also its previous state, and what happened to other neurons at previous inputs. The hypothesis of the study is that forecasting the indicators of region's scientific, technological and innovative development and the activities of regional institutions of innovative development using recurrent neural networks will produce more accurate results than using the linear regression method, the moving average model or the Holt – Winters method, due to the possibility of training the network and taking into account more interrelated variables when making a forecast.

Literature review

Currently, forecasting scientific, technological and innovative development, as well as using artificial intelligence methods in economic research, is gaining great popularity (Coates et al., 2001; Bengisu, Nekhili, 2006). One of these approaches is the use of neural network models. Forecasting based on neural network models is carried out to consider the dynamics of regions' socio-economic indicators, modeling the structure and dynamics of human capital, forecasting solar energy generation, forecasting energy consumption and in many other areas (Fedotov, Semenkin, 2014; Ketova et al., 2020; Pazikadin et al., 2020; Ghaith et al., 2021; Jin et al., 2022).

A review of the scientific literature on forecasting using neural network models indicates the high accuracy and adequacy of the method. In a study led by T.V. Azarnova, the authors predict socio-economic development parameters of the Voronezh Region and conduct neural network training over a retrospective period. As a result, the adequacy of the forecast to the real economic processes in the region is stated. When comparing the forecast of the neural network and the forecast of experts in relation to the indicator of gross regional product, the authors note that the forecast of the neural network is more cautious, while it is impossible to give preference to either of the methods (Azarnova et al., 2020).

Using neural networks, O.V. Kitova clarifies the data of a forecast of tourism indicators in regions with coal mining, obtained using linear regression. The author concludes that neural networks provide higher accuracy and quality of prediction (Kitova et al., 2023; Kitova et al., 2016).

Yu.V. Trifonov used a neural network model to forecast economic potential of Russia's regions. The model used allows calculating indicators and process large amounts of information quickly, efficiently and accurately (Trifonov et al., 2021).

Jiayou Qiu and co-authors use neural networks with an attention mechanism to predict stock prices. The authors note that the model based on neural networks has a wide application prospect and is not inferior to existing classical forecasting methods (Qiu et al., 2019).

Qing Zhang uses a neural network with a radial basis function in combination with a genetic

algorithm to forecast the gross regional product of Shandong Province. The authors conclude that the use of neural networks to predict gross regional product is appropriate and reliable (Zhang et al., 2022).

In a study by A.V. Babkin, a comparative assessment of the effectiveness of various forecasting methods is carried out using the example of forecasting the socio-economic development of the Astrakhan Region. As a result, it is concluded that forecasting using neural networks shows fewer errors and a higher degree of objectivity (Babkin et al., 2015).

Forecasting regions' scientific, technological and innovative development is starting to gain popularity; therefore, researchers use mainly classical forecasting methods – the foresight and extrapolation method.

An example of works devoted to forecasting regions' scientific, technological and innovative development can be found in a study by D.A. Alferyev, who suggests using the foresight method. The author concludes that the use of the foresight method for long-term forecasting is effective and with its help it is possible to form not only the forecast itself, but also the ways of its implementation (Alferyev, 2018). In addition, the foresight method is considered for forecasting in a number of works by other authors (Belyakov, Shumakov, 2018; Shelomentseva et al., 2015). However, this method has its drawbacks, it is an expert method; therefore, the human factor and the quality of the expert group are of great importance in making a forecast. The researchers also note that in the case of making a forecast for a region, a special methodology is needed for each region, taking into account its characteristics.

D.A. Endovitsky forecasts the dynamics of region's innovative development using extrapolation of data. By analyzing the initial data and the obtained forecast, the author concludes that the proposed method does not allow making any reliable forecast of innovative development dynamics, since functional diversification in its composition is not showing stable development (Endovitsky et al., 2023).

Thus, the currently used methods of forecasting scientific, technological and innovative development have some disadvantages; this fact necessitates searching for new relevant forecasting methods.

Forecasting using neural networks has become widespread and is an up-to-date, high-quality and reliable way of making economic forecasts, applicable in the framework of socio-economic analysis, including the analysis of territories. At the same time, it was not possible to find works in which the forecasting of regions' scientific, technological and innovative development was carried out using the method of neural networks, which determines scientific novelty of the research.

Materials and methods

To form the forecast, we chose a model of the system of regional innovative development institutions, which includes several agents: scientific and innovation fund, business incubator and technopark. Such a system of innovative development institutions located on the territory of a constituent entity of the Russian Federation allows solving scientific and technological problems that are most relevant in the region, but not covered at the federal level, as well as providing support measures for projects at all levels of technology readiness and creating a comfortable and attractive environment in the region for the development of science, technology and innovation (Byvshev, 2024; Mazilov et al., 2020).

The Krasnoyarsk Territory was chosen as a model constituent entity of the Russian Federation, since it has two of the three regional innovative development institutions designated in the model – the Krasnoyarsk Regional Fund for Support of Scientific and Scientific-Technical Activities (KRFS) and the Krasnoyarsk Regional Innovative and Technological Business Incubator

(KRITBI), scientific, technological and innovative potential available in the region, confirmed, among other things, by the national rating of scientific and technological development of RF constituent entities[2] (2021 – 25th place, 2022 – 21st place). The technopark's activity in the region was forecasted during the research process.

The research materials included statistical data from the official information portals of the KRFS[3], KRITBI[4], associations of technoparks of Russia[5], data from Rosstat[6] and the Federal Tax Service unified register of small and medium-sized businesses[7]. In order to ensure data comparability, the minimum period of 2020–2022 was used to make the forecast.

The scientific, technological and innovative development of RF constituent entities, including the model region – Krasnoyarsk Territory – can be characterized using a system of indicators reflecting, among other things, the performance of regional innovative development institutions *(Tab. 1)*.

The system of indicators that we use is based on publicly available data from open sources of Rosstat and the Federal Tax Service of Russia. The selection of indicators for the system was carried out by analyzing the works of N.I. Komkov, Wang Yushan, V.G. Basareva, as well as ratings of scientific, technological and innovative development[8] and target indicators of the activities of regional innovative development institutions[9] (Basareva, 2019; Komkov et al., 2019; Wang, 2021).

The activities of regional innovative development institutions are characterized by a system of indicators in accordance with their statutory goals and objectives, as well as indicators included in the state program of the region from which funding is provided *(Tab. 2, 3)*.

Table 1. System of indicators characterizing scientific, technological and innovative development of the Krasnoyarsk Territory

Indicator code	Indicator	2020	2021	2022
1r	Internal research and development costs from all sources, billion rubles	26.60	29.56	36.50
2r	Advanced production technologies used, units	3932	4145	4421
3r	Number of applications for the results of intellectual activity, units	536	489	508
4r	Number of researchers under 39 years old, people	2164	2125	2183
5r	Number of small and medium-sized businesses operating in the scientific, technological and innovative fields, units	210	218	216
6r	Volume of innovative goods, works, services, billion rubles	135.37	92.42	98.00
Source: own elaboration.				

[2] National rating of scientific and technological development of constituent entities of the Russian Federation. Available at: https://clck.ru/34MTeK (accessed: February 24, 2024).

[3] Official Internet portal of the Krasnoyarsk Regional Fund for Support of Scientific and Scientific-Technical Activities. Available at: https://clck.ru/393GkA (accessed: February 24, 2024).

[4] Official Internet portal of the Krasnoyarsk Regional Innovative and Technological Business Incubator. Available at: https://kritbi.ru/doc (accessed: February 24, 2024).

[5] Official Internet portal of the Association of Clusters, Technoparks and SEZ of Russia. Available at: https://akitrf.ru/ (accessed: February 24, 2024).

[6] Official Internet portal of Rosstat. Available at: https://24.rosstat.gov.ru/folder/27085 (accessed: February 24, 2024).

[7] Federal Tax Service unified register of small and medium-sized businesses. Available at: https://ofd.nalog.ru/ (accessed: February 24, 2024).

[8] The rating of innovative development of constituent entities of the Russian Federation. Issue 7 of the Higher School of Economics, 2021; Methodology of the national rating of scientific and technological development of constituent entities of the Russian Federation. RF Ministry of Science and Higher Education. Available at: https://clck.ru/32hVJh

[9] On the approval of the state program of the Krasnoyarsk Territory "Development of small and medium-sized enterprises and innovative activities": Resolution 505-p of the Government of the Krasnoyarsk Territory, dated September 30, 2013.

Table 2. System of indicators characterizing the activities of the KRFS

Indicator code	Indicator	2020	2021	2022
1f	R&D funding from the regional budget, billion rubles	0.15	0.09	0.20
2f	Funds from the regional budget for the provision of activities, billion rubles	0.02	0.02	0.02
3f	Amount of funds raised via co-financing, billion rubles	0.14	0.17	0.11
4f	Number of applications for the results of intellectual activity, units	34	35	38
5f	Number of researchers under 39 years old, people	789	576	444
6f	Number of research and technological developments, units	14	14	14
Source: own elaboration.				

Table 3. System of indicators characterizing the activities of KRITBI

Indicator code	Indicator	2020	2021	2022
1i	Funds from the regional budget for the provision of activities, billion rubles	0,11	0,11	0,08
2i	Amount of funds raised via co-financing, billion rubles	0,18	0,37	0,18
3i	Number of innovative small and medium-sized businesses created, units	16	16	16
Source: own elaboration.				

The KRFS activities are aimed at providing financial support for the scientific, technological and innovative sphere of the Krasnoyarsk Territory by issuing grant funding on a competitive basis for the implementation of projects. The indicators characterizing the activities of this regional innovative development institution are financial and performance indicators, as well as indicators of coverage of the activities of participants in scientific, technological and innovative processes in the region.

KRITBI's activities are aimed at promoting the development of small and medium-sized businesses in the scientific, technological and innovative fields. Its activities are characterized by financial indicators and indicators of environment formation.

To forecast the technopark's activity and assess its potential contribution to the scientific, technological and innovative development of the Krasnoyarsk Territory on the basis of summary data

Table 4. Performance indicators of technoparks in Russia

No.	Indicator	2020	2021	2022
1	Number of technoparks in the Russian Federation, units	183	129	113
2	Number of regions that have technoparks, units	54	39	33
3	Number of applications for intellectual property objects created by residents of technoparks, units	2 222	1 782	1 018
4	Volume of innovative goods, works, and services shipped (performed) by residents of technoparks, million rubles	71 471,04	72 298,31	73 296,53
5	Volume of innovative goods, works, and services shipped (performed) in the regions where technoparks operate, million rubles	4 723 052,80	4 918 069,00	4 994 516,40
6	Number of intellectual property objects registered in the regions where technoparks operate, units	23364	20 088	19 440
7	Internal research and development costs from all sources in the regions where technoparks operate, billion rubles	1 118.60	1 132.00	1 224.20
8	The amount of R&D costs by residents of technoparks, million rubles	33 875	41 719	50 820
9	Investments in the infrastructure of technoparks from regional budgets per technopark, billion rubles	0.16	0.25	0.30
Source: own elaboration.				

on the activities of technoparks in Russia, formed by the Association of Clusters, Technoparks and Special Economic Zones *(Tab. 4)*, an algorithm was formed for calculating the values of indicators characterizing the activities of this type of regional innovative development institutions.

At the first stage of the algorithm, the average relative contribution of the activities of one technopark to the scientific, technological and innovative development of the territories where technoparks operate is calculated in the context of the corresponding indicators for the period from 2020 to 2022 *(Tab. 5)*:

$$\lambda = \frac{\sum_{i=1}^{n} \frac{I_{\text{tech}}^{i}}{\alpha^{i}}}{\sum_{i=1}^{n} \frac{I_{\text{reg}}^{i}}{\beta^{i}}}, \quad (1)$$

where:

i – index of year (data were used for three years: 2020, 2021, 2022);

n – number of years for which the indicators are used in the study;

I_{tech}^{i} – value of the indicator of technoparks' activity for the i-th year;

I_{reg}^{i} – value of the indicator of scientific, technological and innovative development in the regions where technoparks operate for the i-th year;

α^{i} – number of technoparks in Russia in the i-th year;

β^{i} – number of Russia's regions where technoparks operate in the i-th year;

λ – share of the technopark's contribution to the region's scientific and technological development.

As a result, we obtain average relative values, on the basis of which we calculate the estimated values of performance indicators for one technopark in the Krasnoyarsk Territory in 2020–2022 *(Tab. 6)*:

$$I_{\text{tech\_KT}} = I_{\text{KT}} \times \lambda, \quad (2)$$

where:

$I_{\text{tech\_KT}}$ – value of the indicator obtained as a result of the work of the technopark;

I_{KT} – value of the indicator characterizing the scientific, technological and innovative development of the Krasnoyarsk Territory;

λ – share of the technopark's contribution to the region's scientific, technological and innovative development.

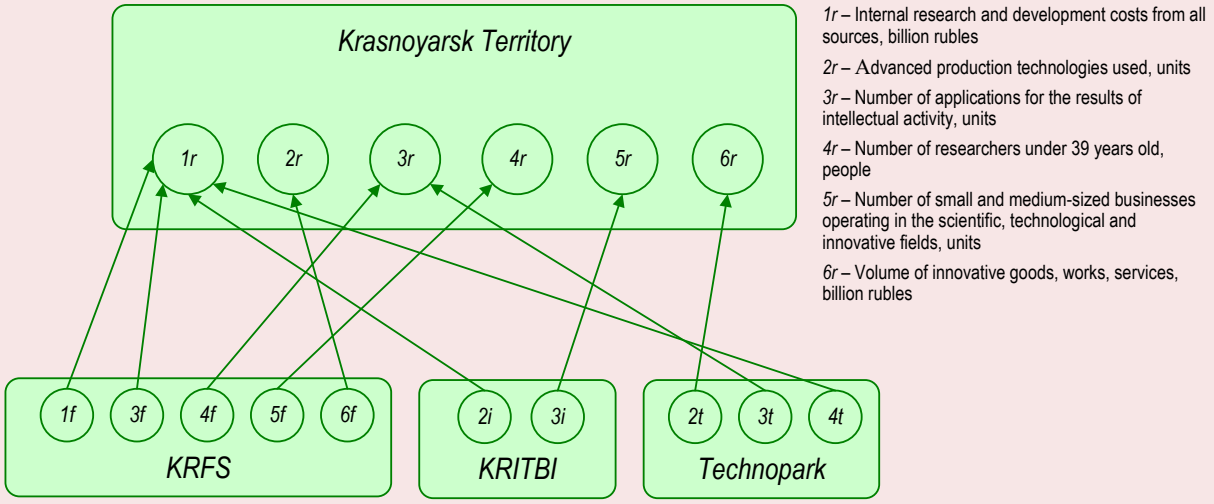
Table 5. Share of the technopark's contribution to the scientific, technological and innovative development of the region where the technopark operates

No.	Indicator	λ
1	Share of innovative goods, works, services shipped (provided), created in technoparks, %	0.4
2	Share of applications for the results of intellectual activity created by residents of technoparks, %	2.3
3	Share of internal research and development costs by residents of technoparks from all sources in the regions where technoparks operate, %	1.1
Source: own elaboration.		

Table 6. Potential values of technopark activity in the Krasnoyarsk Territory

Indicator code	Indicator	2020	2021	2022
1t	Funds from the regional budget for the provision of activities, billion rubles	0.16	0.25	0.30
2t	Volume of innovative goods, works, services, billion rubles	0.54	0.37	0.39
3t	Number of applications for the results of intellectual activity, units	12	11	12
4t	Internal research and development costs, billion rubles	0.29	0.33	0.40
Source: own elaboration.				

System of interrelation of performance indicators of regional innovative development institutions and upper-level indicators of scientific, technological and innovative development of the constituent entity of the Russian Federation



1r – Internal research and development costs from all sources, billion rubles

2r – Advanced production technologies used, units

3r – Number of applications for the results of intellectual activity, units

4r – Number of researchers under 39 years old, people

5r – Number of small and medium-sized businesses operating in the scientific, technological and innovative fields, units

6r – Volume of innovative goods, works, services, billion rubles

1f – R&D funding from the regional budget, billion rubles

3f – Amount of funds raised via co-financing, billion rubles

4f –Number of applications for the results of intellectual activity, units

5f – Number of researchers under 39 years old, people

6f – Number of research and technological developments, units

2i – Amount of funds raised via co-financing, billion rubles

3i – Number of innovative small and medium-sized businesses created, units

2t – Volume of innovative goods, works, services, billion rubles

3t – Number of applications for the results of intellectual activity, units

4t – Internal research and development costs, billion rubles

Source: own compilation.

The technopark's activity is characterized by financial indicators and indicators reflecting the performance of scientific, technological and innovative activities. The data obtained will be used to calculate the forecast values of the technopark as part of the regional system of innovative development institutions.

Each indicator characterizing the activities of regional innovative development institutions is associated with upper-level indicators characterizing the region's overall scientific, technological and innovative development. Based on these connections, a model used in the neural network was compiled *(Figure)*.

The presented relationships of the indicators are determined by the logic of regional innovative development institutions' activities, as well as regional normative legal acts that contain performance indicators for each institution.

After determining the interrelationships between the system of indicators for the scientific, technological and innovative sphere of the RF constituent entity and regional innovative development institutions, we proceed to the forecasting process based on a neural network. Let us describe the operation of the neural network with the following function:

$$sign\,(w_0 + w_1x_1 + w_2x_2 + \cdots + w_dx_d). \quad (3)$$

To forecast time series, a model is needed that will not perceive inputs as independent variables. The recurrent neural network takes into account not only the current value of the series, but also the previous ones. In the presented model, the output of a neural network depends on the three previous input values. That is, the implemented model works with its three previous calculations:

$$\begin{gathered} y_i = f(x_{i-3}, x_{i-2}, x_{i-1}, s_2) = \\ = f\big(x_{i-3}, x_{i-2}, x_{i-1}, h(x_{i-4}, x_{i-3}, x_{i-2}, s_1)\big) = \\ = f\Big(x_{i-3}, x_{i-2}, x_{i-1}, h\big(x_{i-4}, x_{i-3}, x_{i-2}, \\ h(x_{i-5}, x_{i-4}, x_{i-3}, s_0)\big)\Big), \end{gathered} \quad (4)$$

where s_0 – initial state of the network (hidden state of the neural network, which depends on its states at the previous calculation steps and the current input, in this case, the zero vector);

f – function containing network parameters (number of layers, number of neurons on each layer, etc.);

h – activation function;

$X = (x_1, x_2, \dots, x_d)$ – input data of the neural network. Within the framework of this study, multidimensional time series were applied to the input of the neural network.

Neural network models were trained using gradient methods (Adam, AdamW, RMSProp).

Before building neural network models, input data was preprocessed in two stages.

The first stage, data augmentation, was carried out by the method of local polynomial interpolation (formula 5):

$$F(X) = a_0 + a_1 \times x + a_2 \times x^2 + \cdots + a_m \times x^m, \quad (5)$$

where $X = (x_1, x_2, \dots, x_m)$ – ordinal number of the indicators of innovative development institutions, on the basis of which the polynomial is constructed.

Based on the constructed interpolation polynomial, data augmentation is performed by changing the intensity of augmentation:

$$F(X) = a_0 + a_1 \times x + a_2 \times x^2. \quad (6)$$

After the augmentation stage, an expanded data set was obtained, on the basis of which a neural network model will be built.

The second stage is data scaling. Scaling is performed according to the formula:

$$x_{new} = \frac{(x_i - x_{min})}{(x_{max} - x_{min})}, \quad (7)$$

where x_i – i-th value in the dataset;

x_{max} – maximum value in the dataset;

x_{min} – minimum value in the dataset.

As a result of the scaling, we get a data set that lies in the range from 0 to 1.

In the course of the research, a comprehensive model based on neural networks was developed to predict each indicator of scientific, technological and innovative development for a constituent entity of the Russian Federation and the system of regional innovative development institutions. Data on the number of layers, number of neurons and types of activation function are presented in *Table 7*.

The model was built using the following algorithm: 1. Dividing historical data into a training sample and a test sample in the ratio of 79:21; the training sample for the Krasnoyarsk Territory[10] used the values of Rosstat indicators since 2009; the values of indicators since 2009 were also used for the KRFS[11]; and for the indicators we used the number of researchers under 39 years old and the number of scientific and technological developments – from 2016 and 2017 respectively;

[10] Official Internet portal of Rosstat. Available at: https://24.rosstat.gov.ru/folder/27085 (accessed: February 24, 2024).

[11] Official Internet portal of the Krasnoyarsk Regional Fund for Support of Scientific and Scientific-Technical Activities. Available at: https://clck.ru/3BBNHR (accessed: February 24, 2024).

Table 7. Main characteristics of the recurrent neural networks we have developed

Indicator code	Number of hidden layers	Number of neurons in each layer	Activation function
Krasnoyarsk Territory			
1r	3	[9,6,5]	sigmoid
2r	5	[6,12,5,6,3]	hyperbolic tangent
3r	6	[12,10,8,6,8,8]	sigmoid
4r	4	[11,9,6,4]	
5r	2	[8,4]	
6r	3	[9,4,5]	
KRFS			
1f	5	[6,7,5,2,2]	sigmoid
2f	5	[8,9,7,3,2]	
3f	3	[10,8,5]	
4f	7	[8,6,5,9,5,4,3]	
5f	6	[5,6,8,7,3,2]	
6f	4	[4,3,5,5]	
KRITBI			
1i	6	[8,9,6,5,6,4]	hyperbolic tangent
2i	8	[8,5,6,6,6,7,8,9]	
3i	3	[3,3,4]	sigmoid
Technopark			
1t	5	[8,6,5,3,3]	sigmoid
2t	5	[10,7,5,6,2]	
3t	3	[8,5,3]	
4t	4	[6,5,5,2]	

Source: own elaboration.

for KRITBI[12] and Technopark[13] – the augmented values of indicators from 2020 to 2022; for the test sample we used the values of indicators for all agents in 2020–2022.

2. Architecture selection and adjustment of the weight coefficients of neural network models on the training dataset using gradient methods (Adam, AdamW, RMSProp). That is, the training proceeds as follows: a neural network model is launched on a set of test data, with single weight coefficients; then the value of the loss function is calculated and, using gradient methods, the direction in which it will be less is determined; that is, the lower the value of the target function, the more accurate the forecast.

3. Making a forecast and checking the accuracy of the model on a test dataset.

At the forecasting stage, the tenth forecast value of KRITBI models was used to compare all indicators by year, since the intensity of augmentation is 10.

The mean absolute percentage error (MAPE) was used as a metric to determine the accuracy of the forecast of the neural network model, since it is one of the most common metrics used in calculating the percentage of forecasting error.

$$MAPE = \frac{1}{N}\sum_{t=1}^{n}\left|\frac{A_t - F_t}{A_t}\right|, \quad (8)$$

where:

n – size of the training sample;

A_t – actual value;

F_t – forecast value.

[12] Official Internet portal of Krasnoyarsk Regional Innovative and Technological Business Incubator. Available at: https://kritbi.ru/doc (accessed: February 24, 2024).

[13] Official Internet portal of the Association of Clusters, Technoparks and SEZ of Russia. Available at: https://akitrf.ru/ (accessed: February 24, 2024).

Table 8. Forecast for the scientific, technological and innovative development indicators of the Krasnoyarsk Territory and regional innovative development institutions

Indicator code	Forecast							
	2023	2024	2025	2026	2027	2028	2029	2030
Krasnoyarsk Territory								
1r	43.61	51.37	55.05	65.88	69.90	76.42	80.37	84.41
2r	4538	4751	4838	5263	5324	5581	5602	5641
3r	532	575	581	613	616	658	682	699
4r	2208	2224	2229	2401	2428	2498	2536	2561
5r	218	221	221	223	223	224	224	224
6r	102.24	112.11	114.76	126.84	130.88	138.48	140.09	141.69
KRFS								
1f	0.25	0.18	0.22	0.27	0.29	0.36	0.37	0.41
2f	0.02	0.02	0.02	0.03	0.04	0.04	0.05	0.07
3f	0.17	0.18	0.19	0.20	0.23	0.28	0.29	0.30
4f	38	39	39	40	41	43	43	43
5f	621	579	602	625	626	633	639	645
6f	16	16	16	17	17	17	18	19
KRITBI								
1i	0.09	0.12	0.13	0.14	0.15	0.18	0.18	0.19
2i	0.33	0.26	0.27	0.34	0.37	0.40	0.42	0.42
3i	17	17	17	18	18	19	19	19
Technopark								
1t	0.38	0.39	0.40	0.41	0.42	0.46	0.48	0.50
2t	0.43	0.45	0.52	0.54	0.59	0.63	0.64	0.68
3t	12	12	12	13	13	14	14	14
4t	0.46	0.52	0.58	0.73	0.76	0.78	0.85	0.85

Source: own elaboration.

The average forecasting accuracy of the obtained neural network model based on test historical data is 91.53%. For comparison, a forecast was made using other methods, the average accuracy on similar data for the linear regression method was 79.94%, the moving average was 76.87%, and the Holt – Winters method was 81.14%, which indicates the advantage of the applied method in terms of accuracy. In addition, a significant advantage of this method is the ability to take into account the relationships between a large number of indicators that affect the forecast.

As a result, a model of scientific, technological and innovative development for a constituent entity of the Russian Federation with a system of regional innovative development institutions, consisting of several agents, is implemented in the form of a software system – a recurrent neural network, with the help of which a forecast is made.

Empirical analysis of forecasting results for the scientific, technological and innovative development of the Krasnoyarsk Territory

The conducted research made it possible to make a forecast of the dynamics of indicators characterizing the scientific, technological and innovative sphere of the Krasnoyarsk Territory, as well as the performance of regional innovative development institutions and to predict the effects of creating a technopark on the territory of a model constituent entity of the Russian Federation. Table 8 shows the result of the work of the implemented system; the indicator number corresponds to the numbers in the description of the agents.

The cumulative dynamics of all indicators used in the study characterizing the scientific and technological development of the Krasnoyarsk Territory and the activities of regional innovative development institutions, including the modeled performance indicators of the technopark, have a positive trend and reflect high dynamics of scientific, technological and innovative development indicators for the Krasnoyarsk Territory in the perspective until 2030.

The base period used to make the forecast (2020–2022) takes into account two years with crisis trends for the country's economy: 2020 – the beginning of the COVID-19 pandemic and 2022 – the beginning of sanctions pressure on the economy of the Russian Federation by unfriendly countries. It is worth noting that in 2020, one of the key indicators characterizing the scientific, technological and innovative development of territories – internal research and development costs from all sources – decreased by only 1.85% in comparison with 2019 in the Krasnoyarsk Territory, while in 2022 it increased by 23.5 compared to 2021%, and in comparison with the pre-crisis year 2019 – by 34.7%. This indicates a minor impact of crisis phenomena on the area under consideration.

Let us look at the results of the forecast regarding the performance indicators of the scientific, technological and innovative sphere in the Krasnoyarsk Territory. The number of applications for the results of intellectual activity in 2030 will grow by 37.6% compared to 2022; regional innovative development institutions will provide 12.3% of this indicator. The number of advanced manufacturing technologies used will increase by 27.6%, but the share of regional innovative development institutions in the value of this indicator will remain insignificant. The volume of innovative goods, works and services will grow by 44.6%, while the activity of the technopark projected on the territory of the model region will provide 1.88% of the volume of the indicator. The growth rate of performance indicators of the scientific, technological and innovative sphere is significantly lower than the growth rate of the indicator of financial support for the sphere under consideration, which indirectly indicates high inflation rates during the forecast period, as well as wage growth in the scientific, technological and innovative sphere. The increase in wages is consistent with the Address of the President of the Russian Federation to the Federal Assembly, which indicates the need to convert the country's GDP growth into an increase in household incomes.

The trends identified on the basis of the forecast prove that the crisis phenomena did not affect the scientific, technological and innovative sphere of the region in a special way; moreover, they created prerequisites for its development, consisting in the need to solve problems and overcome challenges faced by Russian society, including with the help of scientific, technological and innovative spheres. Such a high dynamics of indicators reflected in the forecast does not look fantastic for the Krasnoyarsk Territory. The growth of domestic research and development costs during the forecast period is supported by the current growth of investments in the region's economy. According to this parameter, by the end of 2023, the region ranks 7th in the Russian Federation and 1st in the Siberian Federal District, while the largest increase in investment activity of organizations in 2023 was recorded in the scientific, technological and innovative sphere[14]. Thus, the growth of internal research and development costs will also ensure the growth of performance indicators in the field, such as the results of intellectual activity, innovative goods, works, services and advanced production technologies, which in turn will have a positive impact on the region's socio-economic development.

[14] The growth of investments in the Krasnoyarsk Territory by the end of 2023 amounted to 23%. Yenisey Siberia Development Corporation. Available at: https://clck.ru/39h6k7 (accessed: March 27, 2024).

The growth in the number of researchers up to 39 years old, presented in the forecast, also looks quite achievable. The main part of scientific, research and innovative organizations is concentrated in the capital of the region, Krasnoyarsk, which, unlike the entire region, which has a negative population dynamics that decreased by 0.9% in the period from 2018 to 2022, is characterized by its positive growth. During the same period, the population of Krasnoyarsk increased by 9.2%, which provides a high potential for growth in the number of researchers under the age of 39.

Conclusion

Within the framework of the study, we proposed and tested a methodological approach to forecasting indicators of scientific, technological and innovative development of the region and the activities of regional innovative development institutions based on recurrent neural networks, which are an element of artificial intelligence. Its integration into various public spheres helps to make optimal decisions for the management of companies and industries in general, which makes it possible to use the proposed methodological approach to generate forecasts of indicators of regional scientific, technological and innovative development within the framework of the development of strategic and program documents at the regional level in the field under consideration, including regional state programs for scientific and technological development that are currently being designed in the regions as was instructed by the President of the Russian Federation.

Having tested the proposed methodological approach, we revealed its advantage over such forecasting methods as linear regression method, moving average model or the Holt – Winters method in terms of the accuracy of forecast values and the ability to take into account the relationship between a large number of indicators, which in turn increases the accuracy of the forecast.

The forecast values obtained during the research look realistic due to their consistency with the targets set by strategic and program documents for the scientific, technological and innovative sphere, as well as compliance with the currently implemented policy aimed at import substitution. In addition, the scientific, technological and innovative sphere has shown low dependence on the crisis phenomena of the beginning of the current decade, which indirectly confirms its resistance to possible crisis phenomena of the future.

The positive dynamics of scientific, technological and innovative development indicators reflects the tendency toward increasing the level of technological effectiveness of the Krasnoyarsk Territory's economy, expressed in an increase in R&D costs and an increase in human capital characterized by a growth in the number of researchers up to 39 years old, as opposed to a decrease in the total population of this age group due to the low birth rate in the Krasnoyarsk Territory in 1991–2007. The indicated growth will be carried out by increasing the attractiveness of the scientific, technological and innovative sphere for the younger generation in comparison with the traditional areas of employment for the region, as well as attracting residents of neighboring constituent entities of the Russian Federation to the region. Positive trends in science, technology and innovation reflect the overall positive socio-economic development in the region, which will confirm the status of one of the leading economic centers of Siberia and the Far East.

The activities of regional innovative development institutions have a positive effect on the growth of indicators of the scientific, technological and innovative spheres, while their relative contribution to the development of the sphere remains at a level comparable to the base period, which proves the stability and relative independence of the scientific, technological and innovative sphere of the region.

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On the Impact of Exports on the Number of Employed Population and on the Professional Structure of Employment in Russia: An Input – Output Approach

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Abstract. The transformation of export activity, which is a "pillar" of the Russian economy and some of its regions, taking place amid geopolitical instability, determines the importance of assessing the consequences of this process for employment, as well as searching for the most promising types of economic activity that could become locomotives of development in the new economic conditions. In this regard, the aim of our study is to assess the impact of export activities on the number and professional structure of employment, as well as to identify promising areas for changing the structure of Russian exports. The multi-country input – output tables of the international database "The World Input – Output Database" served as the basis for modeling; the information base also included data from Rosstat and the Federal Customs Service. The study is of particular relevance, since the most technologically developed territories and industries facing the risks of deterioration of the investment climate and quality of life. Based on an input – output approach, which, along with an assessment of the economic effect on employment from export activities, constitutes the novelty of the study, we identify promising industries for job creation in the context of professions; we also highlight industries with a high multiplier of production costs as promising areas of development. It is noted that the export of minerals, in comparison with other types of activities, has less impact on employment. We point out the branches of the Russian economy, the output of which brings a greater economic effect in comparison with export activities. It is concluded

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that increasing exports of products from these economic sectors, combined with the development of new types of production within the country, will significantly enhance the impact of export activities on the number of employees and on the professional structure of employment. The results can be useful to a wide range of researchers in the field of economics of industries and territories, as well as to federal and regional authorities in the development and revision of various strategic and sectoral documents.

Key words: value chains, fragmentation of production, employment, exports, input – output tables.

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Introduction

Exports have played an important role in the structural transformation of the Russian economy over the previous decades. Export activity has rapidly expanded, stimulated by supportive government policies, allowing Russia to capitalize on the international fragmentation of production in time to become a member of globally integrated production networks. At the same time, the structure of Russian exports is dominated by raw materials and semi-finished products, while final products (primarily machine building) are still largely purchased abroad. This model of participation in global value chains carries a number of problems, among which the most painful are the increased specialization in the production of primary and medium-sized products and the weak ability of raw materials export industries to transform profits into household incomes.

The risks associated with the high importance of export activities for the Russian economy development have always been a topic of active discussions. Following the intensification of sanctions restrictions in 2022, the situation of Russian exporters has been complicated by the need to restructure supply chains and often seek new markets to preserve accumulated technologies and production capacities, while calls to stimulate domestic consumption and change the nature of servicing external demand have intensified.

The share of unfriendly economies in exports from Russia has fallen to 35% by the end of 2022 according to the Ministry of Economy, while at the beginning of the year it was 58%. Consequently, the share of neutral and friendly countries increased from 42% to 65%. By the end of 2023, the share of friendly countries in Russia's foreign trade reached 75%[1]. The structure of exports and imports has not undergone significant changes. In general, imports decreased at the expense of European countries, the weighted drop of which amounted to about 16%[2].

An outstanding example of successful adaptation to new economic conditions is Russian timber producers, who were able to promptly replace European markets with Asian countries. The share of Asian countries in purchases of domestic sawn timber increased by 11 p.p. and amounted to 98%. For comparison: the share of Asian countries in the export structure amounted to 76% in 2021. There will be no European

[1] Vladimir Ilyichev: By the end of 2023, the share of friendly countries in Russia's foreign trade will be more than 75%. Available at: https://www.economy.gov.ru/material/news/vladimir_ilichev_po_itogam_2023_goda_dolya_druzhestvennyh_stran_vo_vneshney_torgovle_rossii_sostavlyaet_bolee_75.html (accessed: May 30, 2024).

[2] Russia redirected almost a quarter of its exports to friendly countries. Available at: https://www.rbc.ru/economics/10/02/2023/63e2411a9a794730042580a5 (accessed: May 29, 2024).

countries left in the top 10 importing countries of Russian sawn timber in 2023[3].

It is obvious that the nature of the structural shifts taking place will be determined by the speed and quality of adaptation of exporting enterprises to the new realities (including reorientation to the domestic market of the country), while the changes will inevitably affect employment and living standards. The consequence may be new sectoral, regional, professional, qualification, educational and other structural mismatches in the labor market, which will increase the risks of loss of labor productivity growth rates, decrease in the volume of potential GDP, difficulties in finding jobs and personnel, etc. The scale of these changes cannot be assessed without analyzing the indirect effects caused by inter-sectoral links in the economy. A particularly interesting issue is the assessment of the nature and significance of export activities for the Russian economy, since understanding the contribution of this factor will simplify the definition of economic policy measures that will have a corrective impact on the adaptation of the most affected industries and territories.

In connection with the above, the aim of the research is to assess the relationship between Russian exports and employment, as well as to identify promising areas of transformation of the number and professional structure of employment through the development of export activities. It is clear that any assessment of potential changes is approximate, since the picture of the Russian economy is only partially formed, but the analysis of various scenarios allows us to formulate some assumptions regarding the short-term dynamics of changes in labor demand.

Literature review

Studying the impact of various employment factors is an important issue for economists. The reasons for this phenomenon are objective: in addition to the issues of balancing supply and demand in the Russian labor market, the importance of determining and forecasting ways to accelerate the adaptation of the country's economy to foreign trade restrictions has significantly increased. The works of V.E. Gimpelson and R.I. Kapeliushnikov occupy an important place among the studies of trends and factors concerning the national labor market development. In particular, we note a recently published article that analyzes the shifts in the structure of jobs in the Russian economy in the period 2000–2019 and concludes that there has been an "evolution in the scenario of improvement" (Gimpelson, Kapeliushnikov, 2023). By improvement the authors mean a reduction in the share of "bad" (routine and pending reduction) jobs with the growth of "good" (highly skilled and highly paid) jobs. The key condition for improving the quality of fixed capital and providing the economy with labor resources is acceleration of scientific and technological development.

A foreign paper (Ping, 2023) presents a similar conclusion, which, based on econometric models, highlights issues related to the impact of the nature of participation in global value chains on employment using China as an example in 2005–2014. According to the research results, the shift in the commodity composition of exports from semi-finished to finished goods contributed to the decline in manufacturing employment during the study period, which supports the "mixed blessing hypothesis" of participation in the global production system. It is worth noting that China faces the need to provide jobs for a significant number of young graduates and the unemployed, and therefore the path of accelerated modernization of the industrial complex carries certain social risks for it, while for Russia it seems to be optimal, as it can become an effective lever in solving the issue of personnel shortage.

[3] Russia has found an alternative to selling sawn timber to Europe. Available at: https://www.rbc.ru/business/02/02/2024/65b8fc719a79470f2a20dbfd (accessed: May 29, 2024).

We should add that export activity is an important source of funds required for industrial modernization, and the efficiency of this process is largely determined by the country's position in global value chains. In this regard, the importance of determining the directions for increasing the beneficial effect of export activities on certain parameters of the economy is growing. A significant place in solving this issue is given to inter-sectoral modeling tools, which allow assessing the indirect effects of the proposed changes in the economy. As an example, we can cite the work (Johnson, Noguera, 2012), the authors of which concluded that if the value added in manufacturing exports is high, its volume can be significantly increased in the services sector in the course of further production process. The size of this economic effect will depend on the strength of in-country inter-industry linkages. Researchers have also found that exports of goods that require domestic materials for production, such as textiles, had a much higher multiplier effect than exports of goods produced solely on the basis of imported components, such as electronics assembly plants (Chen et al., 2004; Koopman et al., 2012; Pei et al., 2012). Such works can include those that assess the effect of stimulating various sectors of the economy (Leonidova, Rumyantsev, 2023). There are also studies devoted to this issue at the microeconomic level (Upward et al., 2013).

Russian studies also cover the issues of assessing the impact of the inter-industry structure of jobs in the economy on certain employment indicators. In particular, the author of the article (Yedinak, 2021) notes the ability of industries of the real sector to create more employment in related sectors of the economy, while the services sector is characterized by the largest direct increase in the wage fund with a low multiplier effect. Another paper (Yedinak, 2020), based on the matrix of total labor costs, gives a decomposition of labor costs into direct and indirect ones, and it is found that mining has the highest indirect effect of creating employment in other sectors of the Russian economy among other economic sectors. The reason for this phenomenon is the low labor intensity of production of the extractive industry.

At the same time, attempts to link the expected changes in the structure of exports with the projected shifts in the occupational structure of employment are quite rare. As an example, we can cite the work of (Los et al., 2015), where the international input–output tables are used to identify the industries, the increase in exports of which will provide the Chinese economy with high-skilled employment. It is also worth noting the attempts of researchers to identify the relationship between sectoral and professional-qualification structures of employment[4] (Luk'yanova, Kapeliushnikov, 2019). In particular, the paper (Kuznetsov, 2023) presents a set of econometric models linking changes in the occupational and qualification structure of employment by types of economic activity in the period from 2002 to 2021, and analyzes the impact of factors on the dynamics of individual employment groups.

An attempt to measure the impact of exports on the size and occupational structure of employment was made using China as an example in a study (Feenstra, Hong, 2010) using input–output tables to account for both direct and indirect effects. The authors found that between 1997 and 2002, the effect of export growth on employment was much smaller than the effect of increased domestic demand. This difference was also found in a study (Chen et al., 2012) for 2002 and 2007.

Various forecasting methods are used in the practice of assessing the occupational and qualification composition of the employed for the future. In particular, direct methods that study

[4] Vishnevskaya N.T. (Ed.). (2017). *Professions in the Russian Labor Market: Analytical Report of the National Research University Higher School of Economics.* Moscow: Izd. dom Vysshei shkoly ekonomiki.

the dynamics of employment in professional-qualification groups with the dynamics of any macroeconomic parameters on the basis of correlation and regression relationship between them are popular. For example, methodological approaches that study the correlation of the growth rate of employment of a particular occupational and qualification group with the GDP growth rate or the dynamics of production of the type of economic activity in which the employees of a particular occupational and qualification group are most in demand (Bakumenko, Sarycheva, 2011; Sarycheva, 2012; Schmidt, 2013).

Summarizing the above, we note that the issues of assessing the direct and indirect impact of export activities on the number and professional structure of employment in Russia are hardly represented in scientific research. At the same time, the inter-industry modeling toolkit is of high importance for the fulfillment of this task due to the possibility to estimate indirect effects.

Materials and methods

Turning to the description of the applied methodological tools, we note that the foundations of the approach to modeling inter-sectoral interrelationships in the economy are laid in the works (Leontief, 1936; Leontief, 1941). Labor, capital and intermediate inputs are required to produce outputs, while intermediate products should be produced by ourselves, again involving factors concerning production and intermediate products, etc., until all intermediate products are taken into account. Leontief presented a mathematical model that tracks factor inputs required at all stages of production of a particular final good, which allows measuring the contribution of external demand relative to domestic demand in generating value added in the countries of origin of the product[5]. The approach we apply is based on a standard methodology for modeling input–output parameters with respect to multi-territory conditions (Johnson, Noguera, 2012),

Figure 1. Schematic of cross-country input–output tables

		Intermediate consumption		Final use		Total
		Russia	Rest of the world (RW)			
		Industry	Industry	Russia	RW	
Russia	Industry	Intermediate consumption in Russia of products manufactured in Russia	Intermediate consumption in the RW of products manufactured in Russia	Final use in Russia of products manufactured in Russia	Final use in the RW of products manufactured in Russia	Output in Russia
Rest of the world	Industry	Intermediate consumption in Russia of products manufactured in the RW	Intermediate consumption in the RW of products manufactured outside Russia	Final use in Russia of products manufactured in the RW	Final use in the RW of products manufactured outside Russia	Output in the RW
		Value added				
		Output in Russia	Output in the RW			

According to: An Illustrated User Guide to the World Input–Output Database: The Case of Global Automotive Production. Available at: https://onlinelibrary.wiley.com/doi/10.1111/roie.12178

[5] See (Miller, Blair, 2009) for initial introduction to the theory of intersectoral analysis. This approach was also followed (Bems et al., 2011) in modeling the effects from the 2008 drop in global demand.

[6] Input-Output tables of the WIOD 2016 release. Available at: https://www.rug.nl/ggdc/valuechain/wiod/wiod-2016-release (дата обращения 20.02.2024).

then supplemented with information on labor inputs required for production as well as labor compensation.

The data source on the structure of the economy and exports of the Russian Federation was the cross-country input–output tables for 2014 (the most recently published) for 41 countries and regions covering the world economy, also called the world input–output tables (WIOT[6]; *Fig. 1*). Details of these tables can be found in the documentation cited in (Timmer, 2012; Dietzenbacher et al., 2013). WIOT were constructed by linking national input–output tables based on national accounts series, and between countries using detailed bilateral trade statistics.

Further, we grouped the original WIOT tables into 25 industries based on data availability and compliance with OKVED 2 industries to build the model *(Tab. 1)*. We should add that the resulting matrix of direct costs of domestic products served as the basis for the calculations, while imports were put into a separate matrix of import product utilization.

The model is based on the fundamental input–output identity (Leontief, 1936):

$$x = Ax + y, \quad (1)$$

where x – total output vector;
A – matrix of direct input ratios;
y – final product vector.

The equation used in the modeling is:

$$(I - A)^{-1} \cdot y = x, \quad (2)$$

where I – unit matrix; $(I - A)^{-1}$ – full input factor matrix.

It reflects the values of gross output x at all stages of production, which are generated in the process of producing one unit of final product y. Based on the obtained matrix dependence, it is possible to calculate what should be the volume of sales x in the economic branches, if the change in final demand y is planned.

The use of input–output tools helps to determine the effect that will be obtained by the economy when the demand for its products changes. Let us assume that as a result of additional export supplies of Russian products, the output of corresponding goods and services will also increase (this may happen during the implementation of investment projects in infrastructure, industry, growth of household incomes, etc.). The creation of additional demand for the products of certain industries will lead to an increase in the main economic indicators for all economic activity types.

We should add that the specification would require exogenously specified final use, the nature of which will determine induced employment growth[7] without explicitly modeling the price-volume interactions that are central to full-fledged general equilibrium models (see, for example, Levchenko, Zhang, 2012). While such models are richer in modeling behavioral interactions, there is an additional need to econometrically estimate various key parameters of the production and demand functions. Since intermediate inputs can be sourced both domestically and abroad, a central feature of global production systems, the number of required parameters to be estimated can be very large. Instead, we rely on a model in which resource and employment costs are known and we assume that their proportions are stable for actual output utilization.

Turning to the specifics of the model used further in the calculations, let us determine that the output can be used to meet the demand within the country or abroad. In the modeling results,

[6] Input–output tables of the WIOD 2016 release. Available at: https://www.rug.nl/ggdc/valuechain/wiod/wiod-2016-release (accessed: February 20, 2024).

[7] Unlike direct employment growth, which implies a change in the number of employed in each industry, induced (full) employment growth also includes the value of indirect employment growth due to inter-industry interactions.

Table 1. Grouping of industries in WIOT tables according to types of economic activities OKVED 2

Economic activities types in WIOT tables	Economic activity types according to OKVED 2 classifier
Crop and animal production, hunting and related service activities; Forestry and logging; Fishing and aquaculture	Agriculture, hunting and forestry, fishing, fish farming
Mining and quarrying	Mining
Manufacture of food products, beverages and tobacco products	Food industry
Manufacture of textiles, wearing apparel and leather products	Light industry
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	Woodworking
Manufacture of paper and paper products; Printing and reproduction of recorded media; Publishing activities	Pulp and paper industry; publishing and printing activities
Manufacture of coke and refined petroleum products	Production of coke and petroleum products
Manufacture of chemicals and chemical products; Manufacture of basic pharmaceutical products and pharmaceutical preparations	Chemical and pharmaceutical industry
Manufacture of rubber and plastic products	Rubber and plastics production
Manufacture of other non-metallic mineral products	Other non-metallic mineral products
Manufacture of basic metals; Manufacture of fabricated metal products, except machinery and equipment	Metallurgical production
Manufacture of computer, electronic and optical products; Manufacture of electrical equipment; Manufacture of machinery and equipment n.e.c.; Manufacture of motor vehicles, trailers and semi-trailers; Manufacture of other transport equipment; Repair and installation of machinery and equipment	Machine building
Manufacture of furniture; other manufacturing	Manufacture of furniture and other production
Electricity, gas, steam and air conditioning supply; Water collection, treatment and supply; Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services	Production and distribution of electricity, gas and water; water supply; water disposal, organization of waste collection and utilization, pollution elimination activities
Construction	Construction
Wholesale and retail trade and repair of motor vehicles and motorcycles; Wholesale trade, except of motor vehicles and motorcycles; Retail trade, except of motor vehicles and motorcycles; Land transport and transport via pipelines; Water transport; Air transport; Warehousing and support activities for transportation, Postal and courier activities;	Trade and transport
Accommodation and food service activities	Hotel and catering activities
Motion picture, video and television program production, sound recording and music publishing activities; programming and broadcasting activities; Telecommunications; Computer programming, consultancy and related activities; information service activities	Information and communication activities
Financial service activities, except insurance and pension funding; Insurance, reinsurance and pension funding, except compulsory social security; Activities auxiliary to financial services and insurance activities	Financial activities
Real estate activities	Real estate operations, renting and provision of services
Legal and accounting activities; activities of head offices; management consultancy activities; Scientific research and development; Architectural and engineering activities; technical testing and analysis; Advertising and market research; Other professional, scientific and technical activities; veterinary activities; Administrative and support service activities	Professional, scientific and technical activities
Public administration and defense; compulsory social security	Public administration and military security; social security
Education	Education
Human health and social work activities	Health and social services
Other service activities	Other service activities

the industries-producers of these product flows are divided into the ***domestic demand sector*** and the ***external demand sector***. The latter differs from exports in that it includes the induced economic effect, taking into account the inter-sectoral interactions that occur in the production of exported products. The separation of domestic and external demand sectors implies that the industries included in them can be included in both sectors simultaneously, with the degree of participation of each industry in these sectors commensurate with the share of its output of supplies to national and foreign markets (in the original WIOT tables). Accordingly, the multiplier effect[8] from the production of exported goods is defined as the ratio of the aggregate output growth of all sectors to the sum of the output of the full volume of exported goods. Thus, the impact of export activity on employment is further understood as the induced economic effect from the production of output of the external demand sector, expressed in the formation of jobs and labor compensation fund.

In addition to these sectors, sectors such as "extractive industry", "manufacturing industry" and "machine building" were identified, for which no separation by destination market was made.

Let us also focus on labor specifics within the framework of this study. Rosstat defines the term "employed" as "persons aged 15 years and older who in the surveyed week performed any activity (at least one hour per week) related to the production of goods or provision of services for payment or profit. The number of employed persons also includes those who were temporarily absent from their workplace for a short period of time and maintained contact with the workplace during their absence"[9].

We used the indicator "Average annual number of employed persons in the economy"[10] as data on employment by sectors of the Russian economy. The data source on the occupational structure of employment was the "Microdata of sample labor force surveys" published by Rosstat (IBM SPSS Statistics software was used in the processing of primary survey data). Microdata on this indicator have been presented since 2010, which determined the period of the study.

Results

Impact of export activities on employment

The multiplier effect for the Russian economy from the output of export activities in the volume of 1 ruble amounted to 1.83 rubles, which is less than in the economy as a whole (1.94; *Fig. 2*). One ruble of domestic demand, in turn, generates 1.97 rubles of output. This difference is largely explained by the fact that mineral extraction, which supplies the key goods of Russian exports, has a relatively low value of the indicator (1.56, while the manufacturing industry has 2.15). Metallurgy has the highest multiplicative effect for the Russian economy – 2.26[11]. We should mention that the multiplier effect in one of the most important industries for the Russian economy – machine building – is 2.09, but it can be significantly increased if more stages of production of manufactured products are developed within the country.

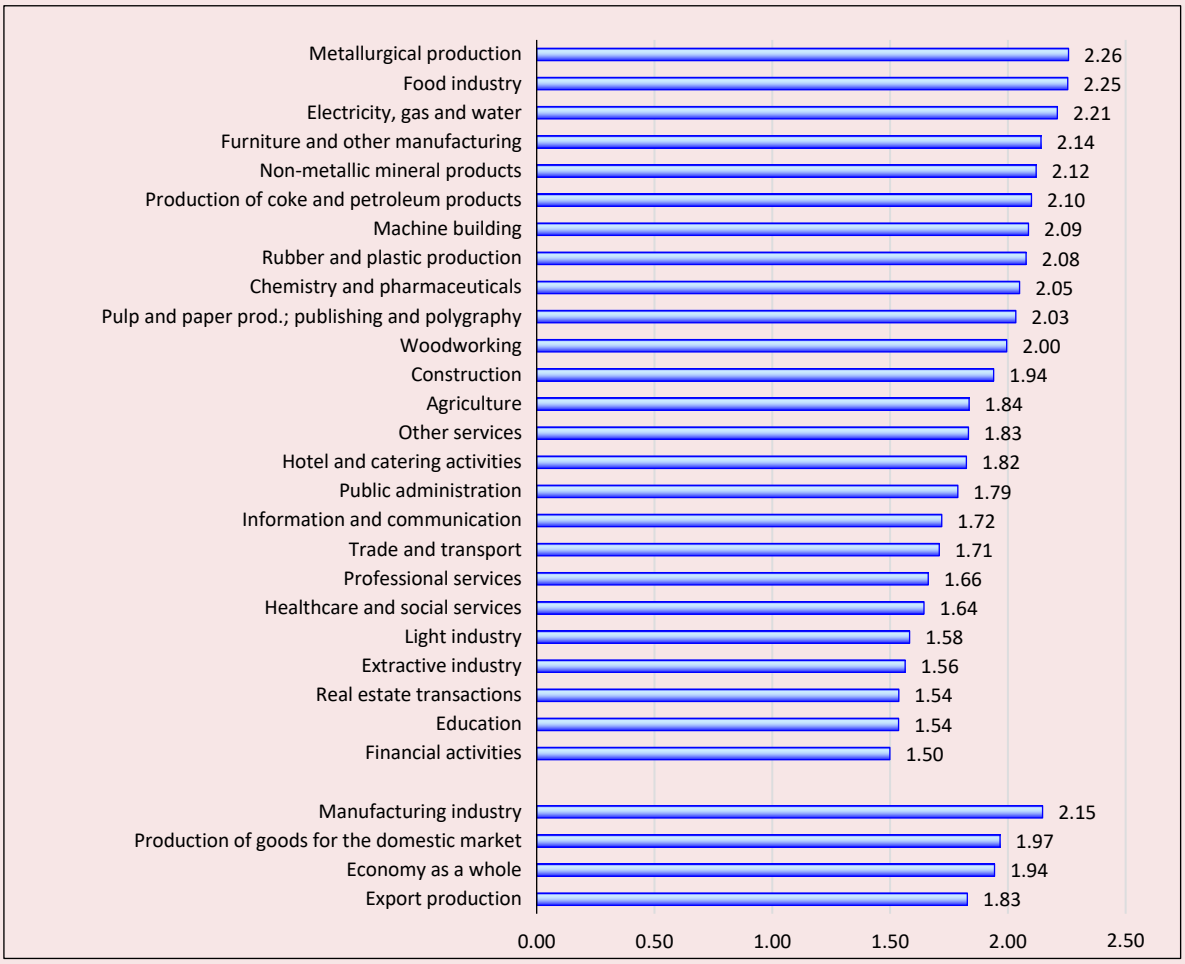
[8] The indicator, also called the total expenditure coefficient and the multiplier of production input, which reflects the increase in one of the macroeconomic indicators (gross output, GDP, budget revenues, etc.) due to the spread of the initial impulse – the increase in output in one of the sectors – through the system of intersectoral relations. In other words, the multiplier is a coefficient that shows how the magnitude of the effect and the initial increase in output that caused it relate to each other (Ksenofontov et al., 2018).

[9] Methodological explanations of Rosstat. Available at: https://rosstat.gov.ru/storage/mediabank/met_ors.docx (accessed: January 25, 2024).

[10] Available at: https://www.fedstat.ru/indicator/43211: https://www.fedstat.ru/indicator/58994 (accessed: January 29, 2024).

[11] One reason for this phenomenon is that the WIOT tables combine data on rolled metal and fabricated metal products production into a single industry, with the latter being the next production stage for the former and therefore having a higher multiplicative effect.

Figure 2. Multiplier effect for the Russian economy in different types of activities, 2014, rubles/rubles



Source: calculated based on WIOT data.

Thus, an increase in exports of manufacturing products will have a significantly greater multiplier effect than maintaining the current export structure. It is worth noting that restructuring of value chains in this direction will also make it possible to acquire added value, which the Russian economy is missing by importing final products.

According to calculations, taking into account inter-sectoral interactions, export activities create 10.6% [12] of employment in the Russian economy *(Tab. 2)*. To a slightly greater extent, the formation of the wage fund depends on export activities – 11.1% in the economy as a whole.

Approximately half of the contribution of export activities to the formation of employment and labor remuneration fund falls on such sectors as trade and transport, exports also have a significant impact on mining and professional, scientific and technical activities. At the same time, in percentage terms, manufacturing industries are most export-oriented.

[12] At this stage, we proceed from the unit elasticity of employment by output and assume that the structure of employment and labor compensation in the economy changes commensurately with changes in the structure of output. This simplification is conditional; further research is planned to clarify the relationship between the structure of output and employment.

Table 2. Contribution of export activities to the formation of employment and labor remuneration fund in the Russian economy in 2022

Activity type	Export contribution to output (taking into account inter-industry effect), %	Average annual number of employed in total, thousand people	Among them, contribution of exports to the number of employed, thousand people	Total wage fund, billion rubles	Among them, contribution of exports to the labor remuneration fund, billion rubles
Trade and transport	20.4	19,002	3,882	13,968	2,854
Professional, scientific and technical activities	9.7	4,883	472	4,684	453
Public administration and military security; social security	12	3,594	431	2,739	329
Production and distribution of electricity, gas and water	18.1	2,266	409	1,627	294
Metallurgical production	27.6	1,477	407	1,134	313
Mining	26.9	1,194	321	1,697	456
Other service activities	9.5	2,841	269	1,916	182
Agriculture, hunting and forestry, fishing, fish farming	5.2	4,466	232	2,507	130
Machine building	7.9	2,820	221	2,253	177
Chemical and pharmaceutical industry	24.7	546	135	510	126
Woodworking	21.7	610	133	296	64
Real estate operations, renting and provision of services	5.6	1,856	105	1,081	61
Construction	1.3	6,552	87	4,784	64
Pulp and paper industry; publishing and printing activities	25	310	78	234	59
Financial activities	5.5	1,303	71	2,293	126
Education	1	5,272	53	3,062	31
Information and communication activities	3.1	1,619	50	2,355	73
Rubber and plastic production	10.9	364	40	225	24
Manufacture of furniture and other production	7.2	524	38	266	19
Hotel and catering activities	1.9	1,862	36	839	16
Production of coke and petroleum products	22	160	35	188	41
Other non-metallic mineral products	5.1	544	27	353	18
Food industry	1.2	2,013	24	1,206	14
Light industry	2.5	636	16	246	6
Health and social services	0.1	4,443	5	2,955	3
Total	**10.6**	**71,157**	**7,577**	**53,418**	**5,932**

Source: Rosstat and WIOT data.

We should say that the average wage for the employment created by exports is 4.3% higher than for the rest of the country's employed. This is due to relatively high qualification requirements for the employment created, in addition to higher labor productivity due to the technological sophistication of the extractive industry.

Impact of exports on employment by occupation

Export activities directly and indirectly create the need for a wide range of professions in all sectors of the Russian economy. The largest group of the employed [13] according to the employment created by export activities are specialists of the highest level of qualification and workers in the service sector, housing and utilities, trade and related activities. There is also a significant number of middle-skilled specialists and operators, apparatus operators, plant and machine operators (in aggregate, the above four groups of professions account for 5.1 million of the 7.6 million jobs created by export activities in 2022; *Tab. 3*).

The distribution of created employment according to the professional structure has undergone significant changes in 2010–2022. For instance, export activities began creating more employment, at the same time reducing the number of attracted managers and unskilled workers (by 38.6% and 19.5% respectively) with a significant increase in the share of specialists of the highest level of qualification (by 49.9%). In addition, the number of agricultural workers attracted by export activities also decreased (by 37.7%) in 2022, compared to 2010. At the same time, the number of employees engaged in the preparation of information, documentation, accounting and maintenance, as well as workers in the service sector, housing and public utilities, trade and related activities increased (by 24.4% and 21.2%, respectively).

Table 3. Contribution of export activities to the formation of employment in the Russian economy depending on the occupational structure in 2010 and 2022*

Activity type	Year	Aggregated groups of occupations for the employed population in their main job									Total, thousand people
		1	2	3	4	5	6	7	8	9	
Total	2010	565	1234	1083	208	1,032	313	960	933	864	7,190
	2022	347	1849	1007	258	1,250	223	933	1015	695	7,577
	2022/2010, %	*61.4*	*149.8*	*93.0*	*124.0*	*121.1*	*71.2*	*97.2*	*108.8*	*80.4*	*105.4*
Agriculture, hunting and forestry	2010	18	15	16	3	4	144	15	63	63	341
	2022	7	15	12	3	5	76	11	44	39	213
	2022/2010, %	*38.9*	*100.0*	*75.0*	*100.0*	*125.0*	*52.8*	*73.3*	*69.8*	*61.9*	*62.5*
Fishing and fish farming	2010	1	0	1	0	0	2	1	1	1	7
	2022	0	0	1	0	0	1	1	1	1	6
	2022/2010, %	*0.0*	–	*100.0*	–	–	*50.0*	*100.0*	*100.0*	*100.0*	*85.7*
Mining	2010	21	28	19	4	8	0	68	110	21	280
	2022	9	46	35	7	10	0	49	129	18	303
	2022/2010, %	*42.9*	*164.3*	*184.2*	*175.0*	*125.0*	–	*72.1*	*117.3*	*85.7*	*108.2*
Manufacturing industries	2010	101	146	96	21	40	14	415	182	157	1,172
	2022	44	173	108	24	31	11	365	216	116	1,088
	2022/2010, %	*43.6*	*118.5*	*112.5*	*114.3*	*77.5*	*78.6*	*88.0*	*118.7*	*73.9*	*92.8*

[13] At this stage, the concepts of "profession" and "occupation group for employed population in the main job" are used interchangeably to simplify the presentation of the material.

End of Table 3

Activity type	Year	Aggregated groups of occupations for the employed population in their main job									Total, thousand people
		1	2	3	4	5	6	7	8	9	
Production and distribution of electricity, gas and water	2010	26	40	40	9	28	0	82	93	28	347
	2022	15	74	61	13	8	0	107	84	25	386
	2022/2010, %	*57.7*	*185.0*	*152.5*	*144.4*	*28.6*	–	*130.5*	*90.3*	*89.3*	*111.2*
Construction	2010	8	7	4	1	1	0	31	10	10	71
	2022	3	11	9	1	1	0	36	10	10	82
	2022/2010, %	*37.5*	*157.1*	*225.0*	*100.0*	*100.0*	–	*116.1*	*100.0*	*100.0*	*115.5*
Wholesale and retail trade; repair of motor vehicles, motorcycles, household products	2010	260	175	255	52	1,160	2	149	150	230	2,432
	2022	170	262	295	42	1,288	2	173	129	191	2,553
	2022/2010, %	*65.4*	*149.7*	*115.7*	*80.8*	*111.0*	*100.0*	*116.1*	*86.0*	*83.0*	*105.0*
Hotels and restaurants	2010	2	1	2	0	13	0	1	1	3	23
	2022	2	2	4	1	19	0	1	1	5	34
	2022/2010, %	*100.0*	*200.0*	*200.0*	–	*146.2*	–	*100.0*	*100.0*	*166.7*	*147.8*
Transport and communication	2010	59	66	88	39	39	1	150	357	82	880
	2022	47	180	94	113	61	0	104	503	56	1,158
	2022/2010, %	*79.7*	*272.7*	*106.8*	*289.7*	*156.4*	*0.0*	*69.3*	*140.9*	*68.3*	*131.6*
Financial activity	2010	7	25	12	11	1	0	0	2	2	61
	2022	4	30	15	11	3	0	1	1	1	67
	2022/2010, %	*57.1*	*120.0*	*125.0*	*100.0*	*300.0*	–	–	*50.0*	*50.0*	*109.8*
Real estate operations, renting and provision of services	2010	74	247	115	30	125	0	84	49	89	813
	2022	47	357	131	43	170	3	89	47	87	973
	2022/2010, %	*63.5*	*144.5*	*113.9*	*143.3*	*136.0*	–	*106.0*	*95.9*	*97.8*	*119.7*
Public administration and military security; social insurance	2010	42	146	109	18	66	0	7	30	45	463
	2022	24	160	70	20	73	1	5	25	29	407
	2022/2010, %	*57.1*	*109.6*	*64.2*	*111.1*	*110.6*	–	*71.4*	*83.3*	*64.4*	*87.9*
Education	2010	3	24	15	1	5	0	1	1	8	58
	2022	2	32	1	1	6	0	0	1	5	50
	2022/2010, %	*66.7*	*133.3*	*6.7*	*100.0*	*120.0*	–	*0.0*	*100.0*	*62.5*	*86.2*
Health care and provision of social services	2010	0	1	2	0	1	0	0	0	1	5
	2022	0	1	2	0	0	0	0	0	0	5
	2022/2010, %	–	*100.0*	*100.0*	–	*0.0*	–	–	–	*0.0*	*100.0*
Provision of other communal, social and personal services	2010	26	41	34	19	59	1	8	10	38	237
	2022	16	59	34	8	90	1	18	6	21	254
	2022/2010, %	*61.5*	*143.9*	*100.0*	*42.1*	*152.5*	*100.0*	*225.0*	*60.0*	*55.3*	*107.2*

Symbols: 1 – managers; 2 – highest skill level specialists; 3 – middle skill level specialists; 4 – employees engaged in preparation of information, execution of documentation, accounting and service; 5 – employees of the service sector, housing and utilities sector, trade and related activities; 6 – skilled workers of agriculture, forestry, hunting, fishing and fishery; 7 – skilled workers of industrial enterprises, construction, transportation, communication, geology and subsoil exploration; 8 – operators, apparatus operators, plant and machine operators; 9 – unskilled workers.
Source: Rosstat and WIOT data.
* Data of the sample labor force survey for 2015–2022 are published without taking into account the results of the All-Russian Population Census in 2020. Available at: https://rosstat.gov.ru/storage/mediabank/Trud_2023.pdf

It is worth noting that these changes were in line with the transformation of the professional structure of employment in the country as a whole: the share of employed specialists of the highest qualification level increased by 7.2% in 2010–2022, while the share of managers decreased by 3.3%, and the share of unskilled workers decreased by 2.8%. These data are based on a sample survey of the labor force, and the explanation of their dynamics seems to be a topic for a separate study.

Finding ways to transform employment

The comparison of the aggregate input–output effect of an equal increase in the supply of exported products and additional output of products intended for domestic consumption (the production of which was previously designated as sectors of external and domestic demand) is important for assessing the positive impact of export activity on employment. In addition, the effects from stimulating the extractive and manufacturing industries, as well as machine-building (regardless of the place of consumption of their products) are presented to determine the directions of structural changes. The modeling condition was the assumed increase in demand in equal volume (1 billion rubles) for the products of the above sectors of the Russian economy.

We should emphasize that the employment increase is only conditionally described as a positive effect, since it is also important to pay attention to such threats as the growing need for personnel in the defense industry, the shrinking and aging workforce, and the complication of the development of traditionally export-oriented oil and gas sectors of the Russian economy due to foreign trade restrictions, which, in turn, creates a threat of a significant decrease in tax revenues. It is also worth mentioning the historically low unemployment rate in Russia – in March 2024 (the most current data), it amounted to 2.7%. According to a survey conducted by the hh.ru research service, employers cite increased geopolitical tensions, lack of specialized specialists and demographic problems as the main reasons for staff shortages. The so-called "self-reversing spiral effect" is also taking effect: fearing potential staff shortages due to poaching and the difficulty of new recruitment, employers are starting to proactively announce vacancies[14].

At the same time, there are potentially promising labor sources. One of the factors is the specific model of anti-crisis behavior of Russian entrepreneurs: people are trying not to be laid off, but to preserve employment by reducing working hours, thus creating an opportunity to distribute additional labor load.

In addition to traditional labor market support measures, other ways are vocational training and advanced training for the unemployed, as well as additional measures to support employment, such as temporary work, subsidized hiring, especially of young people, where employers receive support in the amount of three minimum wages. Another new popular measure is the retraining of employees at the enterprise itself. If an enterprise switches to new technology, purchases new production lines and equipment, raw materials and supplies, the state assumes the obligation to retrain employees[15]. Anton Kotyakov, Minister of Labor and Social Protection, noted that within the framework of the federal project "Employment Promotion" of the national project "Demography" more than 76 thousand people have already started training, and 32.2 thousand have completed it.

[14] "Perfect storm": How the battle for human resources is going on in Russia right now. Available at: https://www.rbc.ru/industries/news/65b24b2c9a7947083271df29 (accessed: February 25, 2024).

[15] Dmitrii Platygin, General Director of the All-Russian Research Institute of Labor of the Russian Ministry of Labor, told in an interview with "RG" why unemployment in Russia is so low. Available at: https://rg.ru/2022/10/18/legche-ne-teriat.html (accessed: May 30, 2024).

Experts traditionally note that the wide introduction of new technologies, including artificial intelligence, will also have an ambiguous impact on the labor market. On the one hand, labor productivity may increase many times, on the other hand, some jobs will be cut. A special status of priority industries can be enshrined[16] as an example of regulating economic modernization. First of all, we are talking about projects that eliminate the low level of localization and critical dependence on unfriendly states. This process will also be facilitated by changes in the organizational structure of traditional activities, such as the gradual transition of retail trade from retail outlets to the "darkstore" format, designed exclusively for the transfer of delivered goods to couriers.

Returning to the assessment of the multiplicative effect from the increase in output of the sectors of the Russian economy, we note that the employment created per unit of output of the external demand sector significantly exceeds the values of the extractive industry, at the same time lagging behind the other sectors under consideration *(Tab. 4)*. The highest employment growth in the production of a fixed value volume of output is observed in the sector of internal demand.

When the demand for the products of the external demand sector increases, a significant part of employment is created in trade and transportation, which is also true for the other economic sectors under consideration. Also, in case of additional demand for the products of mechanical engineering, about half of the created employment will be in the sub-sectors of this type of activity, which distinguishes mechanical engineering among other sectors of industry. The increase in

Table 4. Employment increase in the activity types from the increase in demand for the products of the Russian economy sectors for 1 billion rubles in 2022, persons

Activity type	External demand sector	Internal demand sector	Extractive industry	Manufacturing industry	Machine building
Agriculture, hunting and forestry, fishing, fish farming	16	64	2	47	4
Mining	22	4	46	4	2
Food industry	2	25	0	43	0
Metallurgical production	28	20	4	41	24
Machine building	15	43	8	69	334
Production and distribution of electricity, gas and water	29	46	25	29	23
Construction	6	58	4	6	5
Trade and transport	271	282	110	240	183
Professional, scientific and technical activities	33	68	27	32	32
Public administration and military security; social security	15	43	16	15	15
Other industries	94	249	51	134	65
Total	**513**	**856**	**282**	**640**	**672**

Source: Rosstat and WIOT data.

[16] On Approval of priority directions of projects of technological sovereignty and projects of structural adaptation of the economy of the Russian Federation: RF Government Resolution 603, dated April 15, 2023; On the Strategy of scientific and technological development of the Russian Federation: Presidential Decree 145, dated February 28, 2024.

Table 5. Increase in the labor remuneration fund in the activity types from the increase in demand for the products of the Russian economy sectors by 1 billion rubles in 2022, million rubles

Activity type	External demand sector	Internal demand sector	Extractive industry	Manufacturing industry	Machine building
Agriculture, hunting and forestry, fishing, fish farming	9	36	1	26	2
Mining	32	6	65	6	2
Food industry	1	15	0	26	0
Metallurgical production	22	15	3	31	18
Machine building	12	34	6	55	267
Production and distribution of electricity, gas and water	20	33	18	21	17
Construction	4	43	3	4	3
Trade and transport	199	207	81	177	135
Professional, scientific and technical activities	32	65	26	31	30
Public administration and military security; social security	12	33	13	11	11
Other industries	58	151	30	82	40
Total	**401**	**638**	**246**	**470**	**525**
For reference: average monthly salary of newly recruited employees, rubles (For the economy as a whole for 2022, 62,558 rubles).	65,283	62,413	73,319	60,999	65,364
Source: Rosstat and WIOT data.					

the labor remuneration fund will be distributed in a similar way, with the average wage in the created employment in export activities being the closest to the wage in mechanical engineering *(Tab. 5)*.

The average wage will be higher in the group of employees attracted by the increase in demand for the products of the extractive industry, but due to low labor inputs the increase in the labor remuneration fund in this industry will be lower than in the other economic sectors under consideration. We should say that domestic demand, on the contrary, generates a high increase in the labor remuneration fund with a lower average wage of the involved workers.

The production of products of the external demand sector in comparison with the production of products of the internal demand sector creates significantly less employment in all groups of occupations from the point of view of the occupational structure *(Tab. 6)*. At the same time, the share of managers in the employment created by the external demand sector will be higher than in other sectors (5.2%). The largest group of occupations among the employed directly and indirectly attracted by the sector of external demand are the workers in the service sector, housing and communal services, trade and related activities (23.7%). The internal demand sector is characterized by a different picture – the largest group of the employed is specialists of the highest qualification level (19.7%), and the increase in final demand for its products in the amount of 1 billion rubles will employ almost twice as many specialists of the highest and middle qualification level as compared to the external demand sector.

Despite a relatively high share of specialists of the highest and middle level of qualification, the results of modeling allow concluding that the extractive industry lags behind the manufacturing

Table 6. Employment increase in the professional sector from the increase in demand for the products of the Russian economy sectors for 1 billion rubles in 2022, people

Aggregated groups of occupations for employed in their main job	External demand sector		Internal demand sector		Extractive industry		Manufacturing industry		Machine building	
	People	% by sector	People	% by sector	People	% by sector	People	% by sector	People	% by sector
Managers	27	*5.2*	42	*4.9*	14	*4.9*	31	*4.9*	32	*4.7*
Highest skill level specialists	86	*16.8*	169	*19.7*	56	*19.7*	104	*16.3*	115	*17.1*
Medium skill level specialists	58	*11.2*	104	*12.2*	34	*12.1*	69	*10.7*	73	*10.8*
Clerical staff involved in the preparation of information, documentation, record-keeping and services	19	*3.7*	30	*3.5*	11	*3.8*	21	*3.3*	21	*3.1*
Employees in the service sector, housing and communal services, trade and related activities	122	*23.7*	165	*19.3*	58	*20.5*	114	*17.8*	95	*14.1*
Skilled workers in agriculture, forestry, hunting, fish farming and fisheries	7	*1.3*	24	*2.8*	1	*0.5*	19	*3.0*	5	*0.8*
Skilled workers of industrial enterprises, construction, transportation, communications, geology and subsoil exploration	68	*13.2*	122	*14.3*	36	*12.6*	114	*17.8*	153	*22.8*
Operators, apparatus operators, plant and machine operators	86	*16.8*	123	*14.3*	52	*18.5*	109	*17.0*	117	*17.4*
Unskilled workers	41	*7.9*	77	*9.0*	21	*7.4*	59	*9.2*	62	*9.2*
Total	**513**	*100.0*	**856**	*100.0*	**282**	*100.0*	**640**	*100.0*	**672**	*100.0*
Source: Rosstat and WIOT data.										

industry in terms of the numerical growth of this group of occupations. Consequently, the change in the export structure by increasing the supplies of manufacturing industry products will favorably affect the number and professional structure of the employed. In this respect, the professional structure of machine-building is interesting due to a smaller share of managers (4.7%, compared to 4.9% in the manufacturing industry) with a high share of qualified workers of industrial enterprises, construction, transportation, communications, geology and subsoil exploration (22.8%). We should add that to strengthen the contribution of export activity to the formation of employment it will be effective to increase supplies of other manufacturing industries with a high multiplier effect, but the use of such a factor as export revenues for the development of the domestic machine-building industry in the light of increasing foreign trade restrictions is seen as particularly valuable.

Researchers hold a similar opinion on the issue of economic development through support for exports of investment machine building products (Borisov et al., 2020). The authors note that stimulating exports of this product group within the framework of the policy of "non-autarkic developmental import substitution" creates an opportunity for additional financing of R&D, since export prices are in most cases higher than domestic market prices.

It is worth mentioning separately that the dynamics of formation of a wide range of highly skilled and highly paid jobs necessary for the development of machine building in the Russian economy is negatively affected by the inertial system of business functioning in the mode of "cheap labor trap", under which enterprises do not have sufficient motivation to increase automation, labor is unproductive, poorly paid, and it is inefficient to replace it with technologies. However, military personnel, as well as engaged workers of the defense industry complex, who receive high payments, will not fully "return to their old jobs with multiples of less compensation. As a result, the economy will face a new trend – the exhaustion of the population's readiness for cheap labor, the growth of its territorial and professional mobility will become a new challenge for the economy. When it will be fully understood, we can expect a powerful incentive for technological modernization of production, robotization, professional retraining of the employed"[17]. The median value of salaries offered by Russian employers for the first time in several years exceeded the median value of salaries expected by job seekers[18] in March 2024 according to hh.ru.

A noteworthy tool for additional exports of products of the Russian economy may be the model of "tied loans", following the example of China, where the condition for granting money loans to other countries is the sale of goods and services of own production to the recipient country. Budgetary resources can also become a crucial source for launching a new investment cycle, as they allow directing resources to where there are opportunities to achieve the greatest macroeconomic effect; in addition, they show businesses the directions for effective investment (Shirov et al., 2022).

[17] Cheap labor goes into the stockpile. Available at: https://www.rbc.ru/newspaper/2024/04/19/661fb0ab9a79477de1080a16 (accessed: May 30, 2024).

[18] Ibidem.

Conclusion

Summarizing the analysis of the impact of export activities on the number and professional structure of the employed, we can note the following.

1. Russia's export activities in 2022 directly and indirectly provided jobs for 10.6% of the employed in the economy. At the same time, the impact of additional exports on employment lags significantly behind the domestic demand sector: 1.67 times in terms of the number of employed and 1.59 times in terms of the labor remuneration fund. It should be added that domestic demand due to a greater multiplier effect generates a relatively high increase in the labor remuneration fund with a lower average wage of the employed. In the context of professions, the difference is also significant: the multiplier effect for employment from the production of products of the internal demand sector is 1.89 times higher for specialists of higher and middle levels of qualification.

2. In the professional context, export activities in 2010–2022 reduced the number of hired managers and unskilled workers (by 38.6% and 19.5%, respectively), while the share of top-level specialists increased significantly (by 49.9%). These changes took place simultaneously with the transformation of the professional structure of employment in the country as a whole, but turned out to be more pronounced. The largest group among the employed directly and indirectly attracted by the sector of external demand is the workers in the service sector, housing and communal services, trade and related activities (23.7%). For comparison, in the internal demand sector the largest group of attracted employees is formed by specialists of the highest skill level (19.7%), and with the increase in final demand for its products will be involved almost twice as many specialists of the highest and middle level of qualification in comparison with the sector of external demand.

3. As an example of the levers of strengthening the impact of export activity on the number and professional structure of employment, we present the increase in supplies of manufacturing industry products, in particular, machine building, with which the share of attracted skilled workers of industrial enterprises, construction, transportation, communication, geology and exploration of subsoil will amount to 22.8%. We note that the growth in the impact of export activity on employment is also possible with the increase in supplies of other manufacturing industries with a high multiplier effect. The tool for increasing the multiplier effect of individual industries, in turn, is the development of production of new or missing stages of product processing within the Russian economy. Also, it will be useful the development of such a source of money as domestic consumer demand for the comprehensive modernization of the country's economy.

Our plans include further improvement of this topic, expansion of assessments of qualitative characteristics of employment growth during the implementation of various projects, construction of forecasts, improvement of visualization of the results obtained (maps, graphs), etc.

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Corporate Demographic Policy as a Tool for Implementing the Strategic Interests of the State, Business and Employees

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Abstract. The demographic agenda and transformations of the modern labor market require the concept of corporate social responsibility to be revised, including in the direction of supporting employees who have families. The aim of the study is to develop and test a comprehensive methodology for evaluating existing measures of corporate demographic policy in Russian organizations. Neo-institutional theoretical approach and the theory of employee loyalty served as a methodological basis for the inclusion of the institution of business in the implementation of demographic policy. The empirical study is based on our own methodology for comprehensive assessment of corporate demographic policy measures based on three indicators: employee awareness of the existence of measures, usefulness of measures for recipients, and demographic effectiveness. The information base includes materials from a survey of 1,000 respondents living in the Siberian and Ural federal districts. The research produced the following results: 1) the system of measures aimed at supporting Russian workers and their families is not yet extensive, comprehensive and sustainable; 2) we identified measures leading in information promotion, assessment of usefulness and potential impact on reproductive behavior; we also identified measures that are not common in Russian organizations, but have the potential to influence reproductive decision-making; 3) we determined the foundations of a corporate social policy strategy aimed at supporting the state demographic agenda and working out relevant corporate governance practices, focused on taking into account employees' needs. The findings of the study form an idea of the in-demand vector of strategic planning related to the concept of corporate social responsibility, which, given the transformation of the modern labor market, is aimed simultaneously at supporting the state demographic agenda and strengthening corporate governance.

Key words: corporate demographic policy, corporate social responsibility, human capital, assessment of measures, state demographic policy.

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Introduction

Such realities of modern society as economic turbulence, labor market transformation due to digitalization, personnel shortages and changes in labor motivation of population, force Russian organizations to search for new means of social responsibility policy. Its importance is reinforced by negative demographic situation, developing within country. Issues of saving Russian population and developing human potential are of particular relevance today. In the President's Address to the Federal Assembly, dated February 29, 2024[1], new measures of state support for families with children and new national social projects were announced. This is done in addition to those measures that have already been being implemented in our country for several years. They are stated in the Demographic Policy Concept of the Russian Federation for the period up to 2025[2] and in the national project "Demography"[3].

Social institutions and communities can act as stakeholders involved in transforming certain areas of public policy (Panikarova, 2019; Pevnaya et al.,

[1] President's Address to the Federal Assembly, dated February 29, 2024. Available at: http://duma.gov.ru/legislative/documents/president/ (accessed: March 26, 2024).

[2] On approval of the concept of demographic policy of the Russian Federation for the period up to 2025: Predental Decree 1351, dated October 9, 2007.

[3] Passport of the national project "Demography". Available at: http://government.ru/info/35559/ (accessed: March 3, 2024).

2022). Importance of expanding the list of social institutions responsible for human capital development has been substantiated in a number of scientific studies. One of such social institutions is the social institution of business (Bagirova, Vavilova, 2022; Shubat, 2014). Today this area of social responsibility in our country is implemented, as a rule, by large industry holdings and companies, operating in advanced economic sectors[4]. At a joint session of VCIOM and the Association of Managers a pool of effective support cases implemented by Russian companies for family workers was listed. However, experts noted that such practices are not yet widespread at medium and small enterprises[5]. At the same time, achieving effect from such measures is directly related to their prevalence in different types of enterprises.

According to VCIOM, more than half of Russians (58%) consider employer support for families to be important, since employers shape social rules and determine behavior standards. At the same time, only 33% of families with children currently receive support from employers. Main measures, according to the data, are financial support after birth of children, additional days off for marriage and childbirth, financial support during pregnancy, payment of expenses for children's vacations and additional payments to workers on parental leave[6].

Since 2023 state, business and society have paid significantly more attention to relationship between demographic and economic subsystems of society. Need for development of new approaches to interaction between state and corporate sector on family and demographic issues was identified at the St. Petersburg International Economic Forum[7]; decision to introduce a social rating (EPS-rating) was announced at the Eastern Economic Forum as a measure to support responsible business. This is a universal assessment that aims to determine the level of reliability, social and environmental responsibility of enterprises and develops social capital standard of business according to principles of responsible business[8].

Implementation of policies aimed at supporting workers and their families has a number of benefits for businesses. Russian and foreign scientists have recorded impact of such policy measures on efficiency of businesses' activity and on increase their attractiveness as employers (Gromova, 2020; Saurabh, Modi, 2013; Fore, 2019; Mullins et al., 2020; Wong et al., 2020). According to the results of foreign studies, family life support in company's values at the level of corporate culture has an impact on workers' productivity (Kim, Wiggins, 2011); flexible vacations and work schedules for workers with children increases personnel satisfaction and loyalty (Kamarova et al., 2023; Bourhis, Mekkaoui, 2010)); in companies that finance childcare services there is a decrease in personnel turnover (Lee, Hong, 2011).

If both spouses are employed in the labor market, corporate support measures for employees within organization can also be considered as a mean to resolve family-work conflict. Typically, family-friendly policy is implemented in three areas: time (incentives related to the employee's work and leisure time), childcare services (availability of corporate daycare centers or nurseries), financial

[4] Russian Union of Industrialists and Entrepreneurs. Available at: https://rspp.ru/activity/social/

[5] Corporate family policy 2024: new effective measures. Available at: https://ok.wciom.ru/meroprijatie/korporativnaja-semeinaja-politika-2024-novye-ehffektivnye-mery?ysclid=lsz2hcm016958729027&cHash=9e080fdf23dfe7e0162042af29bf211b (accessed: March 20, 2024).

[6] VCIOM. Available at: https://wciom.ru (accessed January 9, 2024).

[7] With people there will be business: Strategic motivation for private investment in demography. Available at: https://forumspb.com/programme/business-programme/104236/ (accessed: March 20, 2024).

[8] Sustainable development of government and business. Those who look to the future Available at: https://forumvostok.ru/programme/business-programme/ (accessed: March 24, 2024).

support[9]. Autonomy of employees to determine where and when they work (ability to commence and conclude their workday an hour earlier to take their children from daycare or school) reduces risk of developing time-based conflict, which occurs when demands of family and professional roles compete for employee's time (Fan, Moen, 2023). Parents get opportunity to spend more time with their families and to devote themselves to their children.

Employer assistance in obtaining a place in a preschool institution for employee's child (providing a place in a corporate daycare center) also reduces financial and time costs associated with sending a child to daycare, especially, if it is geographically distant. Affordable and quality childcare services allows parents to invest more intensively in their work, which in turn leads to an increase in family income (Feeney, Stritch, 2017).

Research indicates that implementing support measures for employees with children can help to decrease parental tension caused by need to combine two life roles at the same time (Yucel, Fan, 2023). In such organizations employees exhibit greater satisfaction with their occupational domain and rate their life well-being more highly (Bobbio et al., 2022). Job satisfaction can positively influence employee's role within domestic sphere. It can lead to a more positive emotional environment within family, an increase in time dedicated to family and children, a reduction in marital and parental stress and potential for the birth of subsequent children.

We consider development of demographic direction in social policy of organizations as a potential strengthening of state population policy (support of actions to achieve objectives of population maintaining and human potential development aimed at "sustainable natural growth of population and improving life quality, improving population health, education of comprehensively developed and socially responsible citizen"[10]), as a mean to strengthen social agenda of business in turbulent environment, to increase enterprises' performance. Introduction of EPS-rating in Russia has led to the implementation of corporate demographic policy, which is seen as a means to comply with the most urgent Russian agenda[11].

The COVID-19 pandemic and lockdown are now seen as drivers for a number of transformations in corporate management practices, including social responsibility (Nekhoda et al., 2022; Averett, 2020). According to a research, conducted in May 2020 as part of a cross-country research project, the most common measures for Russian employees at that time were remote work (85.8%) and maintaining employee health and well-being (49.6%), while employer-provided childcare services remained highly unpopular (12.8%) (Bagirova, Vavilova, 2022). Respondents working at Russian enterprises highly rated usefulness of these services (average score of 4.22 out of 6 possible), significantly lower – their sufficiency and value.

Our research aims to develop and implement a methodology for evaluating support measures for employees with families at Russian organizations in the post-pandemic period. To achieve this goal, the article addresses following tasks: assessing employees' awareness of existing measures to support employees and their families at the corporate level; assessing usefulness of services provided by employers to support employees' families; subjectively assessing significance of such measures for reproductive decisions; developing proposals to implement corporate support for employees and their families, using economic and organizational-administrative management methods.

[9] UNICEF (2019). Family-friendly policies: A policy brief-redesigning the workplace of the future. UNICEF Early Childhood Development, vol. 3.

[10] On national security strategy of the Russian Federation: Presidential Decree 400, dated July 2, 2021.

[11] EPS-rating of the Russian Federation. Available at: https://xn----etbbhpfd3axw8i.xn--p1ai/ (accessed: March 1, 2024).

Theoretical framework

Potential for commercial organizations to become stakeholders in outcomes of state demographic policy is promising form perspective of a non-institutional approach. This approach suggests that adherence of organizations to their narrow economic interests is an ineffective strategy. Organizations and their environment are linked and exchange processes take place between them, which requires a certain mutual correspondence between them (DiMaggio, Powell, 2014; Meyer, Rowan, 2014). Organizations function within an environment that imposes a number of social, cultural, political requirements on them, which are formulated as institutionalized rules. Despite these basic rules conflicting with efficiency logic, their incorporation increases resources available, legitimacy of their functioning, their survival and sustainability. Potential economic costs associated with decisions to meet environmental requirements in the present are rewarded with substantial bonuses in the long term. Many scientists have found economic effects from the implementation of family-oriented policies for employees even in the short term: reduced employee turnover, increased employee satisfaction with working conditions, increased labor productivity, increased opportunities to hire highly qualified employees, increased market attractiveness of companies (Bourhis, Mekkaoui, 2010; Lee, Hong, 2011).

Researchers have also noted limitations of such policies (Kim, Wiggins, 2011; Nabergoj, Pahor, 2016): impact limits of certain practices on companies performance in transition economies, policy effectiveness only for certain categories of workers, high cost intensity, complexity of evaluating effectiveness of such policies, need for their support by informal culture of organization, increased sense of social injustice among workers who do not have children (this category of workers increases due to general demographic tendencies).

A number of theories of human resource management propose to consider employees as key stakeholders of organizations. This approach яis based on the concept of internal marketing in organizations. Internal marketing is an integral characteristic of a customer-oriented organization and implies "viewing employees as internal customers, viewing jobs as internal products that satisfy needs of these internal customers" (Martensen, Grønholdt, 2006).

Some studies prove relationship between job satisfaction, employee loyalty, customer satisfaction, customer loyalty and organizational performance (Brooks, 2000; Kim et al., 2020; Reichheld, 2021). The underlying concepts ("loyalty-based growth cycle"; "employee-customer-profit", etc.) represent an approach to build a human resource management system in organization, which enables achieving a high level of commitment of company's employees to its values, and, consequently, influencing staff turnover, quality of work and increasing competitive advantages of an organization. Increased employee loyalty (along with increasing customer and investor loyalty) has a significant potential impact on organizational performance and a measurable impact on increasing company's revenue through increased employee productivity. Researchers from the Copenhagen School of Marketing have found that for every unit of increase in employee loyalty, customer loyalty increases by 1.25. This means that the growth of company's performance depends, among other things, on the level of employee loyalty. At the same time, it is important for company management not only to increase employee loyalty but also to build a human resource management system in which loyal employees will improve company's performance. To achieve this effect, it is important to use a three-factor model of loyalty management, which combines material incentives for employees, feedback and non-

material incentives. The third factor justifies economic efficiency of implementing policies aimed at supporting employees and their families in activities of organizations.

Taking into account analysis of current research on supporting employees' families, we have identified areas of social responsibility that we believe to have potential for improving demographic situation in Russia.

1. Ensuring life and health protection of employees (Rostovskaya et al., 2021).

One of the key trends in new generation of organizations is division of health protection into care for physical and mental health of employees. In the first case, main measures include cost recovery for medical services (including pregnancy and childbirth), corporate medicine, prevention campaigns, regular medical check-ups for employees, programs to support and to organize sports and recreational activities (cost recovery for visiting sports facilities, support for company sports team of employees, etc.). Mental health is supported by employing psychologists, including services of psychologists/psychotherapists into the VHI package; organizing comfortable workplace and recreational areas; conducting trainings, seminars, aimed at restoring psychological balance, etc.

2. Decent pay for work, including social support (Hodges, 2020; Lee et al., 2022; Wuestenenk, Begall, 2022).

In addition to paying salaries, meeting requirements of labor market, this category includes an effective bonus fund linked to company's performance, measures to help employees with credit issues, cost recovery for childcare, for child development and education, housing issues and compensation payments to employees when the emergence of family responsibilities has led to a reduction in income.

3. Respecting family responsibilities of employees with children (Halinski, Duxbury, 2019; Magnusson, 2019; Masterson et al., 2020; Samman, Lombardi, 2019; Stier et al., 2012; Wang et al., 2023).

This category of measures is aimed at improving quality of employees and their families' lives. This becomes possible through implementation of such corporate services as organization of educational activities and leisure time for employees' children; measures to maintain work-family balance: possibility of building a flexible career, depending on changes in value orientation (shifting focus to parental work or preparation for it); system of flexible work schedules and vacations; priority of remote work for employees with preschool and primary school-age children.

Considering employees as people with the greatest interest in the company's success, organizations with a high level of corporate social responsibility are ready to offer them a transparent system of interaction. Key means in this case include identifying and addressing needs of employees with family responsibilities in performance of their professional duties; involving employees in discussions on development of corporate demographic programs; creating conceptual support for family values at the highest level of management; creating a safe corporate environment for employees planning and carrying out parental responsibilities; supporting sex equality in matters of career development and work compensation.

It should be noted that these aspects of social responsibility of organizations are aimed at creating a work-family balance, improving quality of life of employees with families, which corresponds to interests of state listed in the National Security Strategy (ensuring a decent life, supporting families, motherhood and fatherhood[12]).

[12] On national security strategy of the Russian Federation: Presidential Decree 400, dated July 2, 2021.

Materials and methods

Sociological survey of working population in the Siberian and Ural federal districts was conducted in December 2022 – February 2023. Data collection from working population was carried out through online surveys. Links were distributed through public administration bodies. Approximately 1,000 respondents were interviewed in two districts. The limitation of this study is that the sample population was biased in terms of sex. In fact, there were more female respondents. To eliminate potential influence of sex on the study's outcomes, the initial data were reweighted with weighting coefficients of distribution of general population by sex. *Table 1* presents structure of respondents by sex, age and having children. Shares of respondents by sex were obtained after reweighting and fully correspond to the general population – shares of men and women of working age in two federal districts, calculated according to Rosstat[13] data from January 1, 2022. During further analysis data were used in consideration of weighting coefficients.

Analysis of data obtained was carried out in IBM SPSS Statistics 23.0 program. The following empirical indicators were identified as the aim of analysis:

1) awareness of corporate demographic policy (specific measures) (this was done in form of a menu question (question was formulated as follows: "What support measures for employees with family responsibilities implemented in Russian organizations have you ever heard of?");

2) assessment of corporate demographic policy usefulness (specific measures) by its recipients (question was formulated as follows: "Please choose support measures you have ever received and rate their usefulness on a scale from 1 to 5, where 5 is very useful and 1 is not useful at all"; respondents rated measures that they had ever received);

3) assessment of demographic efficiency of corporate demographic policy (various measures) (question was formulated as follows: "Evaluate to what extent the listed support measures for employees with family responsibilities could encourage you to think about having your first or subsequent children").

Further for purpose of comparative analysis three indicators passed Z-standardization procedure, since awareness was measured through the share of informed respondents in total number of respondents and assessments of usefulness and demographic effectiveness were measured in average indicators.

Results

Data collected during survey and further reweighted by sex indicate that over half of respondents are aware of existence of support measures for employees with family responsibilities in Russian organizations. The majority of respondents expressed the view that employers should provide support for employees with family responsibilities *(Tab. 2)*.

Table 1. Structure of respondents by sex, age and having children

Sex, %		Having children, %		Average age, y.o.
Male	18 (51.4)	Yes	77	42.22
Female	82 (48.6)	No	23	
Total	100	Total	100	
Source: own compilation.				

[13] Available at: https://rosstat.gov.ru/storage/mediabank/Bul_chislen_nasel-pv_01-01-2022.pdf

Prevalence of measures to support employees and their families in organizations, where respondents work, is presented in *Table 3*. Measures are grouped according to the directions identified during theoretical analysis of most common practices in this sphere in Russia and abroad. Three most common were identified. Each one was mentioned by approximately one third of working

Table 2. Awareness and perception of need for corporate support measures for employees with families

Value	Respondents, %
Awareness of corporate support measures available for employees with families	
Aware of	57.9
Unaware of	26.2
Unsure	15.8
Idea of employer support for employees with families	
Yes	44.2
Rather yes	39.7
Rather no	5.1
No	1.7
Unsure	9.2
Source: own compilation.	

Table 3. Distribution of working respondents' answers about prevalence of corporate measures to support employees, % of respondents' answers

Directions	Measures	Respondents, %
Ensuring life and health of employees	Employee health check-ups	33.0
	Free trips to health resorts, children's health camps	11.2
	Free health resort treatment for employees and their family members	7.7
	Payment of medical services at the expense of the organization ("corporate medicine")	5.9
	Medical cost recovery (including pregnancy and childbirth)	4.9
	Psychological assistance for employees who combine family and work responsibilities	4.1
	Cost recovery for taking special care of family members	1.4
Respect for family responsibilities of employees	Winter celebrations for employees' children	32.0
	Part-time job opportunities for employees with small children (flexible work and vacation schedules)	30.7
	Day off on September 1 for employees if their children are in elementary school	20.8
	Opportunity to work remotely	19.6
	Day off for fathers if child is born	12.8
	Additional paid or unpaid leave (not state-paid) for employees with children	11.5
	Daycare or school places for employees' children	10.6
Decent remuneration for labor, including social support	Additional non-state payment at the birth of a child	11.7
	Additional non-state payments for families with children under three years old, for families with many children	4.9
	One-time payment for preparing children for the beginning of a school year	5.9
	Assistance for young families in purchasing accommodation	5.1
Source: own compilation.		

Table 4. Awareness of working respondents about corporate measures to support employees, % of respondents' answers

Direction	Measures	Respondents, %
Ensuring life and health of employees	Employee health check-ups	42.9
	Free trips to health resorts, children's health camps	29.2
	Free health resort treatment for employees and their family members	17.4
	Payment of medical services at the expense of the organization ("corporate medicine")	16.1
	Medical cost recovery (including pregnancy and childbirth)	15.3
	Psychological assistance for employees who combine family and work responsibilities	8.4
	Cost recovery for taking special care of family members	6,8
Respect for family responsibilities of employees	Part-time job opportunities for employees with small children (flexible work and vacation schedules)	42.4
	Winter celebrations for employees' children	38.2
	Opportunity to work remotely	37.9
	Additional paid or unpaid leave (not state-paid) for employees with children	26.0
	Daycare or school places for employees' children	25.7
	Day off on September 1 for employees if their children are in elementary school	22.1
	Day off for fathers if child is born	15.9
Decent remuneration for labor, including social support	Additional non-state payment at the birth of a child	31.7
	Assistance for young families in purchasing accommodation	26.2
	One-time payment for preparing children for the beginning of a school year	26.1
	Additional non-state payments for families with children under three years old, for families with many children	25.3

Source: own compilation.

respondents: medical check-ups, arrangement of winter vacations for employees' children, flexible laboring time and vacations for employees with small children.

Employees' awareness of certain corporate demographic policy measures in Russian organizations is presented in *Table 4*. The top measures respondents are most informed about also include medical check-ups, flexible work and vacation schedules for employees with small children, winter vacations for children, remote work and one-time payments from employer if a child is born.

Table 5 shows average assessment of measures by their recipients. Leading positions are taken by support measures that have already been noted as the most widespread: arrangement of winter vacations for children, medical check-ups, part-time work and flexible working hours and vacation schedules. A day off on September 1 for employees with children in elementary school, assistance with paying for daycare and school places are marked as new and useful in this list. We should also note relatively low modal values of medical service payment and medical cost recovery for employees and their families and psychological assistance. This is caused not only by low employer provision of these measures but also by certain arrangement problems.

Table 5. Usefulness of demographic policy measures

Direction	Measures	Respondents		
		Mean	Median	Mode
Ensuring life and health of employees	Employee health check-ups	4.16	5	5
	Free trips to health resorts, children's health camps	3.70	4	5
	Free health resort treatment for employees and their family members	3.43	4	5
	Payment of medical services at the expense of the organization ("corporate medicine")	3.13	4	1
	Medical cost recovery (including pregnancy and childbirth)	3.10	4	5
	Cost recovery for taking special care of family members	2.84	3	1
	Psychological assistance for employees who combine family and work responsibilities	2.66	3	1
Respect for family responsibilities of employees	Winter celebrations for employees' children	4.21	5	5
	Part-time job opportunities for employees with small children (flexible work and vacation schedules)	3.96	5	5
	Day off on September 1 for employees if their children are in elementary school	3.88	5	5
	Opportunity to work remotely	3.79	5	5
	Daycare or school places for employees' children	3.66	5	5
	Day off for fathers if child is born	3.46	5	5
	Additional paid or unpaid leave (not state-paid) for employees with children	3.25	4	5
Decent remuneration for labor, including social support	Additional non-state payment at the birth of a child	3.62	5	5
	Assistance for young families in purchasing accommodation	3.26	4	5
	One-time payment for preparing children for the beginning of a school year	3.31	4	5
	Additional non-state payments for families with children under three years old, for families with many children	3.19	3	5

Source: own compilation.

Table 6 presents an average assessment of demographic effectiveness of measures, namely respondents' assessment of prospective impact of these measures on decision to have a child. No significant differences were observed in these assessments across identified groups based on respondents' main socio-demographic characteristics, including sex, age, marital status and having children. High rates of prospective impact of some measures may be related to fact that their introduction is associated with certain guarantees and stability, which can potentially be strengthened among staff when employer is involved in supporting families of their workers.

Figure depicts Z-score of corporate demographic policy measures according to three indicators: awareness, usefulness and demographic efficiency. It can be observed that only four measures exhibit positive values for all three indicators. These benefits include places in daycares or schools for employees' children, additional one-time payment after the birth of a child, free trips to health resorts and children health camps and opportunity to work remotely. At the same time, there are measures with high capacity to influence reproductive decision-making but they are not widespread in Russian organizations. Such measures include assistance to young families in purchasing accommodation, additional payments to families with children under three years old and families with many children, free health resort treatment for employees and their family members.

Table 6. Impact of corporate measures on the decision to have a child

Direction	Measures	Respondents		
		Mean	Median	Mode
Ensuring life and health of employees	Free trips to health resorts, children's health camps	3.59	5	5
	Free health resort treatment for employees and their family members	3.51	4	5
	Medical cost recovery (including pregnancy and childbirth)	3.51	4	5
	Payment of medical services at the expense of the organization ("corporate medicine")	3.51	4	5
	Employee health check-ups	3.39	4	5
	Cost recovery for taking special care of family members	3,18	4	5
	Psychological assistance for employees who combine family and work responsibilities	2.78	3	5
Respect for family responsibilities of employees	Daycare or school places for employees' children	3.68	5	5
	Opportunity to work remotely	3.41	4	5
	Additional paid or unpaid leave (not state-paid) for employees with children	3.41	4	5
	Winter celebrations for employees' children	3.26	4	5
	Part-time job opportunities for employees with small children (flexible work and vacation schedules)	3.29	4	5
	Day off on September 1 for employees if their children are in elementary school	3.19	4	5
	Day off for fathers if child is born	3.04	3	5
Decent remuneration for labor, including social support	Assistance for young families in purchasing accommodation	3.82	5	5
	Additional non-state payment at the birth of a child	3.54	5	5
	Additional non-state payments for families with children under three years old, for families with many children	3.57	4	5
	One-time payment for preparing children for the beginning of a school year	3.42	4	5

Source: own compilation.

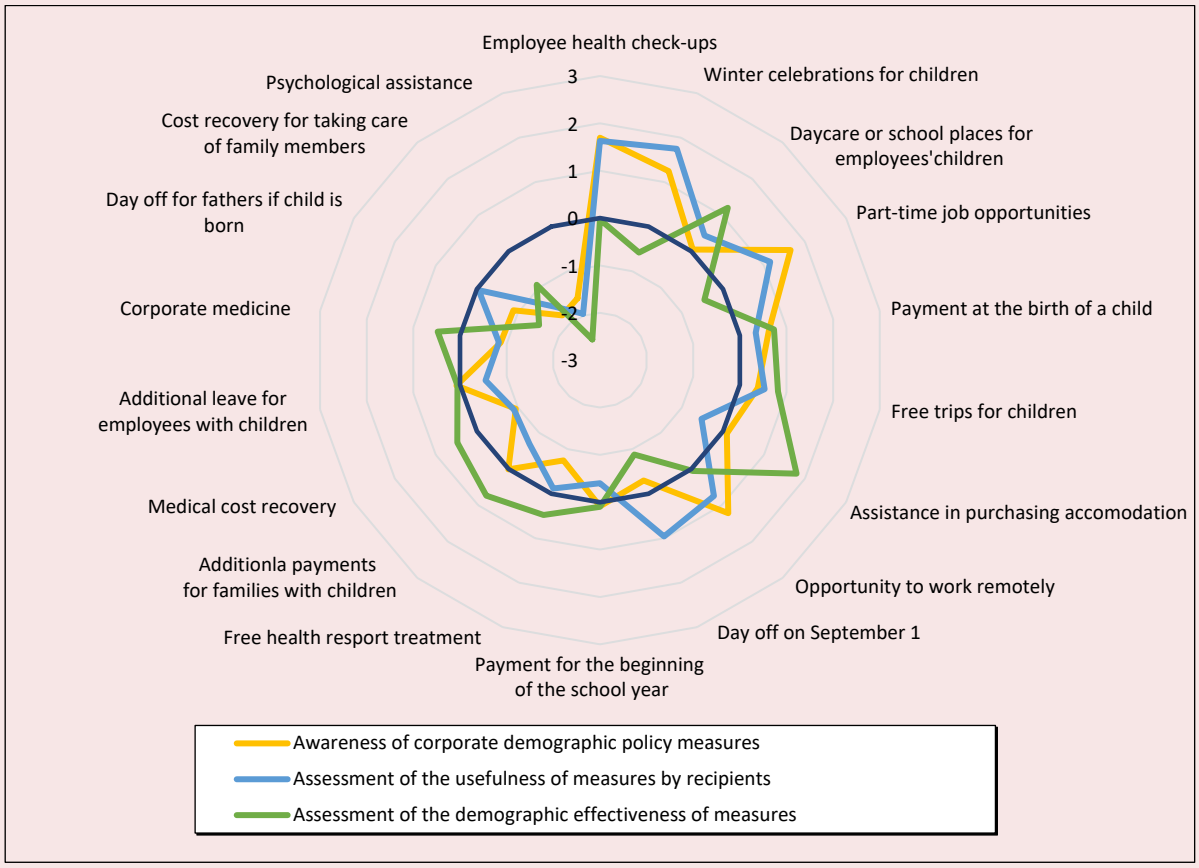
Discussion

Our research findings indicate that system of support measures aimed at workers and their families cannot be called comprehensive, the measures are not characterized by complexity and by implementation sustainability. However, for Russian employees, as during the pandemic (Bagirova, Vavilova, 2022), employer support measures to protect life and health, create conditions for effective combination of professional and family responsibilities and measures of additional financial and social support remain a priority.

Demographic focus of corporate policy is included in "personnel" direction of EPS-rating. Based on analysis, it can become one of priorities for business in building social responsibility policy in modern reality to form, develop and improve human potential.

The research results indicate that for workers who already have families the measures to ensure their life and health and life and health of their family members, to support effective combining of labor and parental responsibilities are the most significant and useful. Along with health protection

Assessments of corporate policy measures in terms by awareness, usefulness and demographic effectiveness



Source: own compilation

measures, material support can be considered as a measure with greater potential to stimulate reproductive decisions.

Efficiency of specific social policy strategy can be evaluated in terms of introduction and implementation of measures designed to provide corporate support for employees and their families, to boost the state's demographic agenda, on one hand, and to develop relevant corporate management practices, on the other. It appears that the implementation of these measures can be based on the application of economic and organizational-administrative management methods.

Priority measures to ensure protection of employees' life and health, financial and social support measures can be introduced through constructing a system of employee motivation. This system offers remuneration for labor not only through pay but also through developing a bonus fund commensurate with company' successes, which covers expenses for providing recreation for employees' children in camps and resorts, health resort treatment for employees, medical services cost recovery (including pregnancy and birth), financial support for employees with children under three years old, employees with many children.

Measures to respect family responsibilities of employees can be implemented through consolidating various activity forms in collective agreement (part-time work for employees with small children, remote work, etc.), developing and implementing a plan of corporate events (winter celebrations for employees' children), building cooperation with local authorities and private educational institutions to develop mutually beneficial cooperation (daycare and school places for employees' children. Taking into account and meeting the needs of employees, combining work and family responsibilities, will contribute to implementing an effective system of interaction with employees as main stakeholders of company, increasing their loyalty to improve the results of organization's activity. This meets progressive requirements of modern labor market and is especially relevant in the conditions of personnel shortage.

It is important to note that the rates of corporate policy measures are dynamic and may depend on a number of factors *(Tab. 7)*. For example, they may depend on the type of state demographic policy measures and pace of their implementation; on conditions within constituent entities of the Russian Federation to support citizens at the corporate level. Consequently, researchers have identified Russian regions with the most favorable indicators of corporate sector development, with the highest level of innovation activity and the lowest share of unprofitable enterprises. In these regions policy, focused on employees' families, may become the most popular for personnel, affordable for enterprises and effective as a new mean of demographic policy (Shubat et al., 2022).

At the local level assessment of effectiveness of support measures for employees' families may depend on a sector of economy and activity of organizations, level of positions held and importance of employees' functions, socio-demographic status of respondents. It should be noted that hypothesis testing about potential impact requires a more detailed analysis of the results obtained during the survey.

Conclusions

Corporate policy to support employees and their families, with the introduction of ECG-rating is considered as a relevant and demanded direction of progressive social policy, focused on Russian society and taking into account the interests of business and state. Research develops and implements a methodology that enables comprehensive assessment of corporate demographic policy measures by three indicators:

Table 7. Factors that could influence the assessment of effectiveness of the measures to support employees' families

Level	Factor
State	State demographic policy measures and rapidity of their implementation Influence increase of EPS-rating in Russian regions
Regional	Predisposition of constituent entities to implement corporate demographic policy
Corporate	Economic sector
	Activity area of organization
	Size, form, organization of business
Personal	Position occupied
	Volume and importance of functions performed
	Work experience
	Socio-demographic characteristics (sex and age structure of employees; family status; number of children, etc.)
Source: own compilation.	

employees' awareness of measures, usefulness for recipients and demographic efficiency.

Analysis of the data from the survey of employees from Russian organizations helped to identify a range of measures that are currently leading in Russian corporate sector in terms of information promotion, usefulness to recipients and potential impact on reproductive behavior of employees. These measures include employee health check-ups, arrangement of winter celebrations for employees' children, provision of places in daycares or schools for employees' children, part-time work opportunities, additional payments after birth of a child, free trips to health resorts and children's health camps. At the same time, free health resort treatment for employees and their families, additional payments for families with children under three years old and for families with many children, medical cost recovery, assistance to young families in purchasing apartment have the greatest potential to influence reproductive decision-making, although these measures are not widespread in Russian organizations.

A set of factors at the state, regional, corporate and personal levels that may influence employees' assessments of effectiveness of corporate demographic policy measures is identified.

Strategic planning of a corporate social responsibility concept is proposed. It takes into account transformation of modern labor market and aims at supporting state demographic agenda, on the one hand, and at strengthening corporate management, on the other. The strategy involves development of a roadmap for the introduction and implementation of corporate support measures for employees and their families.

Implementation of corporate demographic policy by enterprises can result in a range of potential effects for an organization, both within and beyond internal and external environments. These effects may include strengthening of a positive public and internal corporate image, increase in efficiency and productivity, increase in investment attractiveness of company. Comprehensive examination of advantages and consequences of corporate demographic policy provides a replication base for this aspect of social responsibility in Russian business sector. A well-designed corporate demographic policy, which relates to federal demographic agenda and contributes to the development of organization's social responsibility policy, can assist in overcoming demographic challenges and provide Russian companies with a range of additional benefits.

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Demographic Security of Russia: Trends and Forecasts

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Abstract. Currently, the analysis of trends and the assessment of promising parameters characterizing the situation regarding demographic security in Russia attract the attention of the country's leading scientists, officials, managers of various levels, and politicians. Such interest is due to the understanding of the role of the demographic component as the key one in ensuring national security. The parameters of demographic security are contained in several strategic initiatives, in particular in the National Security Strategy of the Russian Federation. This determines not just the relevance, but also a dramatic increase in the importance of analyzing the current state and trends of demographic indicators, as well as building their forecast estimates in order to design and construct more favorable parameters for the development of society. Methodological basis of the study includes techniques and methods of comparative analytics, descriptive statistics and adaptive forecasting. The analysis and development of forecasts were carried out on the basis of official statistics provided by Rosstat. When assessing differences in population dynamics

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in accordance with current accounting and with the data obtained as a result of recalculation using the results of the 2020 All-Russian Population Census, we identified different periods of depopulation. The analysis of retrospective data on demographic parameters and the demographic forecasts determine in the short term the continuation of the second wave of depopulation, while its attenuation and the vector toward achieving demographic security are possible if an optimistic scenario is implemented. An optimistic scenario (achieving an increase in the birth rate) is assumed when developing a mechanism that allows implementing the proposed set of recommendations – measures aimed at increasing the birth rate.

Key words: demographic security, challenges and threats, depopulation, total fertility rate, maternity capital, measures to support families with children.

Introduction

Currently, the priority areas in Russia include preservation of the people of Russia and development of human potential; they are determined by the approved National Development Goals of the Russian Federation for the period up to 2030 and for the perspective up to 2036[1], as well as the national interests of the country, enshrined in the National Security Strategy of the Russian Federation[2] and in fact representing a single, integral system of interrelated components of national security, such as demographic security, state and public security, cultural and ideological, military, economic and other types of national security.

Demographic security is a kind of cornerstone (core) in the national security system (Ageev, Zolotareva, 2023). We agree with I.A. Aleshkovsky who argues that without demographic security, whatever model of economic development Russia chooses, "there can be no question of leadership in global politics and economics" (Aleshkovsky, 2012).

Today, Russia is losing its dominant position on the demographic map of the globe. According to the UN, Russia will lose 5 positions in the world population hierarchy by 2050 and will drop from 9th to 14th place in 2022 *(Fig. 1)*.

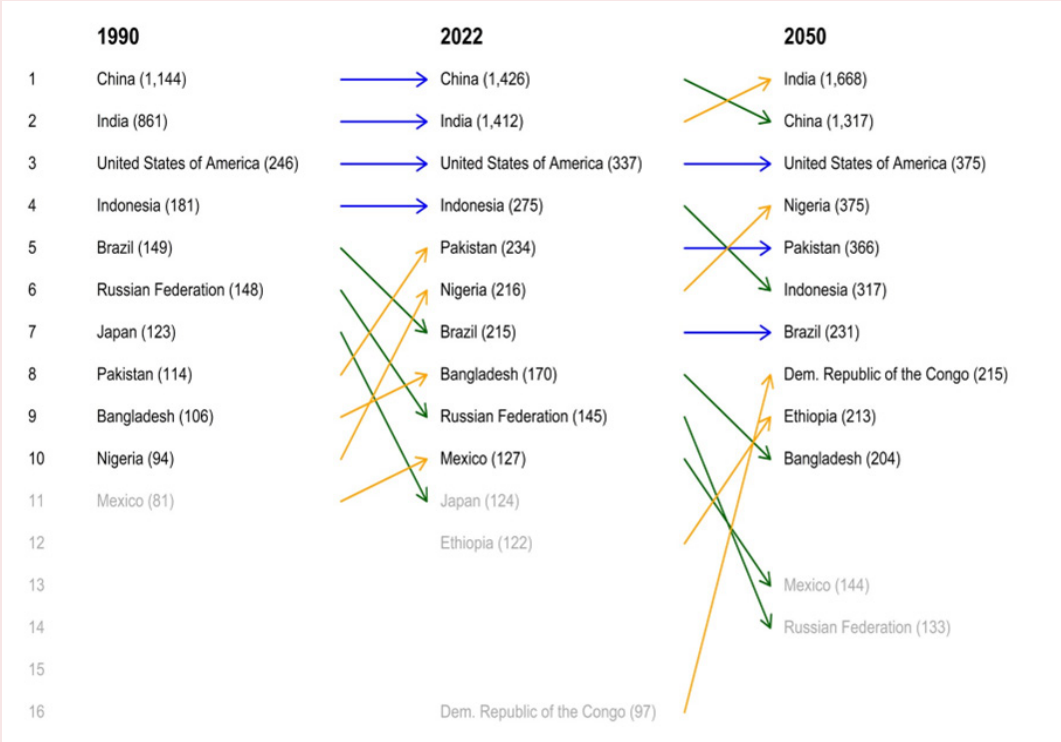
The viability of an ethnic group, people and the state as a whole is directly related to the size of the population, its age and sex structure, family structure, health status, active longevity and, accordingly, life expectancy, etc. The downward population dynamics with a narrowed natural reproduction lead to an inevitable decrease in population density, which predetermines threats to demographic security. Among such threats, demographic expansion is of particular importance, involving a significant transformation of the ethnic structure of a number of regions (when the undeveloped and devastated territories of Russia are filled with migrants from other countries, primarily with very high population density, and conflict zones), loss of historically dominant cultural values, religious, political, etc. positions, and loss of a part of the ancestral territory of residence (as an extreme form of manifestation of demographic expansion).

That is why issues related to national demographic development have become the most important link in the chain of accumulated problems in modern Russian society (Vasilieva et

[1] On the national development goals of the Russian Federation for the period up to 2030 and for the perspective up to 2036: Presidential Decree 309, dated May 7, 2024. Available at: http://www.kremlin.ru/events/president/news/63728

[2] On the National Security Strategy of the Russian Federation: Presidential Decree 400, dated July 2, 2021. Available at: https://www.garant.ru/products/ipo/prime/doc/401325792/

Figure 1. Rating of countries by population



Source: World Population Prospects 2022. Available at: https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/wpp2022_summary_of_results.pdf

al., 2021). Anxiety about the difficult demographic situation can be traced in a number of works by Russian scientists, and in various fields of scientific knowledge: demography, ethnography, sociology, political science, etc. The terms "demographic crisis" and "depopulation" are now used quite frequently, but the catastrophic implications for Russian society and statehood that these phenomena can entail while maintaining negative trends in the future are often not realized. In this context, the task of ensuring the demographic security of modern Russia falls into the category of the most acute problems on a national scale.

According to EMISS, total fertility rate for 2023 was 1.41[3], which is 0.42% less than in 2022. This largely indicates the stability of the indicator (a slight decrease), but determines its critically low value since 2007, when the Concept of Demographic Policy of the Russian Federation for the period up to 20254 was adopted and began to be implemented.

It is quite obvious that in order to achieve demographic security, it is necessary to overcome depopulation processes in society and improve population reproduction. This, in turn, requires the scientifically sound development of additional / updating of existing demographic and socio-economic programs based on comprehensive statistical research in relation to established trends, as well as a prospective assessment of demographic parameters.

[3] EMISS. Government statistics. Total fertility rate. Available at: https://www.fedstat.ru/indicator/31517

[4] On approving the Concept for Demographic Policy of the Russian Federation for the period up to 2025: Presidential Decree 1351, dated October 9, 2007. Available at: http://kremlin.ru/acts/bank/26299

The aim of our work is to identify emerging trends in key parameters of demographic security in Russia, and to forecast total fertility rate, which will allow us to draw conclusions about obstacles to achieving demographic security in Russia and propose a set of relevant measures aimed at increasing fertility. To achieve the goal, we analyzed the views on understanding the essence of demographic security and defined an approach to its assessment, according to which we consider the retrospective dynamics of parameters characterizing population change, the level of depopulation development and total fertility rate, etc. We provide our own forecasts as well as Rosstat's perspective estimates regarding key indicators of demographic security.

Theoretical overview

First, special attention should be paid to the essence of the object of our study; thus, we consider its conceptual framework, which is substantiated by its exceptional role in determining the logic of analysis, defining state policy priorities, and making effective management decisions (Rostovskaya, Zolotareva, 2022) aimed at ensuring demographic security. In this regard, the points of view of various scientists on the definition of the term "demographic security" are considered and analyzed *(Fig. 2)*.

The definitions show ambiguity of interpretation of the term "demographic security" in the scientific literature. Moreover, there is no approved terminology at the state level (in the Concept for Demographic Policy of the Russian Federation for

Figure 2. Some approaches to the definition of "demographic security"

L.L. Rybakovsky

Demographic security can be represented as a state of demographic processes that is sufficient for population reproduction without significant external influence and the provision of human resources for the geopolitical interests of the country.

S.V. Soboleva

Demographic security is a state of protection of life, continuous natural population reproduction and the formation of demographic structures (sex, age, family, ethnic) from demographic threats, supported by an institutional environment.

Demographic threats are phenomena, trends and actions that negatively affect the functioning of the demographic sphere and contradict national and (or) regional goals of demographic development, violate the integrity, independence and sovereignty of the state.

V.G Glushkova and O.B. Khoreva

Demographic security is the functioning and development of the population as such in its age, sex and ethnaic parameters, its correlation with the national interests of the state, which consist in ensuring its integrity, independence, sovereignty and preservation of the existing geopolitical status.

A. Dzhaganova

Demographic security is the situaiton when the socio-economic development of the state and society is protected from demographic threats, including depopulation, population aging, unregulated migration processes, degradation of the institution of family.

Source: own compilation.

the period up to 2025[5], Presidential Decree 606 "On measures to implement the demographic policy of the Russian Federation" dated May 7, 2012[6], etc.). At the same time, the importance of demographic security, which represents a kind of platform for all other aspects of national security, without exception, is undoubtedly increasing in the modern world (Ageev, Zolotareva, 2023; Aleshkovsky, 2012; Ryazantsev, Miryazov, 2021).

We should note that the academic community has different approaches to determining the list of indicators to analyze demographic security. For example, L.P. Shakhotko and N.N. Privalova identify nine indicators (Shakhotko, Privalova, 2001), according to which we can talk about: (1) a systematic approach to assessing demographic security, taking into account the possibility of comparative characteristics with their threshold/critical values; (2) an orientation toward classical socio-demographic parameters, which have been developed in statistical practice and are given in official publications of state statistics. However, with the uniqueness of this approach and a certain validity, the proposed system of metrics has disadvantages: in some cases, it is the absence of a specific numerical threshold value and an indication, for example, of the "level of economically developed countries" (there is a variation by country, which level should be the reference: average, minimum, maximum, etc.); the absence of population change parameters (emphasis is placed on fertility, morbidity and mortality rates). The second drawback definitely plays a significant role. The population may increase when covering natural loss with migration growth, or vice versa – decrease with a large-scale outflow of population even with natural growth, which, undoubtedly, is reflected in the level of demographic security.

N.D. Epshtein and co-authors present a fairly detailed system of demographic security indicators containing three blocks of indicators that not only cover the levels of "certain aspects of demographic security", but also characterize their changes and consequences (Epshtein et al., 2013). This approach has both advantages and disadvantages. On the one hand, the complexity of the proposed system of indicators makes it possible to identify a negative impact on the course of social development; on the other hand, such a wide range of indicators does not include, for example, characteristics of marital status (in particular, an increase in the propensity of the population to marry early and late, etc.), which, in our opinion, contradicts the logic of the study of these authors, because the "aspects of demographic security" they highlight include the threat of "negative changes in residents' marital and family composition".

The National Demographic Report "Demographic Well-Being of Russia", published in 2022 by the Institute for Demographic Research FCTAS RAS, identifies the following indicators for assessing demographic well-being (the achievement of which, in fact, should determine security): 1) upward population dynamics; 2) positive natural and migration growth; 3) total fertility rate of more than 2.14–2.15 children per woman; 4) mortality structure with a moderate contribution of external (preventable) causes of death; 5) balanced sex and age structure of the population (Ryazantsev et al., 2022).

Undoubtedly, it is possible to cite a wider range of approaches to assessing demographic security[7]

[5] On approving the Concept for Demographic Policy of the Russian Federation for the period up to 2025: Presidential Decree 1351, dated October 9, 2007. Available at: http://kremlin.ru/acts/bank/26299

[6] On measures to implement the demographic policy of the Russian Federation: Presidential Decree 606, dated May 7, 2012 (as amended on October 18, 2017; November 9, 2018; March 20, November 25, 2019; January 13, 2023). Available at: https://base.garant.ru/70170932/

[7] Aleshkovsky I.A. Demographic crisis as a threat to Russia's national security. Available at: http://www.intelros.ru/vek-globalizacii/ya2-2012/18423-demografichtskiy-krizis-kak-ugroza-nacionalnoy-bezopasnosti-rossii.html; Denisenko M.B. Will Russia withstand the demographic blow? Available at: http://www.aif.ru/onlineconf/1392868

(Rybakovsky, 2003; Soboleva, 2016, etc.) and present a more complete critical analysis of one approach or another; but let us focus on the following conclusions: first, there is currently no single approach to assessing demographic security, which is typical for science (here we should quote L.I. Abalkin's words that no one has a monopoly on the truth8); second, scientists proceed from their own theoretical views, their own research findings, the interpretation (again partly subjective) of the actual situation, etc.

The generalization of existing approaches and the study of indicators (direct and/or indirect) approved in strategic documents in the field of demographic policy provided the basis for analyzing the state of demographic security based on the following indicators: the population of Russia and its growth rate, the depopulation coefficient (taking into account fertility and mortality) and the total fertility rate.

Thus, the study will use the concept of "demographic security" in the context of the term proposed by L.L. Rybakovsky, that is, data on the regulation of migration processes are excluded, attention is focused on the dynamics of the population (Rybakovsky, 2023a) and the total fertility rate.

Data and methods

The paper presents data analysis on the main parameters of demographic security, logically proceeding to an assessment of forecast values, which makes it possible to propose substantiated measures in the field of national demographic development. The assessment of population changes and depopulation trends, and the forecast of total fertility rate are carried out on the basis of Rosstat state statistics.

Demographic scales, groupings, index analysis methods, time series forecasting techniques, tabular and graphical data representation methods are used as statistical tools.

Forecasting will be carried out with the help of ARIMA, Holt, and Brown models. The practice of using adaptive forecasting methods is quite successful and is presented in many foreign works9 (Garcia et al., 2012; Maniatis, 2012), in particular, forecasting mortality (Lawrence, 1996), fertility (Keilman et al., 2002), migration (Gorbey et al., 1999).

Adaptive models for forecasting in Russian research are mainly used in assessing the prospective values of economic parameters. As noted by T.K. Rostovskaya and O.A. Zolotareva (Rostovskaya, Zolotareva, 2023), the works of R.H. Bakhitova and co-authors (Bakhitova et al., 2016), E.V. Pavlovsky (Pavlovsky, 2017), N.A. Sadovnikova and O.A. Zolotareva (Sadovnikova, Zolotareva, 2020), in which demographic indicators are forecasted by adaptive methods and are almost the only ones of their kind.

Data processing and forecast development were carried out in the "SPSS" application software package.

Based on the IBM SPSS Statistics software, when implementing the forecasting procedure, we obtained the following:

- by an expert in model building – the Brown exponential smoothing model;
- by brute force modeling: ARIMA (portfolio includes more than 30 models) and the Holt exponential smoothing model.

The final forecast model was chosen on the basis of (1) formal statistical criteria: the coefficient of determination (R^2) and the mean absolute percentage error (MAPE); (2) the method of indirect verification – comparison of the obtained forecast values with the forecast values from other sources (Rosstat).

[8] Economic portal. Abalkin Readings: Political economy and economic policy. Available at: https://institutiones.com/personalities/2206-abalkinskie-chteniya.html

[9] Ruppert D., Matteson D.S. (2015). Statistics and Data Analysis for Financial Engineering. Available at: https://link.springer.com/book/10.1007%2F978-1-4939-2614-5

The ARIMA model connects:

✓ an autoregression model of the *p* order:

$$AR(p): y_t = c + \varphi_1 y_{(t-1)} + \varphi_2 y_{(t-2)} + \cdots + \varphi_p y_{(y-p)} + \varepsilon_t,$$

shows the dependence of the value of the current period on the past values of *p*-periods.

✓ a moving average model of the *q* order:

$$MA(q): y_t = c + \varepsilon_t + \theta_1 \varepsilon_{(t-1)} + \theta_2 \varepsilon_{(t-2)} + \cdots + \theta_q \varepsilon_{(t-q)},$$

shows the dependence of the value of the current period on the prediction errors of previous *q* periods[10].

In other words: *p* – order of the autoregressive part of the model; *q* – order of the moving average part.

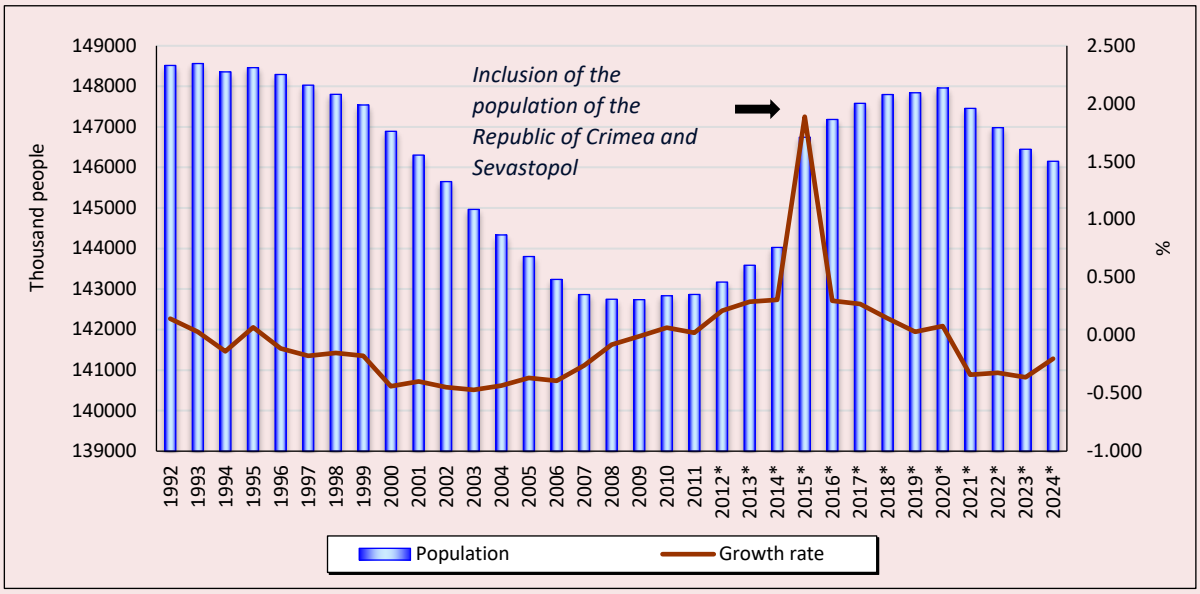
In general, the proposed tools allow us to obtain a relevant assessment of the forecasted values of demographic parameters.

Results

Analysis of demographic security indicators

Population scale and dynamics are the initial parameters for assessing demographic security. The demographic policy concept has approved the goal of creating conditions for population growth to 145 million people by 2025. The achievement of this value can be determined by various factors, both demographic (changes in natural and migration processes) and political (decisions on territorial expansion of the country; there has already been an example in recent practice – a positive increase in the population of Russia in 201411; *Fig. 3*).

Figure 3. Dynamics of the Russian population, data as of January 1, 1992–2024



* Population data for January 1, 2012–2024 have been recalculated taking into account the results of the 2020 All-Russian Population Census.

Source: Rosstat.

[10] Machine learning, neural networks, artificial intelligence. How to create an ARIMA model for forecasting time series in Python. Available at: https://machinelearningmastery.ru/arima-for-time-series-forecasting-with-python/; The ARIMA model in Python for forecasting time series. Available at: https://pythonpip.ru/examples/model-arima-v-python; The ARIMA model. Working group "Center for Macroeconomic Forecasting". National Research University Higher School of Economics. Available at: https://economics.hse.ru/cmf/models_ARIMA

[11] Four new regions are included in the list of constituent entities of the Russian Federation: What will change now. Available at: https://rg.ru/2022/10/06/chetyre-novyh-regiona-vkliucheny-v-perechen-subektov-rf-chto-teper-pomeniaetsia.html

As of January 1, 2024, the population of Russia amounted to 146 million 151 thousand people, having decreased by 2 million 364 thousand people in 32 years (as of January 1, 1992 – 148 million 515 thousand people).

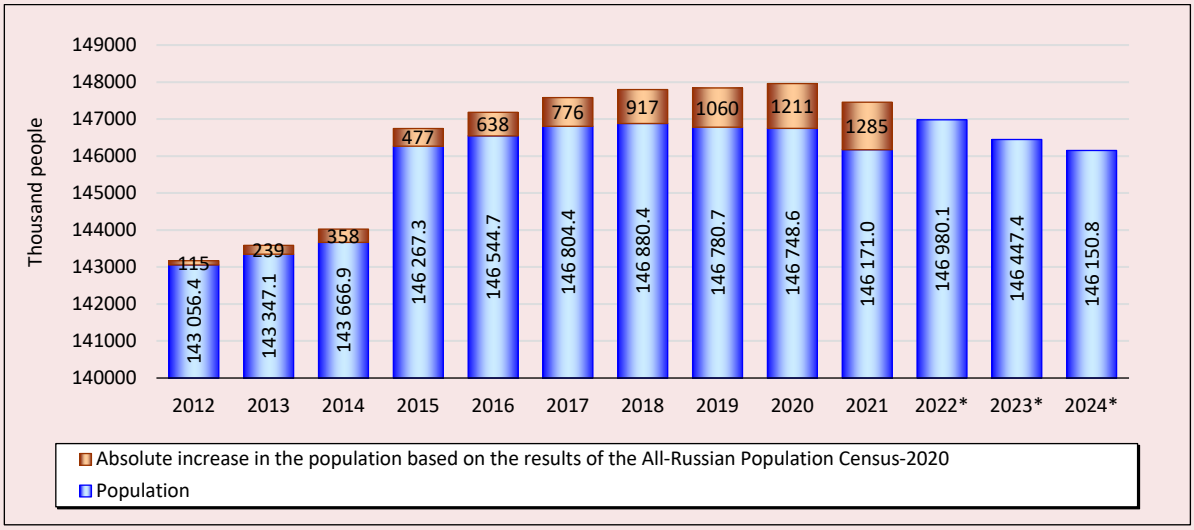
In addition to the increase in the population of Russia due to the accession of the Republic of Crimea and the city of Sevastopol to the Russian Federation, the population change in connection with the 2020 All-Russian Population Census (ARPC-2020; *Fig. 4*) is also of interest. With a decrease in the current population by the delta of recalculation, the reduction over 32 years would amount to 3 million 649 thousand people.

A comparison of population changes according to current figures and recalculation, taking into account the results of the ARPC-2020, gives a different time lag for overcoming the general depopulation, characterized by population decline: according to the current accounting, Russia entered the phase of the second wave of depopulation in 2018 (from January 1, 2010 to January 1, 2018, there was an annual increase in population); taking into account the results of the ARPC-2020 – in 2020, that is, the main reasons for "entering depopulation" can be considered excessive mortality and barriers to migration movements caused by the COVID–19 pandemic (annual population growth was recorded in the period from January 1, 2010 to January 1, 2020). Such ambiguous conclusions determine the need for additional analysis of depopulation processes.

The analysis of the conditional depopulation coefficient (the ratio between the numbers of deaths and births) gives grounds to identify two milestones (waves) of natural depopulation during the analyzed period *(Tab. 1)*:

- ✓ from 1992 to 2012 inclusive (in 1991, the number of births was higher than the number of deaths, the conditional depopulation coefficient was 1.062);
- ✓ from 2016 to the present.

Figure 4. Dynamics of the Russian population, data as of January 1, 2012–2024, and the delta of growth according to recalculations, taking into account the results of the ARPC-2020



* Population data for January 1, 2012–2024 have been recalculated taking into account the results of the 2020 All-Russian Population Census.

Source: Rosstat.

Table 1. Conditional depopulation coefficient in Russia

Year	1992	1993	1994	1995	1996	1997	1998	1999
Conditional depopulation coefficient	1.138	1.544	1.634	1.616	1.596	1.600	1.550	1.765
Growth rate, %	20.85	35.64	5.84	-1.12	-1.23	0.24	-3.14	13.91
Year	2000	2001	2002	2003	2004	2005	2006	2007
Conditional depopulation coefficient	1.757	1.719	1.670	1.601	1.528	1.581	1.464	1.292
Growth rate, %	-0.49	-2.13	-2.89	-4.08	-4.60	3.48	-7.37	-11.76
Year	2008	2009	2010	2011	2012	2013	2014	2015
Conditional depopulation coefficient	1.211	1.141	1.134	1.072	1.002	0.987	0.984	0.983
Growth rate, %	-6.26	-5.78	-0.64	-5.47	-6.50	-1.49	-0.30	-0.09
Year	2016	2017	2018	2019	2020	2021	2022	2023
Conditional depopulation coefficient	1.001	1.080	1.140	1.214	1.489	1.746	1.456	1.392
Growth rate, %	1.80	7.90	5.52	6.51	22.61	17.29	-16.62	-4.42

– aggravation of depopulation; – overcoming of depopulation.

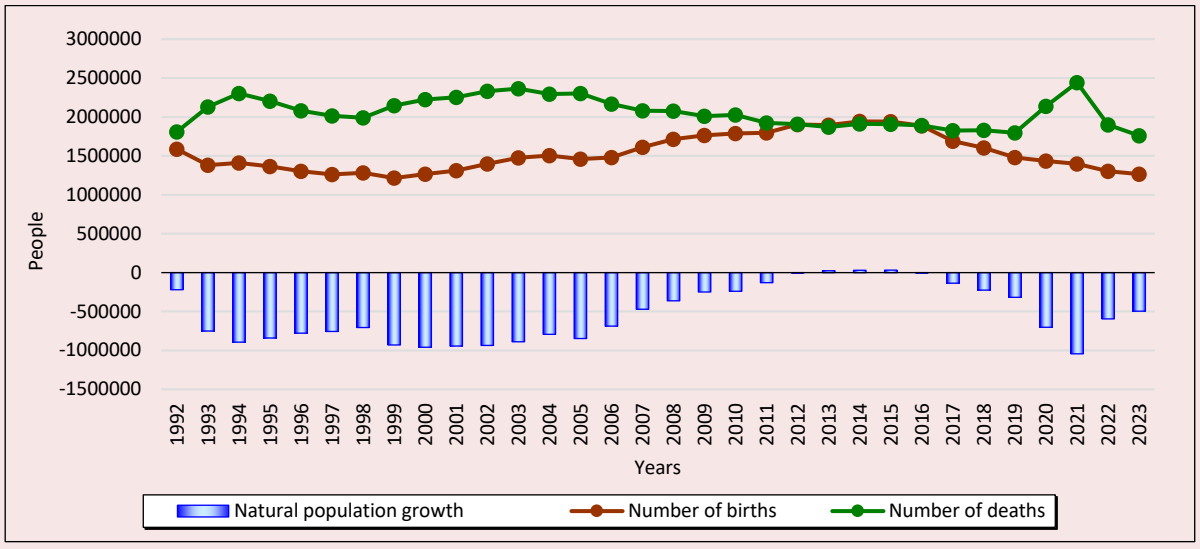
Source: Rosstat.

Assessing the second wave of depopulation, we should pay special attention to the period from 2020 to 2022 (markers of conditional depopulation coefficient values are more maroon in color); while in 2022 the level of the conditional depopulation coefficient decreased significantly (by 16.62%), which was facilitated by the measures taken, primarily aimed at reducing the excess mortality from COVID-19 (increase in the proportion of the vaccinated population).

A further decrease in the conditional depopulation coefficient (in 2023) is also determined by a reduction in mortality, rather than an increase in the birth rate *(Fig. 5)*.

In 1992, for the first time in the post-war period, the number of deaths (during the reforms, but in

Figure 5. Dynamics of the number of births, deaths and natural population growth/decline in Russia for 1992–2023



Source: Rosstat.

peacetime) exceeded the number of births (natural population growth was replaced by a decrease) and the corresponding curves reflecting the dynamics of indicators intersected. This phenomenon was called the "Russian cross" (Rimashevskaya, 1999).

Natural population decline in 1992 amounted to 219 thousand 797 people and was determined by both an increase in mortality (the number of deaths increased by 6.91% over the year) and a decrease in fertility (the number of births decreased by 11.53%), while the dynamics of fertility, based on the comparability of growth rates, definitely had a more significant negative impact than the dynamics of mortality. The situation worsened in 1993 – the excess of the number of deaths over births reached 750 thousand 356 people, while the decrease in the number of births became more dramatic (by 13.42% over the year), but the critical increase in mortality became the dominant factor (the number of deaths increased by 17.81% over the year). Fluctuations in the number of deaths during the analyzed period were determined either by periods of decline (for example, from 1995 to 1998, from 2006 to 2009, from 2011 to 2013, from 2015 to 2017, etc.), or by growth. The dynamics of the number of births show more pronounced/prolonged periods of growth (from 2000 to 2004, from 2006 to 2012), while long time lags of reduction are also recorded, primarily at the present stage: from 2015 to the present, the number of births decreases annually (from 1 million 940 thousand 579 to 1 million 264 thousand 938 children in 2023).

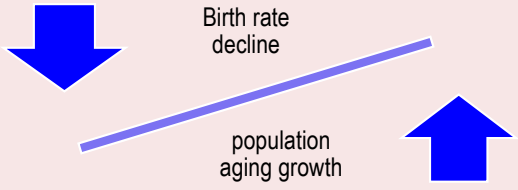
Such a development of demographic processes, which overlapped with the previously formed demographic waves and was partly predetermined by them, formed the main features of demographic development at the present stage and in the foreseeable future: a decrease in the birth rate with a high level of population aging.

Undoubtedly, the key depopulation factors presented in *Figure 6* are, among others, the most acute demographic threats. Due to the demographic situation (Ageev, Zolotareva, 2023) and demographic attitudes in society (Rostovskaya et al., 2021), demographic security challenges today are reasonably identified as priorities in the basic strategic document – the National Security Strategy of the Russian Federation, approved on July 2, 2021 by the Presidential Decree[12].

The assessment of demographic aging according to the J. Beaujeau-Garnier – E. Rosset scale is presented in *Table 2*.

In the near future, the current population age structure (Ageev, Zolotareva, 2023) does not imply reaching the level of demographic old age preceding the "very high" one. Population aging process is becoming one of the most significant

Figure 6. Key factors in depopulation in Russia at the present stage



Source: own compilation.

[12] On the National Security Strategy of the Russian Federation: Presidential Decree 400, dated July 2, 2021. Available at: https://www.garant.ru/products/ipo/prime/doc/401325792/

Table 2. Development of the aging process in Russia

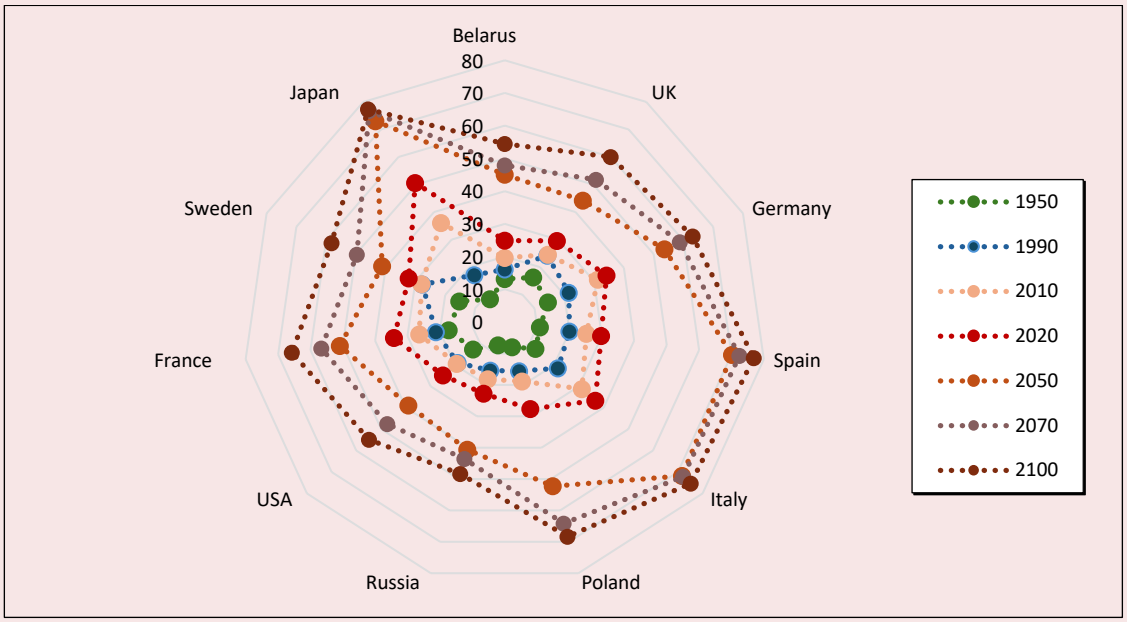
Year	Proportion of the population aged 60 and over, %	Stage of development of the aging process
1897	6.84	Demographic youth
1920	8.25	Threshold of old age
1939	6.72	Demographic youth
1959	8.98	Threshold of old age
1970	11.93	Old age
1979	13.65	Demographic old age initial level
1989	15.3	average level
2002	18.5	very high level
2010	18.9	very high level
2022	23.1	very high level

Source: Population census data.

social transformations of the 21st century, affecting all aspects of society, which is recognized internationally. The global aging prospects, according to UN estimates, suggest that by 2050 the number of people aged 65 and older worldwide will double the number of children under the age of 5 and almost equal the number of children under the age of 12[13].

The UN forecasts on the development of aging in a number of countries around the world, based on forward-looking estimates of the demographic burden of the elderly, representing the ratio of the population aged 65 years and older and the population aged 15–64 years[14], are alarming *(Fig. 7)*.

Figure 7. Ratio of the population aged 65 years and older to the population aged 15–64 years in the countries of the world, including forecast estimates, %



Source: Rosstat.

[13] UN. Peace, dignity and equality on a healthy planet. Aging. Available at: https://www.un.org/ru/global-issues/ageing

[14] UN. Department of Economic and Social Affairs. Population Division. Available at: https://population.un.org/wpp/Download/Standard/Population/

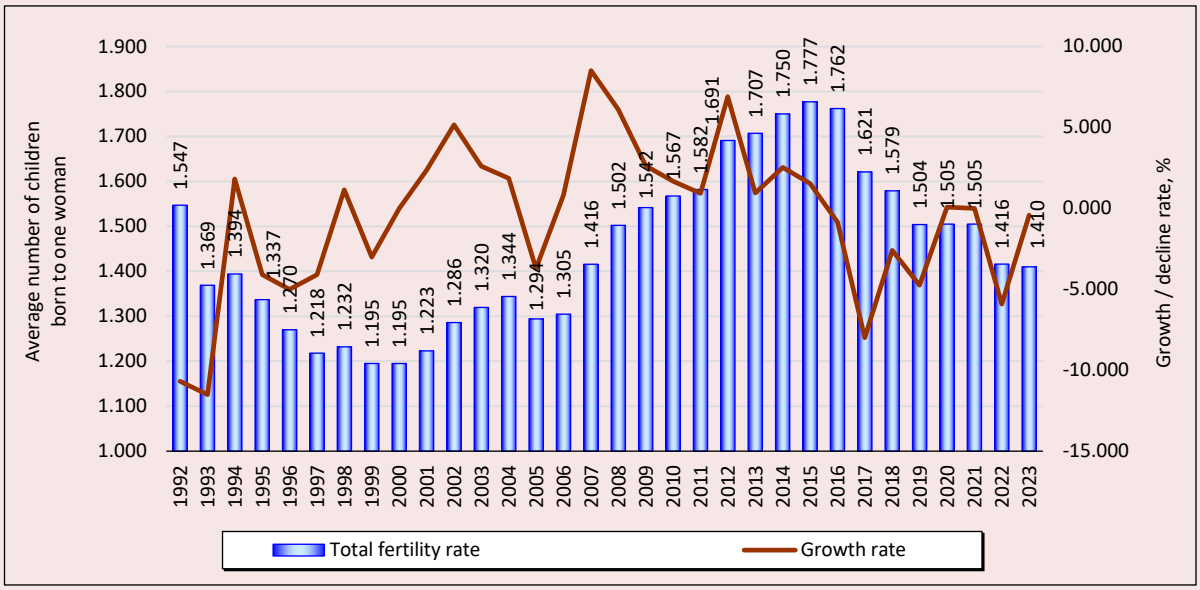
According to the UN forecast, in Russia in 2050 the ratio of the population aged 65 years and older to the population aged 15–64 years will be 40.6%, in 2100 – 48.4% (at the level of 22.8% in 2020), but these are far from the "gravest" figures. For example, in Japan, this figure is expected to be 73% by 2050.

As mentioned earlier, another serious demographic challenge for Russia is low birth rate, more precisely, the narrowed population reproduction throughout the analyzed period (32 years); that is, the trend determining the total fertility rate is below the average of 2.12 births per woman of fertile age (the level of simple reproduction of the population; *Fig. 8*). *For reference*, in 1988 the total fertility rate was 2.13, but later the indicator did not reach the level of simple reproduction.

The retrospective dynamics of the total fertility rate allowed us to identify three milestones in its development (the last two are substantiated in the article by A.I. Ageev and O.A. Zolotareva).

1. 1992–2006: fertility dynamics at this time were formed in very difficult conditions, amid a socio-economic and demographic transition, the impact of which on fertility is widely represented in the works of domestic15 (Borisov, 2007; Ryazantsev et al., 2022) and foreign[16] (Coleman, 2006) authors. These conditions generally changed the way of life and the worldview of society. The first years of the period were characterized by degradation of the institution of family, decrease in the value of a family with children, change in the model of demographic behavior of the population: citizens began to create families at a later age, it was easier to divorce,

Figure 8. Total fertility rate in Russia in dynamics for the period from 1992 to 2023



Source: Rosstat.

[15] Zakharov S.V. Birth rate in Russia: The first and second demographic transition. Available at: https://www.demoscope.ru/weekly/knigi/konfer/konfer_08.html

[16] Livi Bacci M. Future demographic trends and scenarios. Available at: https://paperfoodandmigration.netlify.app/en/chapters/future-demographic-trends-and-scenarios/

extramarital births and all kinds of informal unions spread, the value of "having children" decreased (Ageev, Zolotareva, 2023). The state did not pay due attention to the demographic policy. The average annual value of the total fertility rate for 15 years was 1,302; on average, the indicator decreased by 1.21% annually, from 1.547 in 1992 to 1.305 births per woman in 2006. At the same time, a critical drop in the indicator was noted within the period to the level of 1,195 in 1999 (the historical minimum since 1958[17]).

2. 2007–2015: the birth rate began to increase under the influence of the introduced measures of active demographic policy. In particular, in 2006, in his Address to the Federal Assembly, the President of the Russian Federation proposed the main solution – to introduce "maternity capital", which was approved in 2007 in the Concept for Demographic Policy of the Russian Federation for the period up to 202518; special attention was also paid to the restoration of the institution of family, the importance of traditional family values was declared – the Concept for State Family Policy in the Russian Federation for the period up to 202519 and a number of other government initiatives aimed directly or indirectly at increasing the birth rate were adopted and implemented. The average annual value of the total fertility rate in Russia for 9 years was 1.615; on average, the indicator increased by 2.88% annually, from 1.416 to 1.777 children per woman (maximum value for 32 years).

3. 2016–2023: changes in the birth rate at this time were determined by the combination of existing federal and regional measures, their increase and strengthening. For example, national projects have been developed in accordance with relevant national goals20, the National Strategy of Action for Women for 2017–202221 was approved in 2017, etc. However, judging by the figures, the impact on the population does not have the desired effect observed in the previous decade. The average annual value of the total fertility rate for 8 years was 1.538; on average, the indicator decreased by 3.13% annually (to the level of 1,410 births per woman in the reporting year 2023 – this is the minimum since the introduction of the "maternity capital", i.e. since 2007).

Essentially, our work does not present a comparison of the birth rate in Russia and in other countries, since we consider it unacceptable to focus on trends, for example, characteristic of Western countries (see Bergnehr, 2009; Frejka, 2008; Sobotka, 2004; Waldenström, 2016). Such comparisons can often form an understanding of the normality of negative changes, and then there may emerge a kind of confusion regarding goals and values, when the system of basic / traditional values may be substituted (which was observed in the 1990s).

The article focuses on population dynamics, natural population movement components, conditional depopulation coefficient, aging coefficient

[17] According to Rosstat (Demographic Yearbook of Russia – 2002). Available at: https://rosstat.gov.ru/bgd/regl/B02_16/IssWWW.exe/Stg/d010/i010200r.htm; Demoscope Weekly website. Available at: https:// www.demoscope.ru/weekly/pril.php

[18] On approving the Concept for Demographic Policy of the Russian Federation for the period up to 2025: Presidential Decree 1351, dated October 9, 2007. Available at: http://kremlin.ru/acts/bank/26299

[19] On approval of the Concept for State Family Policy in the Russian Federation for the period up to 2025: RF Government Resolution 1618-r, dated August 25, 2014. Available at: https://www.consultant.ru/document/cons_doc_LAW_167897/1ae3172271088ff17d13f732abf826846524ab91/

[20] National development goals of the Russian Federation for the period up to 2030: the first of these is the goal "preservation of the population, health and well-being of people". Available at: http://www.kremlin.ru/events/president/news/63728; the following national projects have been developed and are being implemented: "Demography". Available at: https://национальныепроекты.рф/projects/demografiya; "Healthcare". Available at: https://национальныепроекты.рф/projects/zdravookhranenie, etc.

[21] On the approval of the National Strategy of Action for Women for 2017–2022: RF Government Resolution 410-r, dated August 3, 2017. Available at: https://www.consultant.ru/document/cons_doc_LAW_213740/647900e93e6b68b5770bca253de3c639d8719f8f/

(structural factor) and total fertility rate, since they are the basic ones for ensuring demographic security22 (Ageev, Zolotareva, 2023; Ryazantsev et al., 2022; Rybakovsky, 2003a; Rybakovsky, 2003b). Covering a wider pool of indicators involves writing a monograph (for example, see the previously mentioned work: Epshtein et al., 2013). At the same time, according to the presented analysis, the importance of state policy aimed at ensuring demographic security is clearly determined. Today, it is important to see the need for further elaboration of measures, primarily aimed at increasing the birth rate and life expectancy, and reducing mortality.

Forecast

Obtaining a reliable and accurate forecast of demographic parameters is possible by using both special demographic forecasting methods (for example, age shifting) and econometric modeling methods (adaptive forecasting methods deserve special attention).

Our work presents a forecast of the total fertility rate developed on the basis of adaptive methods. The choice of this particular indicator to assess the prospects for demographic development is predetermined by the need to understand whether the threat of natural population decline will increase. It is also necessary to explain the refusal of the authors to provide a demographic forecast of the number of population – the decision is determined by the fact that in the near future the population of Russia will include the number of residents of the newly admitted territories (until now, state statistics data are provided without them) and the calculated forecast will lose its significance and relevance.

As mentioned above, the Brown exponential smoothing model was initially obtained by an expert in building models based on IBM SPSS Statistics software *(Tab. 3)*.

The result of the forecast based on the Brown model indicates a possible significant reduction in the total fertility rate by 2028 compared to 2021 (by -11.33%), which is characterized by an underestimate, taking into account actively pursued policies, but substantiated against the background of formed fertility trends in the period from 2016 to the present (the third described milestone of changes in the indicator). This forecast can be considered as a pessimistic/regressive scenario, assuming a "freeze" of measures and activities, primarily related to the support of families with children.

This forecast result provides grounds for searching for alternative models and obtaining a portfolio of models that allows selecting the best one, in particular with higher quality parameters.

A comparative analysis of statistics based on the models obtained on the basis of "brute force" (*Table 4* presents several models from the comparison package) showed that the ARIMA model (7,1,2) best approximates the assessment of trends in the total fertility rate for the next five years.

Table 3. The Brown exponential smoothing model for the total fertility rate

Brown model			2024	2025	2026	2027	2028
Coefficient of determination (R^2)	Mean absolute percentage error (MAPE)	Forecast	1.38	1.34	1.31	1.28	1.25
0.873	3.287	Upper bound	1.50	1.56	1.64	1.73	1.83
		Lower bound	1.25	1.12	0.99	0.83	0.67
Source: data calculated in IBM SPSS Statistics.							

[22] Aleshkovsky I.A. Demographic crisis as a threat to Russia's national security. Available at: http://www.intelros.ru/vek-globalizacii/ya2-2012/18423-demografichtskiy-krizis-kak-ugroza-nacionalnoy-bezopasnosti-rossii.html

Table 4. Adaptive forecasting models of the total fertility rate

Model	Fit statistics of forecast models	
	Coefficient of determination (R-squared)	MAPE – "Mean Absolute Percentage Error"
Holt	0.884	3.059
ARIMA (0,1,0)	0.870	3.402
ARIMA (1,1,0)	0.881	3.247
ARIMA (0,1,1)	0.911	2.961
ARIMA (0,1,2)	0.917	2.741
ARIMA (0,1,3)	0.918	2.703
ARIMA (0,1,4)	0.918	2.739
ARIMA (1,1,1)	0.885	3. 050
ARIMA (2,1,1)	0.885	3. 044
ARIMA (2,1,2)	0.887	2.953
ARIMA (2,2,2)	0.897	2.821
ARIMA (3,2,1)	0.898	2.743
ARIMA (3,1,1)	0.885	3.023
ARIMA (3,1,2)	0.888	2.961
ARIMA (3,1,3)	0.889	3.064
ARIMA (7,1,2)	0.939	2.374
ARIMA (8,1,2)	0.903	2.977
Source: data calculated in IBM SPSS Statistics.		

The given characteristics of the quality of forecasting models allow us to select the best (best approximated) ones from the set. This is the ARIMA Box – Jenkins model (7,1,2): the statistics of the R2 model have a maximum value of 0.939 with the lowest value of the mean absolute percentage error (MAPE) of 2.374. The parameters of the ARIMA model (7,1,2) are given in *Table 5*.

The model values fairly accurately describe the dynamics of actual changes in the total fertility rate *(Fig. 9)*.

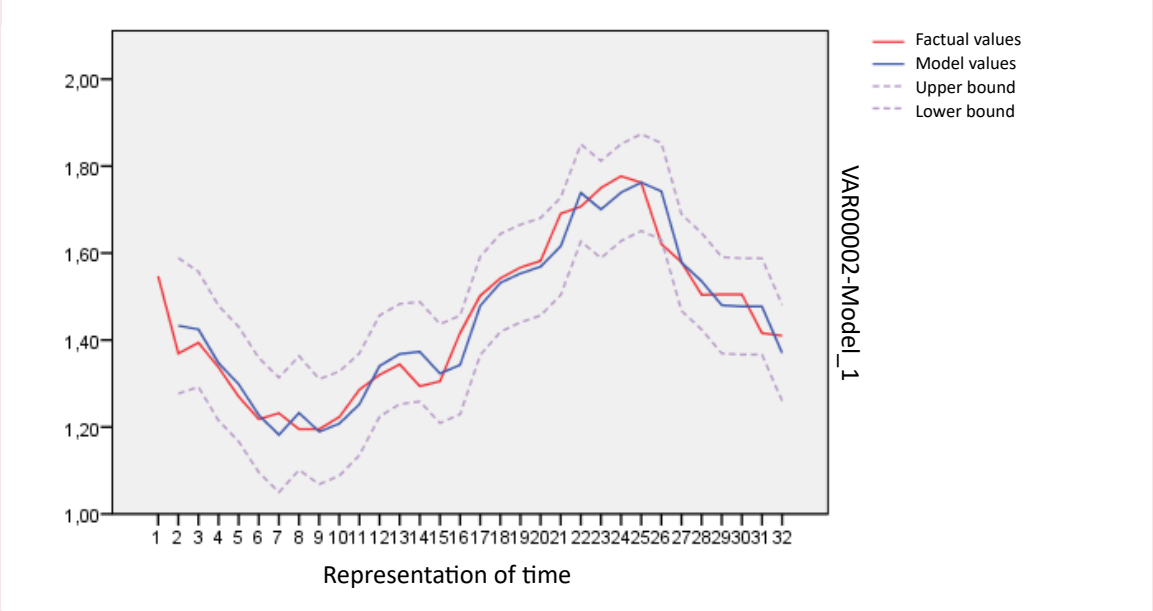
Let us compare the results we obtained for forecasting the total fertility rate of Russia's population according to the ARIMA model (7,1,2) with the forecast values of Rosstat[23] *(Tab. 6)*.

Table 5. Parameters of the ARIMA model (7,1,2)

Model	Constant	AR							Difference	MA	
		φ_1	φ_2	φ_3	φ_4	φ_5	φ_6	φ_7		θ_1	θ_2
ARIMA (7,1,2)	-0.15	0.632	0.383	-0.162	0.029	0.079	0.052	-0.371	1	0.444	0.555
Source: data calculated in IBM SPSS Statistics.											

[23] Rosstat. Demographic forecast. Available at: https://rosstat.gov.ru/folder/12781

Figure 9. Actual and model values of the total fertility rate according to the ARIMA model (7, 1, 2)



Source: calculation in IBM SPSS Statistics.

Table 6. Forecast values of the total fertility rate of Russia's population (ARIMA model (7,1,2) and Rosstat)

Forecast period	ARIMA model (7,1,2)			Rosstat forecast		
	Lower bound of the forecast	Forecasted values	Upper bound of the forecast	Low forecast scenario	Average forecast scenario	High forecast scenario
2024	1.331	1.441	1.552	1.311	1.321	1.419
2025	1.298	1.472	1.647	1.290	1.332	1.428
2026	1.320	1.539	1.759	1.303	1.352	1.436
2027	1.339	1.591	1.842	1.323	1.374	1.448
2028	1.373	1.609	1.867	1.347	1.412	1.463
Source: data calculated in IBM SPSS Statistics and Rosstat data.						

The results of forecasting using the ARIMA model (7,1,2) indicate an estimated average annual increase in the forecast values of the total fertility rate by 3.37% to 1.609 by 2028 in the next five years. In comparison with the value of 2023, the increase in the indicator by 2028 will be 14.11%. However, the value will not reach the maximum recorded in 2015, but will be approximately at the level of 2017–2018. These forecast values, in fact, determine an optimistic scenario. They are higher than the high version of the Rosstat forecast. We should note that the average version of Rosstat's forecast looks pessimistic and assumes a decrease in the total fertility rate to 1.321 in

Table 7. Forecast of Russia's population until 2028, at the beginning of the year (average scenario)

Year	Population, thousand people	Absolute increase / decrease, thousand people	Growth / decline rate, %
2023*	146150.8	-	-
2024	146079.7	-71.1	-0.04864
2025	145631.8	-447.9	-0.30661
2026	145159.3	-472.5	-0.32445
2027	144672.2	-487.1	-0.33556
2028	144181.3	-490.9	-0.33932
Dynamics for 5 years	-	-1969.5	-1.34757

* Data of the reporting period, recalculated taking into account the results of the ARPC-2020.
Source: Rosstat.

2024, which is a "throwback" to the values of the indicator characteristic before the development and introduction of measures aimed at increasing fertility, such as maternity capital. According to the ARIMA model (7,1,2), in an inertial or regressive scenario, a decrease in the total fertility rate is also assumed.

In order to study more seriously the prospects for achieving demographic security and identifying threats, let us turn to the population forecast developed by Rosstat. The analysis of changes in Russia's population in the next five years according to the average scenario is presented in *Table 7*.

In the next five years, the population is expected to decrease by about two million inhabitants. Such a decrease can be covered by recalculating the number when including residents of new territories. However, the current trend itself determines the threat to the demographic security of the country. Moreover, it is assumed that the proportion of children in the population will decrease, by 2028 the proportion of the population younger than the working age (0–15 years) will amount to 17.0% (which corresponds to the trends in fertility predicted by Rosstat), while the proportion of people over the working age will be 22.5%. These demographic changes will inevitably affect the Russian labor market in the medium term, setting possible limits for changes in the size of the labor force.

Discussion

The analysis of the retrospective dynamics of a number of demographic indicators not only determines the stages of population decline, but also indicates serious obstacles to achieving demographic security in Russia.

The forecast of the total fertility rate and the analysis of the population forecast provided by Rosstat made it possible to identify the following threats and challenges in the near future:

– continuing trend of population decline;

– narrowed population reproduction (in the inertial scenario, a decrease in the total fertility rate);

– population aging.

The growth of an already rather high proportion of the elderly population determines the burden on the healthcare system.

A reduction in the proportion of children requires a significant increase in funding for education and science, without which it is not possible to ensure advanced economic development.

Basic threats to demographic security are a decrease in the birth rate and, consequently, population decline.

In order to increase the birth rate (to achieve an optimistic scenario), the state should support families as much as possible, offer more flexible support measures so that families can count on help from the birth of a child to the beginning of their adult life.

Among the main recommendations, the priority ones are as follows:

– to introduce a differentiated approach to maternity capital: separate sums for the first, second, third and subsequent children; that is, it is necessary to return the maternity capital in full for the second child (without deduction for the firstborn); for the second child it should be at least 1.5 times more than for the first; for the third and subsequent in number for children, it should also be a separate amount, at least twice the size of the mother's capital for the firstborn;

– to change the main criterion for receiving allowances for families with children under 17 and pregnant women who registered with the prenatal clinic early: accessibility, given the criterion of need in the amount of the average per capita family income not exceeding at least twice the subsistence minimum of the working-age population in a particular constituent entity of the Russian Federation;

– annual increase in the single childcare allowance should be determined flexibly: either on the basis of indexing taking into account the price index calculated for the category of children's goods (if it is higher than inflation); or on the basis of indexing the subsistence minimum to the consumer price index (if the price index for the category of children's goods is lower than inflation);

– to develop a mechanism for issuing mortgage housing loans for individual housing construction; two scenarios are possible: a mortgage for individual housing construction can be introduced instead of existing preferential mortgage lending programs, or it will complement existing programs; in the first case, the mass consumer will not have alternatives similar in cost, and therefore most families who express a need for housing, will take advantage of the provided benefits and issue mortgage housing loans for individual housing construction; in the second case, the state should increase the comparative attractiveness of residential mortgage loans for individual housing construction, and it can do this in the following ways:

1) the weighted average mortgage rate for individual housing construction should be less than the weighted average mortgage rate for the purchase of an apartment in the city;

2) provision of subsidies for the purchase of motor vehicles (in order to offset the influence of the factor of transport accessibility when deciding on the type of mortgage loan to be issued).

The proposed measure on mortgage lending for individual housing construction is substantiated by the fact that today platform employment is becoming more widespread. The era of digitalization marked the transition from daily office visits to hybrid or completely remote work formats when working. This, in turn, contributes to increasing the attractiveness of individual housing construction in rural areas. The development of the e-commerce market and the delivery of food and grocery products allows the population outside the city to receive all the same benefits, the availability of which was previously extremely difficult. This, in particular, will allow achieving a certain work – family balance, which should contribute to an increase in the birth rate.

In conclusion, we should note that state support for families with children is a proven tool for influencing reproductive behavior and attitudes. It seems possible, by expanding the directions and scales of state support, to reverse the current negative trends, minimize challenges and threats to demographic security.

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Public Health Potential: Current State and Relation to Russian Regions' Features

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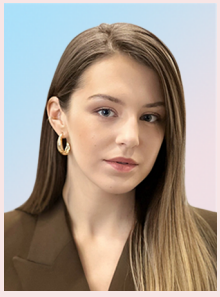

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Abstract. The article investigates issues related to public health and its potential in the context of modern challenges. Understanding health potential as a complex concept is based on the interrelation of various aspects of health (physical, emotional, moral, social) and well-being of an individual in various spheres of life. The aim of the work is to analyze public health potential in various regions of the Russian Federation based on individuals' self-reported health data and the current socio-economic situation in the region. The study is based on the Selective Observation of the State of Public Health Survey conducted by Rosstat in 2019–2022, covering more than 100 thousand people. Additionally, statistical data on the socio-economic situation in the regions were taken into consideration. The analysis methods include hierarchical cluster analysis to classify regions according to the level of self-rated health using Ward's method to determine the proximity of clusters. The study revealed two main types of health potential preservation in Russian regions. The first type is associated with a good environmental situation in the regions alongside a wide spread of rural areas and the maintenance of a tradition of health care, the second type is due to the high level of socio-economic development in the region, an effective health care system and a high level of citizens' education. The age structure of the population turns out to be an important factor influencing self-reported health. The analysis of demographic indicators reveals that regions with high health potential have younger population. The metropolitan regions are distinguished by a high level of socio-economic development and education, which is reflected in the highest indicators of public health. The comparison of more attractive groups of regions in terms of health potential with regions characterized by low health potential shows that low living standards, poverty and high mortality of the working-age population have a negative impact on self-reported health and overall health potential. Health potential is an important indicator of the quality of life; and attention to the factors influencing its formation will allow identifying resources to improve public health and prevent negative trends in the socio-economic and demographic development of the region.

Key words: health, self-reported health, human potential, health potential, regional statistics, sampling observation, public health.

Introduction

An individual and their potential are at the forefront of the development of society, technology and major industries (for details, see: Lokosov, 2023). Health is one of the most important components of human potential (HP) along with education, economic, spiritual and other resources of an individual or population as a whole (Rimashevskaya, 2001; Rimashevskaya, 2009). This highlights the importance of determining human potential as a whole and its components, including health potential. In this regard, it is necessary to search for indicators that can characterize public health at the macro level, with the possibility of including these indicators in the analysis along with other macro indicators. It is also necessary to determine a methodology for analyzing and calculating health potential in relation to the country and regions, which can allow determining health policy at the regional level, taking into account regions' specifics. We assume that public health potential is related to the socio-economic characteristics of the region and may differ significantly across constituent entities of the Russian Federation.

The **aim of the research** is to determine public health potential in various regions of the Russian Federation by analyzing data on subjective indicators of individual health and the current

socio-economic situation in the region in which the individual lives. The article identifies main groups of RF regions formed on the basis of health potential determined through self-rated health data.

Materials and methods

In the framework of studies on human potential, which is understood as a set of available demographic, socio-economic and socio-cultural properties of the population that can be implemented if there is a motivational readiness and certain socio-historical and natural-geographical conditions (Lokosov, 2023), researchers focus on the population quality and, above all, on the internal characteristics of people or an individual (Fedotov, 2017), on a set of their essential features, properties, characteristics and estimates (Fedotov, 2021). In our opinion, self-rated health can be such a property, a feature of the population (individual).

Human potential also includes socio-physiological properties of the population, including health, which is empirically measured using objective statistical indicators (for example, morbidity), synthetic, i.e. calculated indicators formed on the basis of objective and subjective data (healthy life expectancy, commitment to a healthy life), as well as subjective-objective, an example of which is self-rated health.

Considering self-rated health as a property, a characteristic of an individual, as well as a component of human potential that determines one's life expectancy (including healthy life)[1], through subjective health assessments, health potential was determined, and it is expressed in the categorical differentiation of self-assessments of health. An empirical indicator of health potential indicates a good and very good level of health. Understanding and researching health potential as a complex potential (reflecting not only well-being, but also physical and psychological health, taking into account the relationship of self-assessments with objective assessments of specialists (Korkhova, 2001), is based on the WHO definition of health fixed in the preamble to the 1948 Charter of the World Health Organization in 1948, which emphasizes that health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. A healthy person is a prosperous person who has good health of any type: physical, mental, emotional[2]. Besides, the Organization for Economic Cooperation and Development (OECD) in its reports describes self-assessment of health as a unity of mental and physical health[3].

Using the indicator based on self-rated health: an overview and substantiation

Scientific research substantiates the choice of this indicator and confirms its relevance. Self-rated health is considered as a fairly stable indicator reflecting not only the subjective, but also the objective state of health. For example, during a Taganrog study, the results of self-assessment of health were found to correspond to the objective state of health of patients (Korkhova, 2001). Thus, self-rated health is a complex indicator that includes a set of health characteristics, rather than one of its parameters. There is also a proven link between self-assessment of health and mortality (Kaplan, Camacho, 1983), mortality and the need for medical care (Palladino et al., 2016). Self-assessment data are actively used as a criterion of health-related quality of life in the development and evaluation of the effectiveness of preventive

[1] Self-rated health is included in the calculation of the ROSSTAT index – healthy life expectancy. The methodology for calculating the indicator "Healthy life expectancy (years)" was approved by Rosstat Order 95, dated February 25, 2019. Health data are obtained based on the results of selective observation of the health status of the population in accordance with position 1.8.15 of the Federal Statistical Work Plan. The calculation of the indicator is carried out in accordance with position 2.9.1 of the Federal Statistical Work Plan.

[2] Comprehensive mental health action plan 2013–2030. Geneva: World Health Organization. 2022. The term "mental health" was introduced by WHO in 1979.

[3] Health at a Glance 2023: OECD Indicators. Paris: OECD Publishing. DOI: https://doi.org/10.1787/7a7afb35-en (accessed: May 8, 2024).

programs for the protection of motherhood and childhood (Surmach, Epifanov, 2019).

During periods of social stress, statistics do not always provide complete information about public health status, which would allow us to assess the situation at the level of behavior and well-being of individuals responsible for their own health and the health of others. In such situations, the results of sociological research can become an important source of information that allows us to understand the social reality in the health and healthcare system and supplement official statistics. In turn, mass phenomena of social life studied by statistical methods are the basis for sociological analysis, which helps to perceive reality more accurately (Maslov, 1967). Sociological research data complement the statistical material, providing additional illustrations to the understanding of objective processes. That is why self-rated health is used by international organizations such as the OECD[4], the World Health Organization (WHO)[5] and, starting in 2019, Rosstat[6]. It is recommended to monitor and use the self-assessment indicator to estimate public health status during epidemics, along with objective indicators (see for example: Nazarova, 2022). An important circumstance is that the indicator of self-rated health is backed by representativeness in Russia as a whole and in the context of regions. At the same time, regardless of the fact that self-rated health is used by international organizations on a par with statistical data characterizing the population, and is also used as a component in the calculation of the indicator of healthy life expectancy, the combination of self-assessments with macro indicators is practically not used. In this study, we propose to move from the perspective of a population survey within the framework of a survey to the perspective of assessments of macro regions.

An example of the prospect of such a study is the discovery of a connection between self-assessments of public health and macro indicators in the context of urban and rural settlements. This relationship has been verified taking into account differences in the provision of medical care: urban residents may have a higher level of self-rated health, including due to better access to health services (Dor lien, Xu, 2020), as well as the relationship of self-assessments with mortality (Kaplan, Camacho,1983).

The typology of regions, including on the basis of cluster analysis, was put forward in the context of the main macro indicators, which involved indicators indirectly characterizing health – life expectancy, number of patients with alcoholism and drug addiction along with the level of education; natural population growth (Lokosov et al., 2019).

The typology of Russian regions by health status based on a comprehensive indicator, including the level of morbidity for all reasons and average life expectancy, allowed us to identify the top regions: Ingushetia, Moscow, Chechen Republic, Karachay-Cherkess Republic, Republic of North Ossetia–Alania, Republic of Dagestan, and Kabardino-Balkar Republic. The bottom regions in terms of health are those most remote from the center of Russia, which are characterized by low life expectancy and high morbidity (possible causes: alcoholism, low level of health care, low level of social security) (Rybakova, Romanchenko, 2014).

Conditionally, the "top" and the "bottom" clusters are determined in accordance with indicators of sanitary and epidemiological well-being and lifestyle indicators as a result of ranking the average cluster values of indicators of RF constituent entities. The best in terms of sanitary and epidemiological well-being are the Leningrad, Tula, Belgorod regions, etc. (Klein et al., 2022).

[4] Health at a Glance 2023: OECD Indicators. Paris: OECD Publishing. DOI: https://doi.org/10.1787/7a7afb35-en (accessed: May 8, 2024).

[5] Self-rated health. WHO. 2020. Available at: https://gateway.euro.who.int/ru/indicators/hbsc_14-self-rated-health/#id=26248 (accessed: March 20, 2024).

[6] Selective observation of the state of public health. Rosstat. 2019–2024. Available at: https://03.rosstat.gov.ru/szn# (accessed: March 20, 2024).

Studies show the relationship of self-esteem with socio-demographic and economic indicators, but they do not confirm the relationship of self-esteem with macro indicators in the context of countries and regions. Most studies based on the analysis of self-rated health and the relationship with other indicators, for example, with the economic status of an individual (Kartseva, Kuznetsova, 2023; Kislitsyna, 2015) suggest that macroeconomic indicators characterizing the economic well-being of the region may also be related to the level of public health, expressed in self-assessments.

Empirical framework of the research

The analysis uses the results of the "Selective observation of the state of public health" (SPH) for the period from 2019 to 2022[7] in all regions of the Russian Federation; 60 thousand households, including more than 100 thousand people, were surveyed; surveys of all members of these households were conducted. In addition, statistical data reflecting the socio-economic situation in the regions[8] and socio-demographic characteristics of the population were used. These studies are representative of the entire Russian Federation. The analysis of Rosstat materials for Russia's regions made it possible to compare the results of self-assessments with objective data reflecting the level of morbidity and other aspects of public health. Data on respondents aged 15 years and older are taken into account.

Hierarchical cluster analysis using Euclidean distance and Ward's method for determining the proximity of clusters were used to classify regions according to the level of self-rated health. The analysis was carried out separately for each year, which made it possible not only to assess the stability of clustering, but also to study the dynamics of self-rated health in terms of the movement of regions between clusters to obtain a qualitative characteristic. This method was chosen because it was impossible to determine the number of clusters in advance, since significant outliers (more than three interquartile intervals) were observed in the distribution of self-assessments, grouped into one or two separate clusters. The use of hierarchical cluster analysis made it possible to identify the moments of formation of clusters with outliers and highlight them for further analysis. Other researchers also conducted clustering of regions, using socio-economic and demographic indicators characterizing the position of Russian regions in the overall structure in the analysis (details see in: Lokosov et al., 2019).

A comparative analysis of socio-demographic and economic characteristics of groups of regions was conducted using a single-factor analysis of variance, as well as a pairwise comparison of average values using a t-test with an appropriate Bonferroni correction for multiple comparisons. The threshold p-value for determining statistically significant differences is assumed to be 0.05. The key principles of forming groups of regions turned out to be as follows: belonging to a cluster, taking into account the health potential identified on the basis of self-assessments, and changing this affiliation during the analyzed period (from 2019 to 2022).

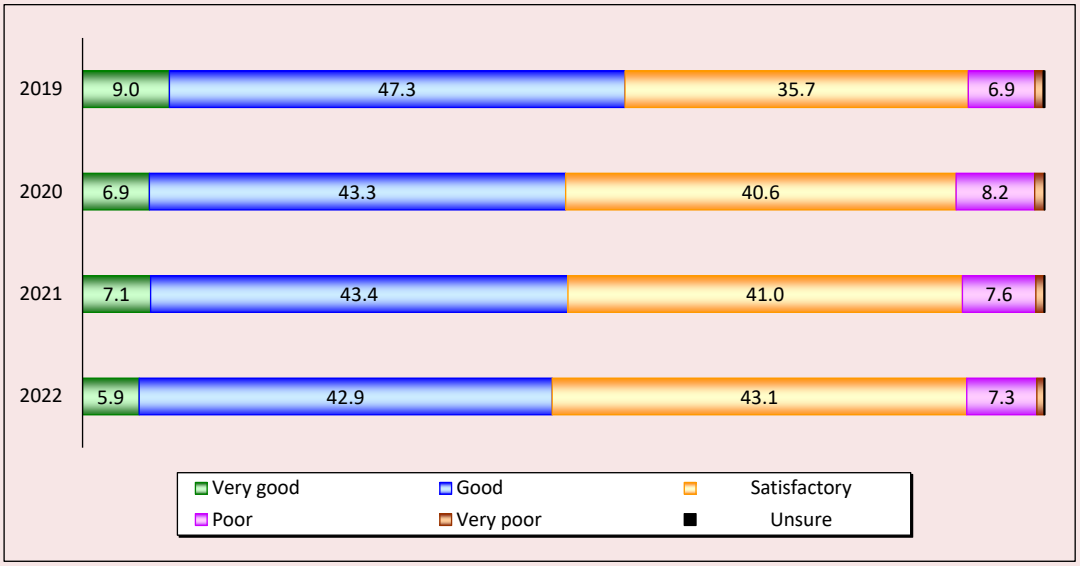
Results and discussion

The dynamics of self-rated health assessments in Russia in the period from 2019 to 2022 are mildly negative *(Fig. 1)*. This trend is manifested in a gradual decrease in the proportion of those who rate their health as being good (4–5 points out of 5) (from 56.4% in 2019 to 48.8% in 2022), against the background of an increase in the proportion of satisfactory ratings (from 35.7% to 43.1%) and

[7] Selective observation of the state of public health. Rosstat. 2019–2024. Available at: https://03.rosstat.gov.ru/szn# (accessed: March 20, 2024).

[8] The socio-economic situation of Russia. January 2022. Ministry of Economic Development of Russia. Rosstat. Moscow: Federal State Statistics Service. 2022. Available at: https://rosstat.gov.ru/storage/mediabank/osn-01-2022.pdf (accessed: January 20, 2024).

Figure 1. Dynamics of Russians' self-rated health assessments in 2019–2022, %*



* Values less than 1% are not indicated in captions.

Source: SPH, own calculation.

a fairly stable proportion of those who rate their health as being poor (1–2 points out of 5). This is typical for describing the dynamics of average assessments; for example, over four years there has been a uniform decrease in the values of the indicator from 3.57 points in 2019 to 3.46 points in 2022 (in 2020/21 – 3.47/3.48 points). It is noteworthy that the negative dynamics of self-rated health assessments go beyond 2020–2021, which could be explained by the impact of the COVID-19 pandemic; the dynamics are the same in 2022. This allows us to hypothesize that the pandemic had a negative impact not only on mortality during the peak of morbidity, but also retained a negative effect on the health of individuals in the long term (Amirov et al., 2021; Khasanova et al., 2021).

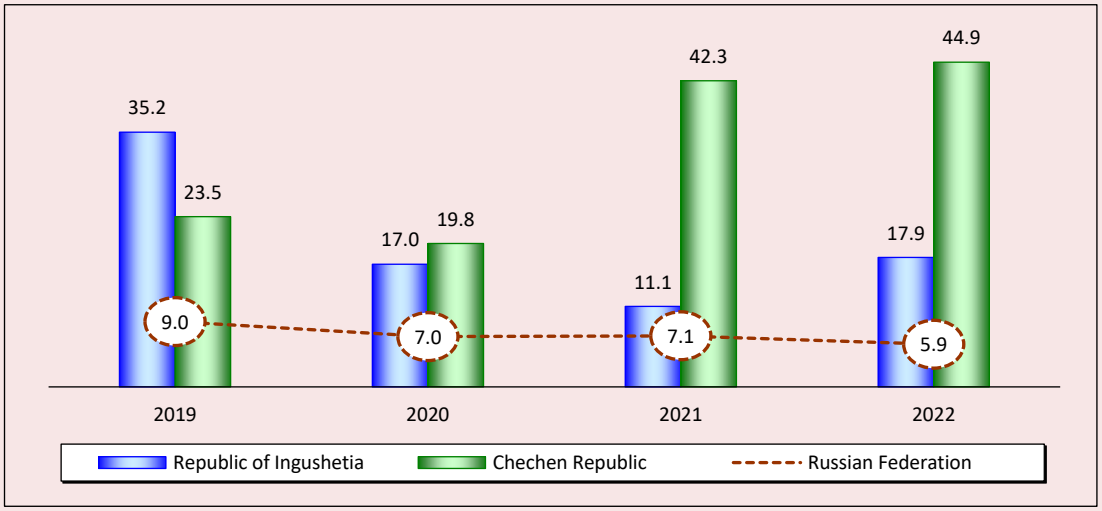
The RLMS-HSE monitoring shows slightly different data than Rosstat: 2019 – 3.27 points; 2020 – 3.30; 2021 – 3.31, 2022 – 3.29 (i.e., there is no trend). Perhaps this is due to the formulation of the question regarding self-rated health. At Rosstat, the central category of gradation in assessing self-rated health is referred to as "satisfactory", while in the RLMS – as "average, not good, but not bad", which is closer in meaning to the "I am unsure" option, and it turns out that respondents tend to choose this response more often.

General overview of public health in the regions

The grouping of regions with different health potential, calculated by analyzing self-rated health assessments, was carried out in two stages:

Stage 1 – clustering of regions in each year of the study, depending on the level of self-rated health of residents. At this stage, hierarchical cluster analysis was used to determine regional features of self-rated health assessments in Russia's regions. For each year under consideration (2019, 2020, 2021 and 2022), there were three significant clusters, and sometimes an additional cluster was formed, which included regions with major deviations (an outlier cluster). Significant deviations toward overestimated self-assessments of health were observed in the

Figure 2. Dynamics of the share of respondents who rated their health as "very good" in the Russian Federation and in some regions in 2019–2022, %



Source: SPH, own calculation.

Chechen Republic (in 2019, 2021 and 2022) and the Republic of Ingushetia (in 2019 and 2022). If these regions were not included in the outliers cluster, they confidently occupied leading positions in the cluster with the highest health scores. However, for some regions, especially for the Chechen Republic, self-rated health assessments were so high that they raised doubts about their reliability (which gave grounds to exclude them from further analysis; *Fig. 2*). Throughout the entire survey period (2019–2022), regions were grouped annually into three clusters (with the exception of the Republic of Ingushetia and the Chechen Republic), which differed statistically significantly in terms of self-rated health assessments (all p-values of the single-factor analysis of variance were less than 0.01).

The first cluster is represented by regions with high health scores (the proportion of respondents who described their health as "very good" and "good" is higher than the share of those who said it was "poor" and "very poor"), the second cluster was formed by regions with average scores, and the third – with the lowest scores.

Stage 2 – determining the dynamics of health potential in the regions. As part of this stage, an analysis of the dynamics of regions belonging to certain clusters was carried out. This allowed us to identify upward dynamics when the region moved into a cluster with higher health scores (for example, from "average" to "best") and downward dynamics. In general, negative dynamics of self-rated health assessments was observed throughout Russia, which was aggravated by the transition of some regions to a cluster with lower self-assessments.

Based on the generalized analysis of regions belonging to clusters in terms of self-rated health assessments and their dynamics, seven groups of regions were identified *(Table)*. The first set consists of three stable clusters in which self-rated health assessments remained unchanged throughout the study period. The second set includes four variable clusters, which included regions that moved from one cluster to another during the monitoring period (i.e., residents of these regions changed their health assessments with each subsequent survey).

Structure of regions according to self-rated health assessments in 2019–2022

<table>
<tr><th colspan="5">Types of clusters – groups of regions</th></tr>
<tr><th colspan="5">Stable clusters – unchanging assessments</th></tr>
<tr><td colspan="2">Group 1
“above-average self-rated health assessments”</td><td>Group 2
“average self-rated health assessments”</td><td colspan="2">Group 3
“self-rated health assessments below average”</td></tr>
<tr><td colspan="2">Subgroup 1.1:
1. Astrakhan Region
2. Kabardino-Balkar Republic
3. Republic of Dagestan
4. Republic of Tyva

Subgroup 1.2:
5. Moscow
6. Saint Petersburg</td><td>1. Arkhangelsk Region
2. Kostroma Region
3. Krasnodar Territory
4. Moscow Region
5. Perm Territory
6. Tambov Region
7. Yaroslavl Region</td><td colspan="2">1. Altai Territory
2. Kirov Region
3. Kurgan Region
4. Orel Region
5. Pskov Region
6. Republic of Komi
7. Republic of Mari El</td></tr>
<tr><th colspan="5">Variable clusters – variable self-assessments</th></tr>
<tr><th colspan="2">Negative dynamics</th><th>Positive dynamics</th><th colspan="2">Unstable</th></tr>
<tr><td>Group 4 “from high to average”</td><td>Group 5 “from average to low”</td><td>Group 6 “from low to average”</td><td colspan="2">Group 7 “improvement and decline”</td></tr>
<tr><td rowspan="4">1. Sevastopol
2. Irkutsk Region
3. Karachay-Cherkess Republic
4. Kemerovo Region
5. Krasnoyarsk Territory
6. Leningrad Region
7. Orenburg Region
8. Primorye Territory
9. Republic of Adygea
10. Republic of Buryatia
11. Republic of Crimea
12. Republic of North Ossetia – Alania
13. Republic of Tatarstan
14. Republic of Khakassia
15. Rostov Region
16. Sakhalin Region
17. Stavropol Territory
18. Tomsk Region
19. Tyumen Region
20. Chukotka Autonomous Area</td><td rowspan="4">Subgroup 5.1 – consistently negative dynamics:
1. Voronezh Region
2. Trans-Baikal Territory
3. Kaliningrad Region
4. Kaluga Region
5. Tver Region
6. Republic of Udmurtia

Subgroup 5.2 – fluctuations followed by a fall
7. Vologda Region
8. Jewish Autonomous Region
9. Ivanovo Region
10. Novosibirsk Region
11. Omsk Region
12. Penza Region
13. Republic of Kalmykia
14. Ryazan Region
15. Ulyanovsk Region
16. Chuvash Republic</td><td>Subgroup 6.1 – stable improvement:
1. Bryansk Region
2. Novgorod Region
3. Smolensk Region
4. Kamchatka Territory
5. Republic of Bashkortostan
6. Chelyabinsk Region</td><td colspan="2" rowspan="4">1. Belgorod Region
2. Vladimir Region
3. Murmansk Region
4. Nizhny Novgorod Region
5. Republic of Altai
6. Republic of Sakha (Yakutia)
7. Sverdlovsk Region</td></tr>
<tr><td>Subgroup 6.2 – overcoming the pit: from the average to the low cluster with a subsequent return to the average cluster:
7. Amur Region
8. Lipetsk Region
9. Magadan Region
10. Republic of Karelia
11. Republic of Mordovia
12. Saratov Region
13. Tula Region
14. Khabarovsk Territory</td></tr>
<tr><td>Subgroup 6.3 – fluctuations between the average and the low cluster:
15. Volgograd Region
16. Kursk Region
17. Samara Region</td></tr>
</table>

Group 1 is the first sustainable cluster with above-average self-rated health assessments (health potential), uniting six regions with the highest health scores. The average self-rated health score is 3.7 points. In these regions, the proportion of residents who rate their health as "very good" or "good" exceeds the proportion of those who rate it as "poor" or "very poor". These regions remained in the cluster with high scores throughout the survey period, demonstrating higher rates compared to other regions. Two subgroups have been formed within this cluster:

– *subgroup 1.1* – average self-rated health score was 3.7 points, in particular, 62.0% of respondents rated their health as very good or good, 5.2% – as poor or very poor: Astrakhan Region, Kabardino-Balkar Republic, Republic of Dagestan, Republic of Tyva;

– *subgroup 1.2* – average self-rated health score was 3.7 points, 64.8% of respondents rated their health status positively to varying degrees, 5.8% held a sharply opposite opinion: two federal cities – Moscow and Saint Petersburg.

The regions in the subgroups differ significantly in their demographic characteristics, which is why two subgroups were identified: on the one hand, these are the two largest cities in Russia, on the other, the constituent entities whose combined number turns out to be less than each of the abovementioned cities. Such an approach will further allow for a more differentiated analysis of the main socio-demographic and economic characteristics of the regions. (In addition, we should note that the group includes regions in which indicators characterizing health are inconsistent, for example, the Republic of Tyva, despite high self-rated health assessments, is characterized by a relatively low level of life expectancy, which requires a separate analysis).

Metropolitan regions have previously stood out from other regions of Russia, for example, the value of health is higher in the regions, but the real concern for their health due to various factors is shown by metropolitan residents[9] and, in general, residents of the regions have a low valeological culture (Novoselova, 2020).

Group 2 is the second stable cluster with an average health potential. The average self-rated health score is 3.4 points. Less than 50% of citizens rated their health as very good or good (46.7%), while the number of those who gave it negative ratings was 8.1%. The cluster includes seven regions with average health scores: Arkhangelsk Region, Kostroma Region, Krasnodar Territory, Moscow Region, Perm Territory, Tambov Region, Yaroslavl Region.

Group 3 is the third stable cluster with below-average health potential: self-rated health score is 3.3 points. In this group, the maximum number of those who assessed their health status as poor or very poor turned out to be 11.7%, while 37.5% of the survey participants held the opposite opinion (similarly, the lowest value for all groups). Regions characterized by "low self-rated health assessments" include Altai Territory, Kirov Region, Kurgan Region, Orel Region, Pskov Region, Republic Komi, Republic of Mari El.

Group 4 is a cluster with values varying "from best to average", in which health potential deteriorated during the years of the survey. The average self-rated health score is 3.5 points. Every second citizen living in these regions had a positive assessment of their state of health to varying degrees (53.5%), representatives of the opposite side made up 7.8%. This group includes 20 regions that fell into the "top" group once during the survey period, but in 2022 moved to the average cluster. Figure 3 shows that most regions repeat the trends typical for Russia as a whole, when the average level of self-rated health falls in 2020, then rises slightly in 2021 and decreases again in 2022.

[9] The Family-Child Lifestyle Values (SeDOJ–2019): An analytical report on the results of an interregional socio-demographic survey (2020). Moscow: MAKS Press. DOI: 10.29003/m857.SeDOJ-2019

Group 5 is a cluster with values varying "from average to worst". The average self-rated health score is 3.4 points. The group is represented by 16 regions, in which 44.8% of respondents rated their health as good or very good, and one in ten as poor or very poor (9.5%). Regions from this group in 2022 fell into the cluster with the lowest estimates of health potential, although in the past they occupied a place in higher categories; but in recent years they have consistently lost their position. Among these regions, one can distinguish the following subgroups:

– subgroup 5.1 – regions with consistently negative dynamics (each year regions moved to a cluster with lower health scores): Voronezh Region, Trans-Baikal Territory, Kaliningrad Region, Kaluga Region, Tver Region, Republic of Udmurtia;

– subgroup 5.2 – regions characterized by positive dynamics at first, followed by a fall in 2022: Vologda Region, Jewish Autonomous Region, Ivanovo Region, Novosibirsk Region, Omsk Region, Penza Region, Republic of Kalmykia, Ryazan Region, Ulyanovsk Region, Chuvash Republic.

Group 6 is a cluster with values varying "from worst to average". The average self-rated health score is 3.4 points; 42.6% of respondents from this group of regions rated their health condition to varying degrees, while one in ten held the opposite opinion (10.2%). The group includes 17 regions that were included in the middle cluster in 2022, but had previously occupied lower positions in terms of health potential. There are also several subgroups among these regions:

– subgroup 6.1 – regions demonstrate stable improvement (Bryansk Region, Novgorod Region, Smolensk Region, Kamchatka Territory, Republic of Bashkortostan, Chelyabinsk Region);

– subgroup 6.2 – regions are overcoming the decline; from the cluster with average self-rated health assessments there is a drop into the category with the lowest ratings, followed by a return to the cluster an order of magnitude higher (Amur Region, Lipetsk Region, Magadan Region, Republic of Karelia, Republic of Mordovia, Saratov Region, Tula Region, Khabarovsk Territory);

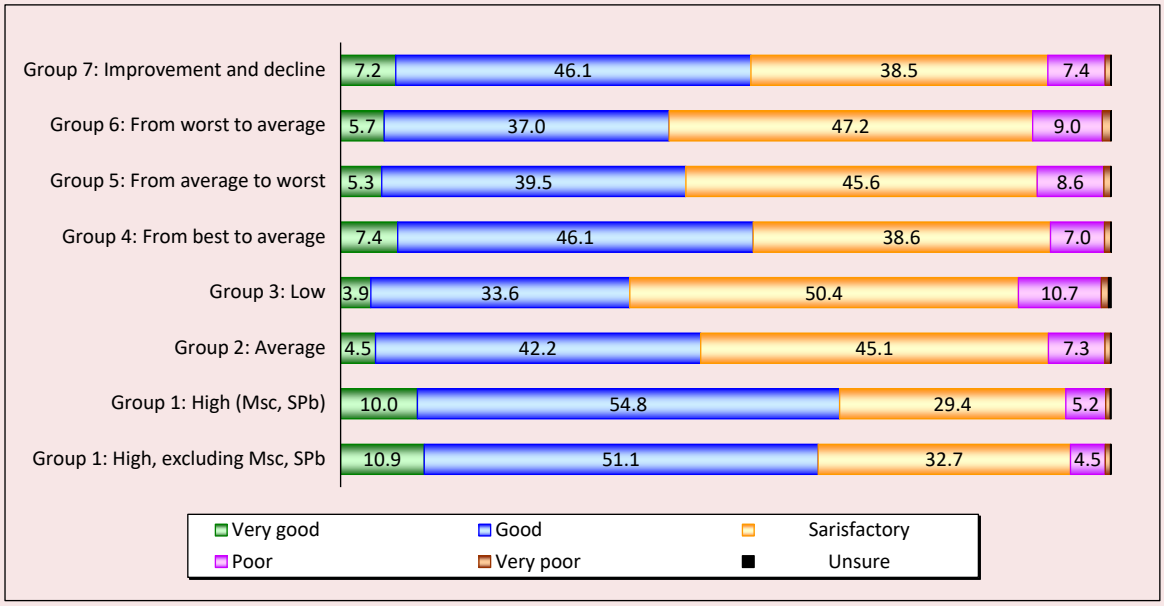
– subgroup 6.3 – shows fluctuations between the group with average and low self-rated health assessments (Volgograd Region, Kursk Region, Samara Region).

Group 7 is a cluster with varying values of "improvement and decline". The average self-rated health score is 3.5 points. Approximately one in two residents of this group of regions assessed their health status positively (53.2%), while 8.2% of respondents held negative views. The group consisting of 7 regions is characterized by stable positive dynamics of transition to clusters with higher ratings until 2021 and return to the middle cluster in 2022.Constituent entities included in this category are as follows: Belgorod Region, Vladimir Region, Murmansk Region, Nizhny Novgorod Region, Republic of Altai, Republic of Sakha (Yakutia), Sverdlovsk Region.

Analyzing the trends in the physical public health in the regions, expressed in self-rated heath assessments, we can say that a positive condition (in regions with consistently high scores) and positive dynamics (in regions that showed a transition from low to high self-assessments during the years of the survey) is typical only for 22 regions (group 1 and group 6); 23 regions (group 3 and group 5) demonstrated a negative condition (most residents assessed their health as poor) or negative dynamics (most representatives of the regions lowered their self-rated health assessments). The rest showed implicit dynamics (7 regions – group 7) and mainly middle indicators (26 regions – groups 2 and 4).

Stage 3 – characteristics of self-rated health assessments in 2021 in the context of the groups of regions. The analysis of indicators of self-rated health assessments by groups of regions allows

Figure 3. Self-rated health assessments in 2021 by groups of regions, %*



Source: SPH, own calculation.

* Values less than 3% are not indicated in figure captions

us to form an idea of the actual perception of an individual's state of health, taking into account their place of residence. The regions belonging to group 1, characterized by *"above-average self-rated health assessments"* (subgroups 1.1 and 1.2), have a high proportion of positive health assessments (more than 60%), as well as average self-assessment values (3.7 points). The mentioned subgroups are similar in terms of the values of the indicators, which proves the correctness of the cluster analysis. However, this group is heterogeneous in other socio-demographic and economic indicators, which will be discussed in more detail below. Groups 4 and 7 occupy the third place in terms of average self-rated health score of 3.5 points; among representatives of these groups about half of the respondents rated their health positively. This is followed by groups 2, 5 and 6 ("average", "from average to low" and "from low to average"), which are slightly worse than the previous ones: the average score is 3.4 points, but at the same time they retain the proportion of respondents who, to varying degrees, assessed their health as good – over 40%. The worst situation in terms of self-rated health assessments is observed in the regions of group 3 ("consistently below average") – here only 37.5% of respondents gave assessed their health as good, and 11.7% said it was bad *(Fig. 3)*.

Stage 4 – analyzing the indicators of regions' socio-demographic and economic development. The comparison of the average values of socio-economic development indicators in the groups of regions was carried out on the basis of an analysis of key indicators for 2021, which was due to the availability of sufficient statistical data. Further, the analysis was carried out by comparing individual thematic groups of indicators, including demographic development, medical care, education, economic development at the macro level, as well as the development of science, culture, sports, leisure, etc.

The analysis of a number of indicators characterizing the quality of human potential (Rimashevskaya et al., 2014) reveals the nature of the influence of various factors on public health potential. The results show that population age structure is of particular importance in this issue. The regions of group 1, with the exception of the metropolitan subgroup, are characterized by a high proportion of the population younger than working age and a low proportion of pensioners; this, in general, given the trend of higher health ratings characteristic of the young population, leads to high indicators of health potential in the region as a whole.

In the metropolitan regions (subgroup 1.2), the average number of pensioners is 260.3 per 1,000 people; in subgroup 1.1 – 239.4 per 1,000 people; and in group 3 with the lowest self-rated health assessments, the number of pensioners reaches 339.8 per 1,000 people. The average number of employees per pensioner for 2021 in group 3 is 1.3 people (in group 1 the situation is slightly better: in subgroup 1.1 – 1.6 people and in subgroup 1.2 – 2.5 people). In group 1, other demographic indicators that characterize the social health of the regions are better; for instance, they show the most favorable situation in the marriage and divorce sphere: in subgroup 1.1, there are 766.6 divorces per 1,000 marriages; in subgroup 1.2 the indicator is lower – 717.5; and in group 3, the value reaches 819.4. Total divorce rate per 1,000 people in subgroup 1.1 is 3.6; in subgroup 1.2 – 4.3; in group 3 – 4.5; total marriage rate per 1,000 people in subgroup 1.1 is 4.7; in subgroup 1.2 – 8.2; in group 3 – 5.5.

Group 3, which has the lowest health potential, shows the most negative average assessment characterizing population growth, a higher mortality rate – 19.2 (in group 1 – 10.6), including a high mortality rate of the working-age population – 658.4 (in group 1 – 427.5). The average value of the indicator "termination of pregnancy" (abortions) per 16000 women aged 15 to 49 years in subgroup 1.1 was 14.8, in subgroup 1.2 – 10.5, in group 3 – 20.1 and per 100 births – 23.8, 26.0 and 51.9, respectively.

The regions in group 1 show the lowest rates of infant mortality, mortality of working-age people, as well as mortality from road accidents, which may indirectly indicate good medical care, its high availability and a greater prevalence of self-preservation practices. The statistics of deaths from road accidents indicate that less risky behavior on the roads may be detected in the regions; in subgroup 1.2, the death rate from road accidents per 100,000 people is 4.2, while in other groups the average value of the indicator is more than twice as high.

Subgroup 1.2, which includes Moscow and Saint Petersburg, consists almost entirely of urban population. By the end of 2021, the share of urban residents in this subgroup was 99.2%, while in subgroup 1.1 this figure was the lowest among all groups of regions – 54.6%. This may serve as confirmation of the hypothesis that urban areas are characterized by a more developed health care system, while in the regions of subgroup 1.1, a healthier lifestyle and better ecology are maintained, as well as, possibly, the quality of food due to the high proportion of rural residents who are most likely to have a subsidiary farm.

Partially, the higher health scores in subgroup 1.2 can also be explained by the higher level of education of metropolitan regions' residents, since education is one of the most important factors affecting human health (Nazarova, 2007; Nazarova, 2014). More than a third of the respondents from subgroup 1.1 have higher education (34.8%); in subgroup 1.2 their number reaches 47.8%; for comparison, in group 3 there are only 28.7% of persons with higher education, and the proportion of people with secondary vocational education, on the contrary, is higher – 48.3% (in subgroup 1.1. – 36.2%, in subgroup 1.2 – 41.9%).

We should also mention the level of morbidity and the specifics of the health care system. For example, in subgroup 1.1, 646.8 cases of diseases were registered in patients diagnosed for the first time in their lives, per 1,000 people (in subgroup 1.2 – 958.2, which may be explained by the high level of detectability of morbidity); and in group 3, the indicator value is 1.5-fold higher (996.0). In group 3, the situation is also unfavorable regarding certain types of diseases: diseases of the circulatory system (diseases were registered in patients with a diagnosis established for the first time in their lives), subgroup 1.1 – 21.0, subgroup 1.2 – 22.6, group 3 – 31.1; respiratory diseases – 283.1; 433.1; 490.2 and some others.

In group 3, a small proportion of citizens were found who annually undergo medical check-ups. The proportion of citizens leading a healthy lifestyle is also small: in subgroup 1.1 it is 7.8%, in subgroup 1.2 – 6.8%, and slightly more in group 3 – 8.5%. However, in Russia as a whole, the proportion of people leading a healthy lifestyle is extremely small (one tenth of the population), which at this level means a negligible contribution to public health potential in the context of different regions. Capacity of outpatient clinics at the end of 2021 per 10,000 people in group 3 was 321.7 thousand visits per shift, and in subgroup 1.2 – 364.4. The number of doctors of all specialties per 10,000 people in group 3 was 41.0 people, in subgroup 1.2 – twice as high – 82.3, and the average number of hospital beds per 10,000 people, on the contrary, was higher in group 3 (88.4), in subgroup 1.1 – 83.1, in metropolitan cities – 74.1. The situation with the provision of hospital beds is as follows: the number of people per hospital bed in group 3 was 113.6, which is slightly lower than in group 1 (subgroup 1.1 – 125.4, subgroup 1.2 – 124.3).

The economic well-being of citizens plays an important role in their health. The average wage in subgroup 1.2 is 65.9% of total money income, in subgroup 1.1 – 38.0%, in group 3 – 55.1%. Other incomes (including "hidden" ones) in subgroup 1.1 account for 25.5% of total money income, in subgroup 1.2 – 3.7%, in group 3 – 5.2%. Income from entrepreneurial activity is as follows: in subgroup 1.1 – 9.3% of total money income, in subgroup 1.2 – 4.8%; in group 3 – 5.9%. Monthly consumer spending on average per capita is the largest in metropolitan cities – 54,250 rubles, in group 3 it amounts to 22,378 rubles, in subgroup 1.1 – 20,947 rubles. Food purchases based on the results of a sample survey of household budgets in subgroup 1.1 are higher than in other regions and amount to 42.1%, in subgroup 1.2 – 32.3%, in group 3 – 35.3%.

The other groups of regions do not differ so significantly from each other, with the exception of group 4 – "from high to average", which is distinguished by a younger population structure (but not young enough to compete with group 1). The regions of group 4 have a reserve for improving their health potential. Group 2 (with average estimates of health potential) tends to group 3 (with low estimates of health potential) according to the general characteristics of the region. The remaining groups represent regions in which residents assess their health status differently, but do not have significant differences; nevertheless, they have a certain resource that allows them to maintain their position without reducing their health potential. In all groups, compared with group 1, the overall mortality rates and mortality rates in working age are higher, which is a negative factor related to the level of health in these regions.

Conclusions

A number of Russia's regions with consistently high self-rated health assessments demonstrate two types of preservation of public health potential: the first type – taking into account good ecology in the regions for residents mainly living outside urban agglomerations, maintaining a tradition

of caring for their health, healthy nutrition for a significant part of rural residents; the second type – by maintaining a high standard of living, a high level of education and income and development of the healthcare infrastructure. In the first type of regions, there is a high proportion of the population younger than the working age, and a low proportion of pensioners. The younger population evaluates their health mainly positively, while the assessments of own health potential by representatives of the older generation are lower.

An analysis of the demographic development indicators of the regions shows that, first of all, self-rated health assessment is related to the age structure of the population. The regions of the subgroup with consistently high indicators of self-rated health (subgroup 1.1) are characterized by the highest proportion of the population younger than working age; the lowest proportion of pensioners, which in general, given the trend of higher health ratings at a young age, leads to higher indicators of health potential in the whole region. However, even in these regions, high health ratings would be impossible in the case of a low level of socio-economic development and well-being of citizens. The metropolitan cities are characterized by a high level of socio-economic development, have a higher level of education, there is a lower level of infant mortality, as well as mortality of working-age people. The abovementioned group of regions is most vividly opposed by the group with the lowest health potential, expressed in residents' self-assessments, over several years of the survey. Low health potential in these regions is associated with a high mortality rate of the working-age population, a high level of poverty, as well as a significant level of alcoholism and drug addiction.

Health potential is an important indicator of the quality of life and the general well-being of society. For Moscow and Saint Petersburg, the key factor determining their belonging to a cluster with high health potential is the socio-economic development and well-being of residents, reflected, among other things, in high life expectancy. In a number of regions where there are changes in self-assessment of health potential, the short-term appearance of low scores is considered favorable, which can be adjusted for the better due to the availability and activation of certain resources. However, the constant decline in health potential and persistently low self-rated health assessment are alarming signs. Negative factors such as low living standards, poverty and high mortality rates represent serious obstacles to achieving a good level of public health and realizing its potential.

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The Impact of Precarity on Quality of Employment and Living Standards of Households of the Middle Generation Workers

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Abstract. The relevance of the research topic is due to the growing impact of precarity on the quality of employment and standard of living among generational groups of economically active population. The opportunities and threats of current employment associated with standard of living may be manifested differently in these generational groups, especially among representatives of the middle generation. Information base of the study is compiled on basis of representative data from the Russia Longitudinal Monitoring Survey of HSE (RLMS-HSE) for 2021. A sample has formed among employed and unemployed people of the middle generation in age from 36 years up to retirement age. The results obtained denote that the presence of a high level of education and specialized ICT skills enables qualified representatives of the middle generation to ensure sustainable employment and minimize precarity risks. In general, a higher level of ICT skills increases the possibilities of the middle generation to apply their present

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labor capacities in the labor market. It was discovered that precarious employment is found not only in poor population. It is common among all social groups according to living standards, while it is most evident among low-income households of middle generation workers with per capita incomes of 1–2 subsistence minimums. Taking into account the position of middle-generation people in employment, their qualification and educational characteristics, as well as level of ICT skills, this research has produced some recommendations, which will contribute to neutralize precarity threats and implement professional potential of middle-generation workers in order to enhance living standards of their households.

Key words: precarity, precarious employment, generational groups, households, middle-generation workers, quality of employment, standard of living, education, ICT-skills.

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Introduction

In modern economic dynamics imposed by capitalism, the chance to be employed in the long term is perceived as a privilege (Eichhorst, Marx, 2015). Neoliberal paradigm, which has dominated Russian system of social and labor relations over the past 20 years, has contributed to general expansion of precarity and emergence of new precarious employment forms. This has become a key factor in income inequality growth, social problems and decline in public trust in activities of government institutions (Baccaro, Howell, 2017).

Technological changes and development of information society have led to the fact that ICT skills and level of education have become effective drivers of professional development. They help people successfully adapt to changing demands of labor market and to increase their competitiveness (Bobkov et al., 2016). Levels of education and ICT skills are integral components of labor potential that can be used by both employed and unemployed individuals. They are indicators of employment quality, reflecting the level of professional training and role in division of labor system, which leads to differences in the concentration of precarity indicators across different generational groups and affects living standard of employed population (Bobkov et al., 2022a; Bobkov et al., 2022b). However, not all generational groups have the same level of ICT skills and education, which creates inequalities between people and can impact their employment, career opportunities and standard of living. Therefore, for a deeper understanding and analysis of this problem, this research is being conducted, within the framework of which ICT skills levels, qualifications and education are considered as factors influencing segmentation of employed and unemployed citizens of the middle generation according to presence and concentration of precarity indicators. Obtained results indicate a relationship between levels of education, qualifications and ICT skills of the middle generation and the risks of precarity to which representatives of this age group are exposed. It has been established that the problem of employment precarity is widespread among all social groups in terms of living standards. Relationship between concentration of precarity indicators and employment situation of the middle generation (hereinafter also referred to as the generational group “Middle Generation”, “middle generation group”) actualizes the need to develop proposals aimed at neutralizing the threats of precarity, realizing educational potential

and using ICT skills middle generation to improve living standards of households. Therefore, this work aims to research precarity impact on employment quality and living standard of households of middle-generation workers. Research hypothesis contains a number of interrelated assumptions about the varying degrees of middle-generation participation in precarious work and its consequences for living standard of their households, depending on the middle-generation workers' employment status, skill level, education and ICT skills.

Scientific novelty of research lies in establishing relationship between concentration of precarity indicators and levels of ICT skills, qualifications and education of representatives of the middle generation, which determines their position in employment and standard of living. Practical significance of research is determined by ability to use the results in activities of government bodies, business community, educational institutions and trade union organizations.

Elaboration of the problem

A number of studies have noted a relationship between risks of precarious employment and age and gender characteristics of individuals (Broughton et al., 2016; Burgess et al., 2013). Young people tend to start their careers in precarized jobs. In middle age, associated with a higher level of education and qualifications, increased work experience, risks of precarity are declining (MacDonald, 2016; Grimshaw et al., 2016).

Young people and people of pre-retirement and retirement age are more likely to work in conditions of part-time, temporary, informal, episodic employment – forms of precarity (Precariat..., 2020).

Study by V.N. Bobkov, E.V. Odintsova, N.V. Bobkov presents research results of level and quality of employment in generational groups of working population (youth, middle and older generations) and its influence on its distribution, taking into account compliance of per capita income of households with social standards. Level of employment and its quality in terms of prevalence of precarious employment have been identified and distribution of generational groups by per capita income in households has been obtained, taking into account employment and precarious employment indicators (Bobkov et al., 2021).

A.V. Popov analyzed and summarized domestic and foreign experience in identifying generational groups from perspective of social and labor relations. Two approaches are identified: the first is based on theory of generations of W. Strauss and N. Howe, the second is based on age. Advantages and disadvantages of these approaches are characterized (Popov, 2022a; Popov, 2022b).

A.V. Kuchenkova examines age-related differences in precarity degree of employment and nature of its relationship with subjective well-being of workers, perception of unstable conditions of employment and work activity. Based on national Russian survey of working population, author compares three age groups of employed people: under 29 years old, 30–49 years old, 50 years old and older. As a result of analysis, it was concluded that certain signs of precarity are more common among young people and less common among older people and middle-aged workers (Kuchenkova, 2022).

R. Donnelly's article, "Precarious work in midlife: Long-term implications for the health and mortality of women and men", found a correlation between precarious employment in midlife and adverse health outcomes in later life. Negative impact of precarious employment on physical and mental health of workers has been established in association with increasing risks of premature mortality due to prolonged stay in a precarious position (Donnelly, 2022).

In the course of analyzing differentiation of wages in generational groups of Russian population based on microdata from the Sample Observation of Population Income and Participation in Social Programs (VNDN), carried out by V.E. Gimpelson and D.I. Zinchenko, it was established that its peak values are observed at the age of up to 40 years, subsequently they have a downward trend. Authors associate decline in wages, which begins long before pre-retirement age, with outdated and not entirely relevant human capital of older generation. Researchers believe that in the future we can expect a redistribution of wage fund in favor of middle age groups (Gimpelson, Zinchenko, 2019).

In general, foreign and domestic studies of precarious employment focus on problems of young people and older generation (Precarious employment..., 2017; Doellgast et al., 2018). Meanwhile, aspects of employment precarity in relation to the quality of employment and living standard of the middle generation remain insufficiently developed, which predetermined the significance of this issue.

Research of precarity influence on employment quality and living standard of households of middle-generation workers seems important from the point of view of not only the wider numerical representation of this generational group but also its transitive property, which determines connection of the younger generation with the older age group. Identification of precarity employment risks in connection with quality of employment and living standard of the middle generation provides a methodological and regulatory foundation for strengthening labor potential of young people and for minimizing precarity risks impact on them in the process of transition to the middle generation group. Understanding the nature of precarity influence on employment quality and living standard of households of middle-generation workers contributes to development of effective means to neutralize threats of precarity, implement educational potential and use of ICT skills of the middle generation to ensure necessary quality of employment and standard of living of households by the time they move to the older generation group.

Materials and methods

To conduct the study based on representative data of the 30th wave (2021) of the Russian Monitoring of Economic Situation and Population Health of the National Research University Higher School of Economics (RMEH NRU HSE), a sample was formed from people of the middle generation in the age from 36 years to retirement limits (in accordance with the transition period of pension reform for 2021 for women – 56.5 years; for men – 61.5). Among them the employed and the unemployed were identified (in accordance with ILO criteria). Analysis was carried out according to developed methodology for them. Research sample consisted of 3,100 people. Methodological solutions used in research to group representatives of the middle generation by level of qualifications, ICT skills, education and living standards, are based on the original authors' approaches published earlier (Bobkov et al., 2022a; Bobkov et al., 2022 b; Precarious employment..., 2019). At the same time, authors realize that the category analyzed in the age from 36 years to the retirement age is a rather heterogeneous social group, covering people with different life prospects, attitudes, values, labor potential and behavior, marital status, household composition, etc. As part of subsequent, more in-depth theoretical developments related to issues identified, it is advisable to consider influence features of precarity on employment quality and living standard of households of middle-generation workers, taking into account these socio-demographic characteristics.

Research presents representatives of the middle generation according to their employment status in three categories (groups):

I. Engaged in the most skilled labor;

II. Employed in skilled labor;

III. Employed in unskilled labor.

Based on membership in an occupation group according to the National Classification of Occupations, representatives of the first group have the third and fourth (highest) level of qualifications (groups 1–3 and 01–02 according to the National Classification of Occupations). This group includes managers, specialists of higher and medium qualification levels, officers and non-officer military personnel. People engaged in skilled labor have the second level of qualification (groups 4–8 according to the National Classification of Occupations), these include employees engaged in the preparation and execution of documentation, accounting and maintenance; workers in service and trade sectors, protection of citizens and property; qualified workers in agriculture, forestry, fish farming and fishing; skilled workers in industry, construction, transport and related workers; plant and machine operators, assemblers and drivers. The first (lowest) level of qualification (groups 9 and 03 according to the National Classification of Occupations) is typical for people employed in unskilled labor from among workers without qualifications and ordinary military personnel.

The specifications of each employment situation group are determined by the level of education and ICT skills of workers. Gradation of educational characteristics assumes presence of employed and unemployed people of the middle generation group, both with secondary vocational education and above and without vocational education. Ranking of ICT skills is based on a three-level classification:

– the third (highest) level of ICT skills includes specialized skills (ICT specialists);

– the second (medium) level of ICT skills involves user skills related to professional activities;

– the first (low) level of ICT skills covers basic skills not related to professional activities (Bobkov et al., 2022b).

To identify presence and concentration of precarious employment among people of the middle generation, the original authors' classification was used, including two groups of indicators of employment precarity *(Tab. 1)*.

Employed people are divided into three categories based on presence and concentration of precarity indicators in percentage terms for each group.

1. Steadily employed (lack of indicators for employed).

2. Transition group (occupied with 1–4 non-key indicators).

3. Precariously employed (three levels of precarity indicators concentration):

3.1. Moderate – employed with 1–2 key indicators;

3.2. High – employed people have 1–2 key and 1–4 non-key indicators;

Table 1. Classification of indicators of precarious employment

Key indicators of employment precarity	Non-key indicators of employment precarity
(1) Employment based on verbal agreement without paperwork (2) Level of income from main employment that does not ensure stability of financial situation of households (3) Forced unpaid leave at initiative of employer (4) No paid leave (5) Employer reducing wages or reducing hours of work	(1) Self-employment in the informal sector (2) Wages arrears (3) Unofficial (partial or full) income from employment (4) Deviating from standard working hours: a working week of more than 40 hours or no more than 30 hours (at the main place of work)
Source: (Odintsova, 2023; Level and quality of life..., 2022).	

3.3. The highest are employed with 3–5 key indicators, which may be accompanied by 1–4 non-key indicators (Odintsova, 2023).

This typology with identical status range is taken as the basis for grouping employed and unemployed people of the middle generation according to living standards. Based on income and consumption criteria, four categories of households are identified:

– the least wealthy (poor);
– low-income;
– below average wealth;
– medium- and high-income (Bobkov et al., 2022a).

Results and discussion

Analyzing distribution of people employed in the most skilled labor of generational group "Middle Generation" by presence and concentration of precarity indicators and employment situation, it should be noted that the largest share of stable (48%) and precariously employed people with different concentration levels of precarity indicators (9.3% – with the highest concentration of indicators) has the second (average) level of ICT skills (user skills related to professional activities; *Tab. 2*). This may be due to the higher level of ICT skills in the middle age group relative to the older generation, as well as prevalence of relevant professions in the age groups under 50 years old.

The least representative are groups of middle-generation workers with secondary vocational education and higher, who have the third (highest) level of ICT skills (specialized skills). Share of steadily employed people in this category was 7.3%. Meanwhile, among people employed in the most skilled labor with the third level of ICT skills, no employees with the highest concentration of precarity indicators were identified. This indicates that workers with high level of education and ICT proficiency have more stable jobs and are less likely to face employment precarity. In the transition

Table 2. Distribution of people employed in the most skilled labor of the generational group "Middle Generation" by presence and concentration of precarity indicators and employment situation, 2021

Characteristics of the group by employment status	Groups by presence and concentration of precarity indicators, % for each group				
Level of ICT skills / Level of education	Sustainably Employed	Transition group	Precariously employed		
			With moderate concentration of indicators	*With high concentration of indicators*	*With the highest concentration of indicators*
Third (highest) level of ICT skills (specialized skills) – ICT specialists / Secondary vocational and higher	7.3	1.9	1.7	0.7	0.0
Second (medium) level of ICT skills (user skills related to professional activity) / Secondary vocational and higher, as well as without vocational education	48.0	25.2	39.6	22.3	9.3
First (low) level of ICT skills (basic skills not related to professional activities) / Secondary vocational and higher, as well as without vocational education	10.9	9.3	11.3	10.8	3.1

Note: The total value of columns is 100%.
Source: own compilation based on RMEH by the National Research University Higher School of Economics.

group, there is a high proportion (25.2%) of middle-generation workers with the second (average) level of ICT skills.

Employed middle-generation workers with the first (low) level of ICT skills (basic skills not related to professional activities but necessary for use in everyday life: for communication, study, entertainment, etc.) are evenly distributed in groups according to their availability and the concentration of precarity indicators (from 10.9% – steadily employed to 10.8% – precariously employed with a high concentration of indicators). In this case, lack of specialized skills in the field of ICT, due to their lower importance in professional activity, does not act as a factor in employment precarity.

More detailed analysis of the data presented in Table 2 shows that the average level of ICT skills plays a significant role in ensuring employment for the middle generation. This may be due to the fact that modern jobs increasingly require use of computer technology and information skills. Therefore, having an average level of ICT skills can be important factor in professional development. This also points to the need to improve workers' ICT skills to ensure competitiveness in labor market.

In the structure of middle-generation citizens employed in skilled labor, in terms of presence and concentration of precarity indicators and employment situation, people with a low level of ICT skills (basic skills not related to professional activity) and without vocational education predominate. Moreover, among them there is a significant proportion of precariously employed people with high (31.8%) and the highest (49.7%) concentration of precarity indicators *(Tab. 3)*.

Table 3. Distribution of those employed in skilled labor in the "Middle Generation" generational group by the presence and concentration of precarity indicators and employment situation, 2021

Characteristics of the group by employment status	Groups by presence and concentration of precarity indicators, % for each group				
Level of ICT skills / The level of education	Sustainably Employed	Transition group	Precariously employed		
			With moderate concentration of indicators	*With high concentration of indicators*	*With the highest concentration of indicators*
Second (medium) level of ICT skills (user skills related to professional activities) / Secondary professional and higher	4.0	1.6	4.5	3.9	2.5
First (low) level of ICT skills (basic skills not related to professional activity) / Secondary professional and higher	11.6	24.4	15.4	19.9	22.4
Second (medium) level of ICT skills (user skills related to professional activities) / Without vocational education	1.8	1.1	1.9	2.0	2.5
First (low) level of ICT skills (basic skills not related to professional activity) / Without professional education	13.8	33.6	19.5	31.8	49.7

Note: The total value of the columns is 100%.
Source: own compilation based on RMEH by the National Research University Higher School of Economics.

The lack of vocational education and the presence of basic, non-professional ICT skills among people employed in skilled labor of the middle generation group determines not only high concentration of precarity indicators but also their presence in the transition group (33.6%), forcing this category of citizens to balance between stable and precarious employment. Decrease in precarity and increase in stable employment of middle-generation citizens engaged in skilled labor correlate with expansion of ICT skills variability associated with professional activities, as well as increase in the level of education from secondary vocational and higher.

Considering distribution of people employed in unskilled labor in the middle generation group by presence and concentration of precarity indicators and employment situation, we can highlight a slight predominance of precariously employed people without vocational education with the first (low) level of ICT skills (basic skills not related to professional activity; *Tab. 4*).

Therefore, share of people with the highest concentration of precarity indicators is 6.8%. Similar indicators are lower for precariously employed people with education at the secondary vocational level and higher. This value indicates that education can act as one of factors in reducing precarity of employment. The higher the level of education, the greater chances of a stable and well-paid job. Persons with a high concentration of precarity indicators often do not have professional education.

Unemployed people (people with extreme form of precarity – temporary unemployment) with secondary or higher vocational education and a higher level of ICT skills (specialized skills; ICT specialists) make up only 6% of the total number of unemployed in the middle generation group *(Tab. 5)*, which is completely corresponds to the value of the third group of unemployed people without vocational education and with an average level of ICT skills. Meanwhile, the share of unemployed people with an average level of ICT skills (user skills related to professional activities) is many times higher (26%). The highest risks of acquiring unemployed status are associated with the first (low) level of ICT skills (basic skills not related to professional activity) and the lack of vocational education. The share of carriers of an

Table 4. Distribution of people employed in unskilled labor in generational group "Middle Generation" by presence and concentration of precarity indicators and employment situation, 2021

Characteristics of the group by employment status	Groups by presence and concentration of precarity indicators, % for each group				
Level of ICT skills / The level of education	Sustainably Employed	Transition group	Precariously employed		
			With moderate concentration of indicators	*With high concentration of indicators*	*With the highest concentration of indicators*
First (low) level of ICT skills (basic skills not related to professional activity) / Secondary professional and higher	1.1	0.5	1.7	2.2	3.7
First (low) level of ICT skills (basic skills not related to professional activity) / Without professional education	1.5	2.4	4.4	6.4	6.8

Note: The total value of the columns is 100%.
Source: own compilation based on RMEH by the National Research University Higher School of Economics.

Table 5. Distribution of unemployed (people with extreme form of precarity – temporary unemployment) of the generational group "Middle Generation" by employment situation, 2021

Group	Characteristics of the group by employment status		*% of the unemployed in the "Middle Generation" generation group*
	Level of ICT skills	Level of education	
I. Unemployed people with secondary or higher vocational education and a high level of ICT skills	Third (highest) level of ICT skills (specialized skills), ICT specialists	Secondary professional and higher	6.0
	Second (medium) level of ICT skills (user skills related to professional activities)	Secondary professional and higher	26.0
II. Unemployed with secondary or higher vocational education and low level of ICT skills	First (low) level of ICT skills (basic skills not related to professional activities)	Higher education and higher	-
	First (low) level of ICT skills (basic skills not related to professional activities)	Secondary vocational	14.0
III. Unemployed without vocational education and with low and medium levels of ICT skills	Second (medium) level of ICT skills (user skills related to professional activities)	Without professional education	6.0
	First (low) level of ICT skills (basic skills not related to professional activities)	Without professional education	48.0

Note: "-" – there are not enough observations to conduct an assessment. Source: own compilation based on RMEH by the National Research University Higher School of Economics.

extreme form of precarity with these characteristics amounted to 48% of unemployed of the middle generation group.

Based on data in Table 5, we can conclude that the presence of professional education and specialized user skills related to professional activities does not guarantee protection against extreme form of precarity – temporary unemployment. Such a situation may indicate an imbalance of supply and demand in labor market or low demand and uncompetitiveness of such ICT skills. Acquiring the status of unemployed is associated with risks of drop in living standards, long-term unemployment and decrease in qualifications; it aggravates situation of unemployed if they lack vocational education and have a low level of skills in the field of information and communication technologies. According to research, almost half of unemployed citizens of the middle generation are at high risk of precarity and decline in living standards.

Impact of precarity on living standard of households of middle-generation workers

Assessing representatives of middle generation by presence and concentration of precarity indicators through the prism of living standards, it should be noted that the most representative in terms of coverage of both stable and precarious workers is the category of low-income households of workers with per capita incomes of 1–2 living wages (LW) and with income used for consumption in amount of 1–2 consumer baskets (CB). Share of steadily employed people with per capita incomes of 1–2 living wages is 37.6%, and with incomes used for consumption of 1–2 LWs– 56.8% *(Tab. 6)*.

Next in the group of steadily employed citizens of the middle generation, in descending order, are households of workers who are well-off below average, with per capita incomes of 2–3.1 living wages – 31.4%, middle- and high-income households with per capita incomes of 3.1 living wages and above –26.3%. The list is completed

Table 6. Distribution of economically active population (EAP) of the generation group "Middle Generation" by presence and concentration of precarity indicators and standard of living, 2021

Living Standards Group	Groups by presence and concentration of precarity indicators, % for each group					
	Sustainably Employed	Transition group	Precariously employed			
			With moderate concentration of indicators	*With high concentration of indicators*	*With the highest concentration of indicators*	*Unemployed*
Least affluent (poor)						
With per capita income less than 1 living wage	4.7	12.2	11.0	10.6	15.3	44.7
With income used for consumption less than 1 CB	19.9	30.0	28.0	28.5	25.4	34.3
Low income						
With per capita income 1–2 living wages	37.6	42.5	53.0	54.1	61.0	45.6
With income used for consumption, 1–2 CB	56.8	55.4	58.8	58.3	60.2	60.2
Wealthy below average						
With per capita income 2–3.1 living wages	31.4	31.5	27.9	26.0	20.0	7.9
With income used for consumption, 2–3.1 CB	15.8	10.9	10.9	10.5	13.3	4.6
Middle and high income						
With per capita income 3.1 living wages and more	26.3	13.8	8.1	9.3	3.7	1.8
With income used for consumption 3.1 CB and more	7.5	3.7	2.3	2.7	1.1	0.9
Source: own compilation based on RMEH by the National Research University Higher School of Economics.						

by a small group of the least wealthy (poor) households of middle-generation workers with per capita incomes of less than 1living wage – 4.7%. In this group share of steadily employed citizens with income used for consumption of less than 1 CB is 19.9%. Among the well-to-do below average with income used for consumption, 2–3.1 CBs – 15.8%. In the category of medium- and high-income people with income used for consumption of 3.1 CBs and more, share of steadily employed people is at the level of 7.5%.

An extremely high level (61%) of precarity with the highest concentration of indicators is observed among low-income households of middle-generation workers with per capita incomes of 1–2 living wages. Share of low-income households of middle-generation workers with moderate (53%) and high (54.1%) concentrations of precarity indicators is also significant. In the context of each group of precariously employed people based on the concentration of indicators of precarity, low-income households of workers with income used

for consumption in amount of 1–2 CBs average about 60%. This suggests that precarious employment is a problem affecting a large proportion of low-income, middle-aged segment of population. Such citizens face an increased risk of employment precarity, which significantly complicates their financial stability and social status. At the same time, the high percentage of precarity among members of this group indicates the need to take measures aimed at improving their economic situation.

Relatively high levels of precarious employment are typical for households of middle-generation workers with below-average income. However, unlike low-income households, this category of people with per capita incomes of 2–3.1 living wages demonstrates opposite dynamics, expressed in the predominance of employed people with a moderate concentration of precarity indicators (27.9%) over those with the highest concentration of indicators (20%). Share of precariously employed people with the highest concentration of indicators and consumption income of 2–3.1 CBs relative to the first two groups is low (13.3%).

Percentage of precariously employed people among the least wealthy (poor) with per capita incomes of less than 1 living wage varies in the range from 11% – a group with moderate concentration of indicators, which is approximately on the same level as the middle- and high-income ones, to 15.3% – a group with the highest concentration of precarity indicators. Over 28% of the least wealthy (poor) with income used for consumption of less than 1 CB are characterized by both moderate and high concentration of precarity indicators of employment.

The lowest concentration of precariously employed people was identified among medium- and high-income households of middle-generation workers with income used for consumption of 3.1 CBs and more. At the same time, representatives of this group with relatively high standards of living rarely act as carriers of extreme precarity and are practically not exposed to risks of temporary unemployment due to presence of professional education and ICT skills that correspond to high standards of living.

Share of unemployed in the group of middle- and high-income people with per capita incomes of 3.1 monthly income and more is only 1.8%, and among people with income used for consumption of 3.1 monthly income and more – no more than 1% (0.9 %). As the level of income in households of middle-generation workers declines, share of unemployed increases across groups represented by living standards. If among wealthy below average this value varies in the range from 4.6 to 7.9%, then among poor and low-income people with per capita incomes of no more than 2 LWs, share of unemployed is about 45%. This high value indicates serious problems associated with providing employment for these groups and insufficient support from the state. A high level of unemployment (60.2%) is observed in the group of low-income people with income used for consumption in the amount of 1–2 CBs. Percentage of unemployed among the least wealthy (poor) with income used for consumption of less than 1 CB is almost twice as low. This is due to small representation of middle-generation people in this group in terms of living standards relative to other generational groups and their predominance in the group of low-income citizens. In terms of living standards, 42.5 and 55.4% of low-income households of middle-generation workers are in the transition group. Also represented there are the least wealthy (poor) with income used for consumption of less than 1 CB – 30%, and below average with income per capita 2–3.1 CBs – 31.5%.

Living standards models of households of middle-generation workers depending on concentration of precarity indicators and characteristics of employment situation

Research results on distribution of employed and unemployed people by income level generally characterize the modern model of socio-economic differentiation, which makes absolute limited opportunities for overwhelming majority of households of middle-generation workers to obtain higher labor incomes and improve living standards. Data shows a significant gap between those who have access to high-paying jobs and those who earn below the medium income. It is important to note that such differentiation not only aggravates social inequality but also creates serious obstacles to improving living standard of country's population.

Middle-generation workers with higher levels of ICT skills are more likely to earn employment income needed to support average and above-average household incomes. It is likely that the higher the ICT skills level, the wider the range of opportunities to "convert" them into higher employment income. This statement is true without taking into account differentiation of income from employment depending on industry: employment with the same level of ICT skills in different industries can provide different levels of income. Analysis of share of unemployed in different groups with different income levels allows us to conclude that the lower the income, the higher the share of unemployed. This circumstance requires increased attention and measures from government to reduce unemployment and support low-income citizens.

Characterizing living standard models of households of middle-generation workers depending on concentration of precarity indicators and specification of their employment situation, it is necessary to highlight some features inherent in groups in question in terms of living standards.

Least wealthy (poor)

Approximately a quarter of the least wealthy households of middle-generation workers are exposed to risks of precarity and almost 45% are carriers of the extreme form of precarity – temporary unemployment. It is well known that unemployed citizens, especially for a long period, are in an unfavorable situation and experience financial difficulties. Problems of low quality of employment and low labor income negatively affect living standard of unemployed, low-income citizens and members of their households. These households are faced with the need to survive on income that is insufficient to meet basic human needs, with limited opportunities to improve their own situation. Overcoming this situation requires systemic measures to combat precarity and create real conditions for decent work.

Low income

Precarious employment is widespread, mostly among low-income households of middle-generation workers with per capita incomes of 1–2 LWs. Low-income households of middle-generation workers are in a complex contradictory situation. They do not fall into category of poor but cannot be considered wealthy either. Labor activity that generates an income of less than two subsistence minimums indicates low quality of employment and low standard of living. Low income may be result of insufficient wages, lack of stable employment or limited opportunities for professional growth, which are key markers of precarity, concentration of indicators of which is most pronounced in this group. A low level of income from primary employment can lead to financial deficit, making it difficult to cover the basic needs of employed people and their families for quality food, medical care, housing and education. In this regard, there is a need for government policies aimed at increasing incomes and ensuring equal opportunities for all employed citizens.

Wealthy below average

Among households of workers in this group with income used for consumption in the amount of 2–3.1 CBs, the majority are employed, whose concentration of precarity indicators is moderate. This may be due to the fact that this category of people has a certain stability of income and a higher standard of living compared to the first two groups. Despite this, the group also represents a considerable proportion of employed people with the high (26%) and the highest (20%) concentration of precarity indicators, which may be caused by lack of qualifications, lack of opportunities for career growth or underemployment. At the same time, the group is not homogeneous; within it there may be people with different professions, age cohorts, education and level of ICT skills. These factors can determine quality of employment and help improve living standard of this category.

Middle and high income

Representatives of this group are less exposed to risks of precarity, including its extreme form, due to presence of professional education and developed ICT skills. However, this category of households may face other problems, such as stress, overexertion and imbalance in work-family-life balance. Within this issue, additional research is needed to establish relationship between these negative effects and employment precarity of medium- and high-income households of middle-generation workers.

In modern realities of globalization processes intensification and rapid development of information and communication technologies, strategic vector to limit precarious employment spread, improve standard of living and quality of employment for all workers, including representatives of the middle generation, should be an absolute priority of state policy. We consider it advisable to formulate a number of practical recommendations aimed at neutralizing threats of precarity, implementing educational potential and using ICT skills of the middle generation to improve standard of living of households:

– minimize share of fixed-term labor agreements and temporary contracts in public sector, to reduce use of contractors, temporary and freelance positions in it;

– create transitive programs for transition from temporary to permanent jobs;

– make social protection more inclusive to ensure basic guarantees and facilitate access for middle-generation workers with a high concentration of precarity risks;

– use of temporary workers should be subject to legal restrictions;

– establish decent jobs as a priority over transnational profits in trade agreements;

– maintain regular group meetings or actively seek feedback to analyze problems and ideas of middle-generation workers and partner with them to find solutions or to improve working conditions;

– promote inclusive workforce initiatives, such as career planning at the start of any period of non-regular work and expanding training opportunities to place middle-generation workers in precarious jobs;

– create trust funds to provide temporary financial support for workers of the middle generation group with the highest concentration of precarity indicators and low levels of ICT skills;

– conduct regular advanced training in digital literacy programs for middle-generation workers with low levels of ICT skills employed in low-paid and unstable jobs in health care, elderly and child care sectors;

– expand list of electronic services and Internet resources aimed at users with any level of ICT skills, intended for unemployed middle-generation citizens who have difficulty finding work;

– apply tools of socially responsible restructuring in the process of releasing middle-generation workers with the high and highest concentration of precarity indicators.

Conclusion

Summarizing research results, it should be concluded that high level of education and specialized ICT skills corresponds with stable employment and the lowest risks of precarity. Due to improvement in quality of employment, determined by higher levels of ICT skills, qualifications and specialization, risks of precarity are reduced. Problem of employment precarity is not limited only to the poor. It is common among all social groups according to living standards. Precarity affects not only economic sphere but also negatively affects psychological and physical health of people, leading to decrease in their standard of living and social instability.

Employed Russians have more developed digital competencies than unemployed ones. Among unemployed with low and medium levels of ICT skills, high risks of not realizing their labor potential were identified (48%). Middle-generation workers with professional education have greater opportunities in labor market and are more likely to apply for decent jobs. At the same time, unskilled labor remains one of the main sources of precarity, which is reflected in low levels of ICT skills and lack of vocational education among this group of workers. However, labor precarity is not limited to unskilled workers. In some cases, people with a high level of education, including those employed in the most skilled labor, are exposed to risks of precarity due to unfavorable economic conditions, technological changes and other factors. Therefore, to increase competitiveness and adaptability to changes in labor market, it is important to carry out continuous training and improve ICT skills[1].

In the context of the growing influence of precarity on employment quality and living standard of households of middle-generation workers, it is extremely important for all interested parties to carry out systematic activities to minimize negative effects of this phenomenon and maximize use of education and ICT skills to improve living standard of this generational group.

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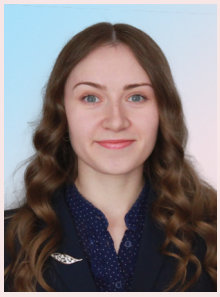
Modern Territorial and Socio-Demographic Specifics of Long-Distance Commuting in Russia



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Abstract. The uneven spatial development of Russia is manifested not only in the heterogeneity of residents' settlement, but also in the transformation of the socio-economic sphere, including local labor markets shrinkage, which inevitably affects migration mobility. One of the most common types of migration is return short-term labor migration (otkhodnichestvo), in particular, long-distance commuting. Taking into account the socio-economic and socio-cultural contrasts of urban and rural areas, it is important to understand the differences in the scale of long-distance commuting and in the portrait of migrants themselves. The aim of the research is to assess regional differences in the contribution of rural and urban population to long-distance commuting, to identify socio-demographic characteristics of rural and urban rotational labor migrants. The information base includes data from the All-Russian Population Census-2020 and the selective monitoring of the use of the daily temporal resource by the

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population-2019. It is confirmed that rural population is more involved in long-distance commuting. Despite the fact that urban and rural long-distance commuting workers are involved mainly in long-term migration, the proportion of long-term departures is noticeably higher among the former, while short-term trips are more common among the latter. It is established that the majority of urban residents leave for work to other regions, while every third long-distance commuting migrant from rural areas leaves for work within the region of their residence. It is shown that Russia's regions are markedly differentiated by the share of urban and rural residents in the total number of long-distance commuting migrants, and by the ratio of the contribution of urban and rural residents to general, short-term and long-term long-distance commuting, as well as intraregional and interregional long-distance commuting work. Typical features were confirmed in the socio-demographic portrait of long-distance commuting migrants, and rural–urban differences were revealed.

Key words: otkhodnichestvo, long-distance commuting, rural–urban differences, socio-demographic portrait.

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Introduction

A manifestation of spatial transformations in Russia expressed in compression of socio-economic space, its polarization and heterogeneity of residents' settlement, is otkhodnichestvo – a return short-term labor migration. Increasing polarization of cities and rural areas leads to increase in intensity of population labor mobility, inability to earn money in place of residence, blocking of vertical mobility contribute to its development into horizontal (spatial) mobility[1]. Studies of municipal areas of the Non-Black Earth Region have proven widespread prevalence of long-distance commuting among rural working population. Depending on location characteristics and socio-economic situation, such movements affect from 1.3 to 1.2 of working population (Averkieva, 2013, p. 110). The key driver of long-distance commuting from rural areas is mass bankruptcy and liquidation of agricultural enterprises, which is especially important for regions with low agroclimatic potential in the Non-Black Earth Region of the European part of Russia (Fokin, 2016, p. 85). Prevalence of long-distance work in small towns is significantly higher than in cities, which are acceptors of labor migration. Main reasons for long-distance commuting from small towns are low pay, lack of work, dismissal and desire to change life through migration[2]. A common feature of leaving rural and urban areas for purpose of earning money is its forced nature, largely due to the need to feed family in conditions of tightening local labor markets or discrepancy between available jobs, population skills and needs. (Averkieva, 2016, p. 26).

[1] Nefedova T.G. (2015). Otkhodnichestvo in migration system in Post-Soviet Russia. Prerequisites. Demoscope Weekly, 641–642. Available at: http://demoscope.ru/weekly/2015/0641/tema01.php (accessed: April 9, 2024).

[2] Mkrtchyan N.V., Florinskaya Yu.F. (2017). Labor migration from Russian hinterland. Demoscope Weekly, 735–736. Available at: http://demoscope.ru/weekly/2017/0735/tema01.php (accessed: April 9, 2024).

It is important to determine socio-demographic portrait of long-distance commuters: gender, age, marital, educational, occupational and income characteristics of this group. Taking into account socio-economic and socio-cultural differences in urban and rural areas, it is important to study the portrait of such migrants in relation to people from urban areas and villages.

Despite attention of scientists to the topic of short-term (return) labor migration and of otkhodnichestvo in recent decades, it is necessary to conduct in-depth research of certain migration types, including long-distance commuting. ***Our research aims*** to assess regional differences in contribution of rural and urban population to long-distance commuting, to identify socio-demographic characteristics of rural and urban long-distance migrants.

The first research hypothesis was differences assumption in involvement degree of rural and urban population in long-distance commuting, including different frequency (short-term and long-term) and direction (intraregional and interregional). In addition, it is assumed that Russian regions are noticeably differentiated in terms of rural and urban contribution to long-distance commuting. According to the second hypothesis, there are significant differences in socio-demographic portrait of rural and urban long-distance commuting workers due to socio-economic and socio-cultural specifics of rural and urban areas and population life style.

Theoretical and methodological aspects

Research interest in return labor migration arose in the second half of the 20th century. It was caused by intensity and diversity increase of such flows at various territorial levels (from international to local), strengthening of short-term migration in everyday life and increasingly significant impact on settlement and economy (Makhrova et al., 2022). Scale and settlement characteristics of return labor migration were first studied in economic geography, within framework *mobile transition concepts* (Zelinsky, 1971) *and "new mobility"* (Sheller, Urry, 2006), *counter-urbanization* (Halfacree, 2012), *differential urbanization and evolution of settlement* (Fielding, 1989; Zayonchkovskaya, 1991; Nefedova et al., 2015), *center-periphery concept of spatial development* (Swiaczny et al. al ., 2009; Mkrtchyan, Florinskaya, 2016).

The phenomenon of pre-revolutionary otkhodnichestvo (mass leaving of peasants to urban areas) was actively studied by Soviet historians S.L. Burkin (Burkin, 1978), B.V. Tikhonov (Tikhonov, 1978), P.G. Ryndzyunsky (Ryndzyunsky, 1983). Then this topic fell out of scientific view for some time. Since 1980, otkhodnichestvo research has been resumed. We analyzed new phenomenon of "shabashnichestvo" (unofficial seasonal work outside the region of permanent residence), which became widespread in the 1960–1980. (Valetov, 2008). In early 1990 in connection with increasing intensity of internal return labor migration against backdrop of serious socio-economic shocks in Russia, the first works on modern, or new otkhodnichestvo appeared (Shabanova, 1992). In 2000 this phenomena has been studied by Russian economists, geographers and sociologists (Plyusnin et al., 2013; Nefedova, 2015a; Nefedova, 2015b ; Leksin, 2021, etc.)

In the second decade of 2000 due to results of 2010 All-Russian Population Census and sample labor force surveys (since 2011), it became possible to assess prevalence of return labor migration. However, as noted by E.V. Antonov, if the data from sample surveys representative at the level of constituent entities of the Russian Federation, are presented in a generalized form and do not enable studying regional differentiation of labor mobility or conducting analysis at the level of municipalities and settlements, the census provided such an opportunity (Antonov, 2016, p. 55). During this period works devoted not only to national scale but also to geographic and settlement characteristics

of otkhodnichestvo appeared (Nefedova, 2015b; Florinskaya et al., 2015; Averkieva et al., 2016; Antonov, 2016). According to research, the main "center of gravity" for internal labor migrants (including otkhodniks) is the capital region (Moscow and the Moscow Region), for which the Central Federal District and the Volga region often become suppliers. The Volga region, Siberia and other Ural regions supply with people oil and gas regions of the Ural (Tyumen Region, Khanty-Mansiysk Autonomous Area and Yamal-Nenets Autonomous Area) (Florinskaya et al., 2015, pp. 34–35). The issue of otkhodnichestvo from rural areas and its role in providing employment to rural population was studied by K.V. Averkieva (Averkieva, 2016), leaving urban areas, in particular from small and medium-sized cities, was considered in detail by T.G. Roshchina, Yu.F. Florinskaya and N.V. Mkrtchyan[3] (Roshchina, 2007; Mkrtchyan, Florinskaya, 2019).

Yu.F. Florinskaya used data from sample labor force surveys to study socio-demographic characteristics of short-term labor migrants (Florinskaya et al., 2015). Some studies used sociological methods to identify portrait of a modern otkhodnik, including a long-distance commuting worker (Plyusnin et al., 2013; Zhidkevich, 2016; Turakaev, Baymurzina, 2022). According to the results, a long-distance commuting worker is a middle-aged man (30–49 years old), a resident of a rural area, working at gas and oil enterprises, married and has children (Turakaev, Baymurzina, 2022; Kasatkina et al., 2023). Education level of long-distance commuters vary: in some cases, this category is dominated by people with primary or secondary vocational education (Zhidkevich, 2016; Turakaev, Baymurzina, 2022), in others – with higher or incomplete higher education (Kasatkina et al., 2023).

However, it seems important to consider socio-demographic portrait of a long-distance commuter in a settlement context, since settlement type (rural or urban) is recognized as the basic geographical factor in population labor mobility, along with spatial position of municipality relative to the nearest regional center and tension in the local labor market (Averkieva et al., 2016, p.175). Therefore, our research will focus on differences between urban and rural short-term migrants.

We follow approach according to which long-distance commuting, along with commuting, seasonal and push-pull migration, is a type of *new otkhodnichestvo, which is a return short-term* (for less than 12 months) labor migration (Sokolova, Kalachikova, 2023). At the same time long-distance commuting, like commuting, refers to a regular form of work. Regularity is ensured by a certain work schedule and involves systematic periods of time for migrants to return to their permanent place of residence (Sokolova, Kalachikova, 2023). Therefore, in this work, *long-distance commuting refers to return short-term regular labor migration*. Difference between commuting and long-distance commuting primarily lies in frequency and duration of movements. If the first one implies more frequent (daily or several times a week) and shorter trips, then the second one – more rare and longer trips. This work uses concepts of "otkhodnichestvo", "new otkhodnichestvo" and "otkhod", as well as "long-distance commuters", "long-distance workers" and "commuting workers" as synonyms.

Materials and methods

Unfortunately, there is no general statistic accounting of long-distance commuters in Russia, although statistical authorities collect information

[3] Florinskaya Yu.F., Roshchina T.G. (2004). Labor migration from small towns in Russia: Scale, directions, social effects. Demoscope Weekly, 175–176. Available at: http://demoscope.ru/weekly/2004/0175/analit03.php (accessed: April 12, 2024); Mkrtchyan N.V., Florinskaya Yu.F. (2017). Labor migration from cities of Russian hinterland. Demoscope Weekly, 735–736. Available at: http://demoscope.ru/weekly/2017/0735/tema01.php (accessed: April 12, 2024).

on number of such workers at enterprises. Due to lack of statistic on the number of long-distance workers in country and regions, researchers have to use alternative and often indirect sources of information – data from sociological surveys, sample surveys and population censuses. In this research, source of information on prevalence of long-distance commuting migrants in Russian Regions was the ***All-Russian Population Census-2020***. Long-distance commuters were conditionally taken to be people who go to work outside their place of residence several times a month, once a month or less, which makes it possible to separate them from commuting migrants who leave theirs places of residence daily or several times a week (Sokolova, Kalachikova, 2023, p. 314). At the same time, short-term migration is understood as leaving to earn money several times a month, and long-term migration meant going to work once a month or less. This approach meets authors' criteria for long-distance commuting: return, short-term and regular character.

Despite limitations of the All-Russian Population Census-2020 (among people who travel to work several times a month or less, there may be commuting and pull-push migrants who are seasonally employed outside their place of residence, as well as their transitional forms; it is not possible to determine regions receiving long-distance commuters, age of migrants, their education and occupation), its advantage is the ability to assess nationwide scale of long-distance commuting, its regional characteristics and directions, to identify settlement nature (Korolenko, 2023, p. 196).

To *analyze prevalence of long-distance commuting among urban and rural population*, share of long-distance workers in the total number of employed people working outside their place of residence and noting the frequency of such trips was calculated. To *determine contribution of urban and rural population to long-distance commuting*, their share in the total number of long-distance migrants was calculated. To *identify rural-urban differences in regional scale of long-distance commuting*, constituent entities of the Russian Federation were first grouped according to share of urban and rural populations in the total number of long-distance migrants, according to the contribution ratio of urban and rural population to the total, short-term and long-term, intraregional and interregional long-distance commuting; then a matrix of correlations among Russian regions was designed according to contribution of urban and rural population to long-distance commuting of different frequency and direction. Tabular and graphical methods were used to *visualize results*.

Source of socio-demographic characteristics of urban and rural long-distance commuting migrants were ***Selective monitoring of the use of the daily temporal resource by the population-2019.*** An individual survey questionnaire contained a question about work schedule[4], one of the answer options was "long-distance commuting." Respondents who chose this option were classified as long-distance commuters. Despite indirect approach to identifying the category of migrants in question (on issue of work schedule), it is consistent with definition of long-distance commuting, since, according to the Labor Code of the Russian Federation, long-distance commuting implies work outside the place of residence (when daily return to cannot be ensured), with limited periods of stay (no more than 1–3 months), alternating periods of work and rest (in accordance with the work schedule)[5], which ensures return, short-term and regular character of such trips.

Number of long-distance commuters in the total sample was 497 people, or 1.3% among working respondents, which corresponds to the All-Russian

[4] Working respondents were asked: "What is your work schedule?"

[5] Chapter 47. Peculiarities of labor regulation for long-distance commuters (Articles 297–302). Labor Code of the Russian Federation. Available at: https://base.garant.ru/12125268/3201b9e922528de35860ae879600576e/ (accessed: June 6, 2024).

Population Census-2020 – 2% of employed population in Russia (Korolenko, 2023, p. 197). The questionnaire also contained questions about gender and age of respondents, region of residence, type of territory and settlement, marital status and household composition, education, characteristics of employment, income, which allow us to study socio-demographic portrait of a rural and urban long-distance worker. Disadvantages of this information base include limited sample size, which does not allow deepening analysis (for example, by region of the Russian Federation); time limit of examination; predominance of urban residents over rural residents among long-distance workers (304 people versus 194), which differs with results of other studies and is largely explained by characteristics of the sample (not representative by the settlement type of workers with a long-distance commuting schedule). Nevertheless, possibility of studying a portrait of a long-distance commuter at the settlement level, due to information availability about type of residence place, "outweighs" methodological limitations of census data.

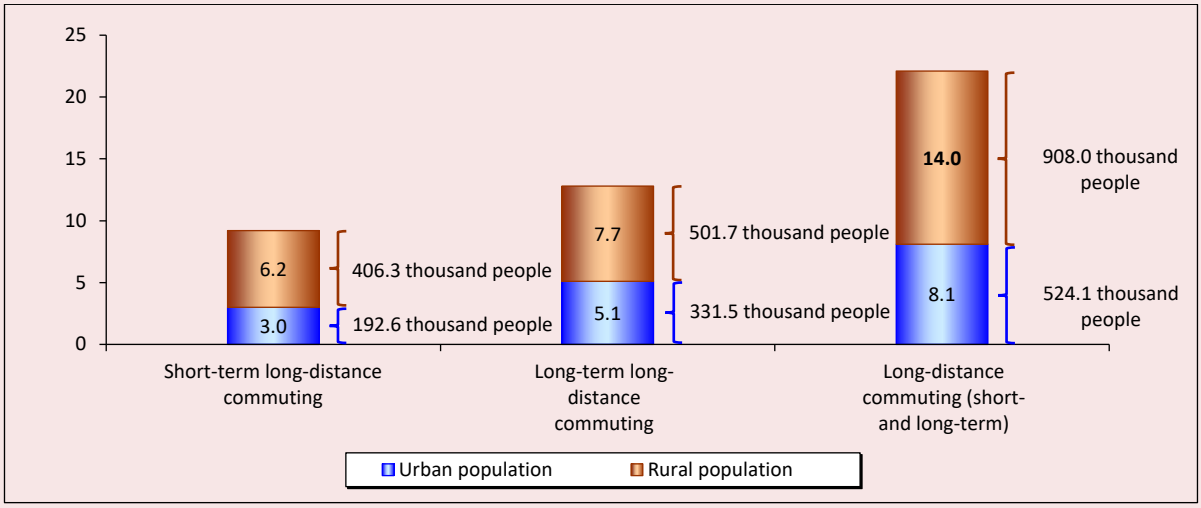
Main results

Rural and urban long-distance commuting: differences and regional specifics

Long-distance commuters make up 22% of the total employed population working outside their place of residence. 14% of them are rural and 8% are urban residents (Fig. 1). Long-term trips are more common among long-distance commuters (13% of the total employed population leaving for work, 8% are rural and 5% are urban residents). The share of short-term long-distance commuters is 9%, 6% of them are rural and 3% are urban residents.

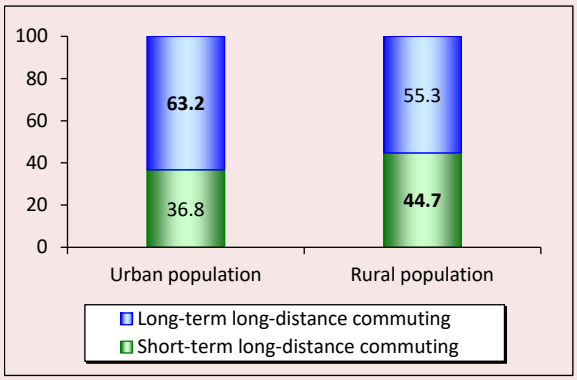
Both among urban and rural population who go long-distance to earn money, long-term migrations predominate, but their share is higher among the former (63% versus 55), while short-term trips are more common among the latter (45% versus 37; *Fig. 2*). Urban long-distance commuters, compared to rural ones, are more involved in interregional movements (78% versus 63), while more than a third of rural commuters travel within their region of residence (36% versus 18% for urban ones; *Fig. 3*).

Figure 1. Long-distance commuting of different frequency according the urban and rural percentage, % of the number of people who work outside their place of residence and who indicated departure frequency



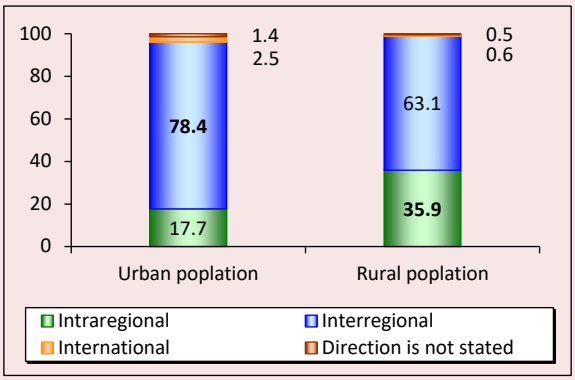
Source: All-Russian Population Census-2020. Volume 10. Labor force. Available at: https://rosstat.gov.ru/vpn/2020/Tom10_Rabochaya_sila

Figure 2. Urban and rural long-distance commuting by departure frequency, % of the number of people who work outside their place of residence and who indicated departure frequency



Source: All-Russian Population Census-2020. Volume 10. Labor force. Available at: https://rosstat.gov.ru/vpn/2020/Tom10_Rabochaya_sila

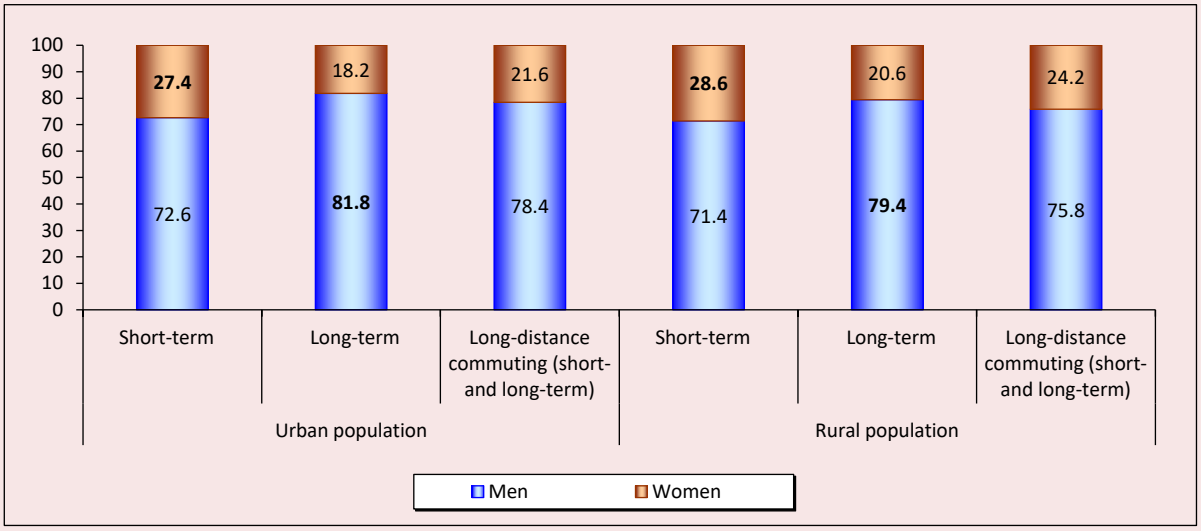
Figure 3. Urban and rural long-distance commuting by departure direction, % of the number of people who work outside their place of residence and who indicated departure frequency



Source: All-Russian Population Census-2020. Volume 10. Labor force. Available at: https://rosstat.gov.ru/vpn/2020/Tom10_Rabochaya_sila

By gender, men predominate among urban and rural long-distance commuters (78 and 76%, respectively; *Fig. 4*). The largest share of men is noted in the category of those who travel long-term to earn money (82% among urban population and 79% among rural population). Share of women is slightly larger among short-term long-distance commuters (29% rural and 27% urban), but is still inferior to the proportion of men.

Figure 4. Urban and rural long-distance commuting by gender, % of the number of people who work outside their place of residence and who indicated departure frequency



Source: All-Russian Population Census-2020. Volume 10. Labor force. Available at: https://rosstat.gov.ru/vpn/2020/Tom10_Rabochaya_sila

Let us note regional differences in rural and urban long-distance commuting. Based on the ratio of urban and rural long-distance commuters, Russian regions were divided into three groups *(Tab. 1)*. More than half of constituent entities of the Russian Federation found themselves in the group of regions with rural predominance in the total number of long-distance commuters (48 out of 85). The largest proportion of rural go long-distance to earn money is typical for Chechen (92%), Dagestan (91%), Karachayevo-Circassian (83%), Kalmykia (81%), Altai (79%), Tyva (78%) republics, Lipetsk (83%) and Voronezh (80%) regions. These are primarily regions with a high share of rural population: in 2021 Altai reached 71%, Chechen Republic – 62%, Karachayevo-Circassian Republic – 57%, Dagestan – 55%, Kalmykia – 54%, Tyva – 46%. Some of them are characterized by a low standard of living, especially rural areas. They occupy the last positions among constituent entities of the Russian Federation by per capita income (Tyva, Altai, Kalmykia)[6], as well as first places by unemployment (Dagestan, Karachayevo-Circassian Republic, Chechen Republic, Altai, Tyva, Kalmykia)[7]. This fact is confirmed by the results of Russian studies, according to which the most important push factor for leaving is low wages or income (Averkieva et al., 2016, p. 146). In addition, regions of the North Caucasus and Southern Russia are characterized by high

Table 1. Russian regions according to the ratio of urban and rural contribution to the total long-distance commuting

Group	Number	Regions
Regions with rural predominance in the number of long-distance commuters (60% or more*)*	48	Omsk (60%), Amur (60%), Arkhangelsk (62%), Samara (62%), Kaluga (63%), Tomsk (63%), Novosibirsk (63%), Ulyanovsk (63%), Nizhny Novgorod (64%), Kursk (65%), Rostov (65%), Tyumen (65%), Saratov (66%), Oryol (66%), Astrakhan (68%), Kurgan (68%), Penza (68%), Vologda (70%), Volgograd (71%), Belgorod (71%), Ryazan (71%), Tambov (73%), Orenburg (74%), **Voronezh (80%), Lipetsk (83%),** Tatarstan (65%), Kabardino-Balkaria (66%), Crimea (66%), Sakha (Yakutia) (67%), Mari El (71%), Adygea (71%), Chuvashia (71%), Bashkortostan (72%), North Ossetia - Alania (72%), Udmurtia (73%), Mordovia (73%), Buryatia (74%), Ingushetia (74%), **Tyva (78%), Altai (79%), Kalmykia (81%), Karachayevo-Circassian (83%), Dagestan (91%), Chechen (92%),** Chukotka Autonomous Area (70%), Krasnodar (70%), Altai (74%), Stavropol (77%) territories
Regions with urban predominance in the number of long-distance commuters (60% or more)	10	Kemerovo (63%), Sakhalin (64%), Moscow (64%), **Magadan (87%), Murmansk (88%), Yamal-Nenets Autonomous Area (79%) and Khanty-Mansi Autonomous Area (71%), Sevastopol (95%), Moscow (100%), Saint Petersburg (100%)**
Regions with equal contribution of urban and rural population in number of long-distance commuters (from 40 to 60%)	27	Kaliningrad (59% and 41%), Ivanovo (59% and 41%), Kirov (57% and 43%), Kostroma (55% and 45%), Chelyabinsk (54% and 46%), Yaroslavl (54% and 46%), Sverdlovsk (52% and 48%), Vladimir (49% and 51%), Irkutsk (48% and 52%), Leningrad (47% and 53%), Tversk (46% and 54%), Novgorod (44% and 56%), Tula (42% and 58%), Smolensk (42% and 58%), Bryansk (42% and 58%), Pskov (40% and 60%), Jewish Autonomous Region (45% and 55%), Yamal-Nenets Autonomous Area (57% and 43%), Kamchatka (54% and 46%), Khabarovsk (52% and 48%), Krasnoyarsk (50% and 50%), Primorsky (49% and 48%), 51%), Transbaikal (45% and 55%), Perm (41% and 59%), Komi (52% and 48%), Karelia (51% and 49%), Khakassia (43% and 57%)
Source: All-Russian Population Census-2020. Volume 10. Labor force. Available at: https://rosstat.gov.ru/vpn/2020/Tom10_Rabochaya_sila		

[6] Inequality and poverty. Income of population within country and constituent entities of the Russian Federation (new methodology). Federal State Statistics Service. Available at: https://rosstat.gov.ru/folder/13723

[7] Rating of regions by unemployment. *RIA-rating*. Available at: https://riarating.ru/infografika/20230227/630237190.html?ysclid=lvezwrlw3k621004137

population density in rural areas and, as a consequence, a problem of overpopulation. T.G. Nefedov and N.V. Mkrtchyan note that agriculture modernization and prevalence of non-labor-intensive crop production in southern regions revealed rural overpopulation and stimulated labor migration to cities (Nefedova, Mkrtchyan, 2017, p. 63). The Lipetsk and the Voronezh regions, which belong to the Black Earth regions of the European part of Russia, are characterized by an increased share of non-agricultural employment of rural commuters, which is associated with uncompetitiveness of local jobs compared to work in the capital region (Nefedova, Mkrtchyan, 2017, p. 65).

In addition to federal cities (Moscow, Saint Petersburg and Sevastopol), 7 constituent entities were classified as regions with urban predominance among long-distance commuters – Murmansk, Magadan, Sakhalin, Moscow, Kemerovo regions, Yamal-Nenets Autonomous Area and Khanty-Mansi Autonomous Area – Yugra. These are highly urbanized regions: the share of urban population in 2021 in Saint Petersburg reached 100%, in Moscow – 98%, in Magadan Region – 96%, in Sevastopol – 94%, in Khanty-Mansi Autonomous Area – 93%, in Murmansk Region – 92%, in Kemerovo Region – 86% , in Yamal-Nenets Autonomous Area – 84%, in Sakhalin and Moscow regions – 82% each. Leadership of the Yamal-Nenets Autonomous Area and the Khanty-Mansi Autonomous Area is explained by commuting of urban population to oil production areas – to the south of the Tyumen Region, to the Khanty-Mansi Autonomous Area and in to southern part of the Yamal-Nenets Autonomous Area, to gas fields – to the northern regions of the Tyumen Region, to the central and northern parts of the Yamal-Nenets Autonomous Area, to the north-west of the Khanty-Mansi Autonomous Area (Solodnikov , 2015, p. 51). The greater involvement in urban long-distance commenting in the Magadan, Sakhalin and Kemerovo regions may be associated with the high intensity of movements from suburbs to regional capitals and their agglomerations: Magadan, Yuzhno-Sakhalinsk and Kemerovo (Averkieva et al., 2016, pp. 192– 193). The Moscow Region, on one hand, as part of capital region is a center of attraction for temporary labor migrants, on the other hand, it acts as a supplier of temporary return labor migrants, most often commuting workers, for Moscow. Predominance of urban population among long-distance commuters by analogy with commuting migrants, is explained by the center-rapidity factor, when in pursuit of a higher level of income, residents of the Moscow Region go to the capital to earn money, but due to gap in housing prices between Moscow and region their labor migration is of a return nature[8].

Twenty-seven constituent entities of the Russian Federation were included in the list of regions with an equal contribution of urban and rural population. This is a rather heterogeneous group, represented by regions of the Center, North-West, Ural and Far East of Russia.

Table 2 presents a matrix of Russian regions according to the ratio of urban and rural contribution to long-distance commuting of different frequency and focus. In 31 regions of Russia, rural population predominates both in short-term and long-term, as well as in intraregional and interregional long-distance commuting (so-called "origin regions of long-distance commuters"). In 14 constituent entities of the Russian Federation, rural population prevails in short-term and intraregional commuting, and there is an equal urban and rural contribution to long-term and interregional long-distance commuting. Labor migration within these regions is carried out by rural population, while residents of urban and rural areas are equally involved in

[8] Makhrova A.G., Bochkarev A.N. (2017). Commuting in the Moscow region: new data. Demoscope Weekly, 727–728. Available at: http://demoscope.ru/weekly/2017/0727/tema01.php

trips to work in other regions. In six constituent entities of the Russian Federation (federal cities of Moscow and Saint Petersburg, Khanty-Mansi Autonomous Area, Magadan, Murmansk and Sakhalin regions), urban population is involved in the majority of long-distance commuting of various frequency (short-term and long-term) and direction (intraregional and interregional). In the Chelyabinsk, Sverdlovsk, Kaliningrad, Kostroma and Ivanovo regions, long-term and interregional to earn money are mainly carried out by urban population, and within regions –

Table 2. Matrix of regions of the Russian Federation according to the ratio of urban and rural contribution to long-distance commuting of different frequency and direction

			Regions groups according to the ratio of urban and rural contribution to intraregional and interregional long-distance commuting					
			1	2	3	4	5	6
			Urban predominance intraregional and interregional long-distance commuting	Urban predominance interregional long-distance commuting and equal contribution of urban and rural population in intraregional long-distance commuting	Equal urban and rural contribution to interregional long-distance commuting (there is no intraregional watch)	Rural predominance in intraregional long-distance commuting, equal contribution of urban and rural population in interregional watch	Rural predominance in intraregional and interregional long-distance commuting	Rural predominance in intraregional long-distance commuting and urban predominance in interregional long-distance commuting
Groups of regions according to the ratio of the contribution of GN and SV to short- and long-term shifts	1	Urban predominance of GBV in short- and long-term long-distance commuting	**6** Moscow, Saint Petersburg; Khanty-Mansi Autonomous Area; Magadan, Murmansk, Sakhalin regions	**1** Sevastopol	-	-	-	**1** Yamalo-Nenets Autonomous Area
	2	Urban predominance in long-term long-distance commuting and equal contribution of urban and rural population in short-term long-distance commuting	**2** Sakhalin, Kemerovo regions	-	-	**3** Leningrad, Vladimir, Yaroslavl regions	-	**5** Chelyabinsk, Sverdlovsk, Kaliningrad, Kostroma, Ivanovo regions
	3	Equal contribution of urban and rural population to short- and long-term long-distance commuting	-	**2** Kamchatka, Krasnoyarsk territories	**1** Nenets Autonomous Area	**5** Tula, Bryansk, Tver, Novgorod regions, Jewish Autonomous Region	-	**2** Kirov Region, Khabarovsk Territory
	4	Rural predominance in short-term long-distance commuting and equal contribution of urban and rural population in long-distance commuting	-	**1** Republic of Komi	-	**14** Perm and Trans-Baikal Territories, Crimea, Tatarstan, Khakassia, Novosibirsk, Vologda, Arkhangelsk, Amur, Nizhny Novgorod, Omsk, Samara, Kaluga, Smolensk	**1** Ulyanovsk region	**2** Republic of Sakha (Yakutia), Irkutsk Region

End of Table 2

			Regions groups according to the ratio of urban and rural contribution to intraregional and interregional long-distance commuting					
			1	2	3	4	5	6
			Urban predominance intraregional and interregional long-distance commuting	Urban predominance interregional long-distance commuting and equal contribution of urban and rural population in intraregional long-distance commuting	Equal urban and rural contribution to interregional long-distance commuting (there is no intraregional watch)	Rural predominance in intraregional long-distance commuting, equal contribution of urban and rural population in interregional watch	Rural predominance in intraregional and interregional long-distance commuting	Rural predominance in intraregional long-distance commuting and urban predominance in interregional long-distance commuting
	5	Rural predominance of in short- and long-term long-distance commuting	-	-	-	**5** Republic of North Ossetia-Alania; Tomsk, Rostov, Tyumen regions; Chukotka Autonomous Area	**31** Chechen, Bashkortostan, Karachayevo-Circassian, Dagestan, Kalmykia, Tyva, Mordovia, Udmurtia, Kabardino-Balkarian, Altai, Buryatia, Adygea, Ingushetia, Mari El, Chuvashia republics; Astrakhan, Voronezh, Lipetsk, Volgograd, Orenburg, Tambov, Belgorod, Saratov, Ryazan, Kurgan, Penza, Oryol, Kursk regions; Krasnodar, Altai, Stavropol territories	-
	6	Rural predominance in short-term long-distance commuting and urban predominance in long-term long-distance commuting	-	**1** Primorye Territory	-	**1** Pskov Region	-	**1** Republic of Karelia

Regions that are characterized by consistency in frequency and direction of long-distance commuting with vectors “short-term – intraregional” and “long-term – interregional” are highlighted green.
Source: All-Russian Population Census-2020. Volume 10 Labor force. Available at: https://rosstat.gov.ru/vpn/2020/Tom10_Rabochaya_sila

by rural. At the same time, urban and rural population of these regions are equally involved in short-term long-distance commuting. Among short-term, long-term and interregional long-distance commuters from the Tula, Bryansk, Tver, Novgorod regions and the Jewish Autonomous Region, urban and rural residents are equally represented, while rural population is more often involved in intraregional movements. Among short-term and long-term intraregional long-distance commuters from Republic of North Ossetia-Alania, Tomsk, Rostov, Tyumen regions, Chukotka Autonomous Area, rural residents predominate, while urban and rural are equally involved in trips outside these regions. Other regions turned out to be few in number.

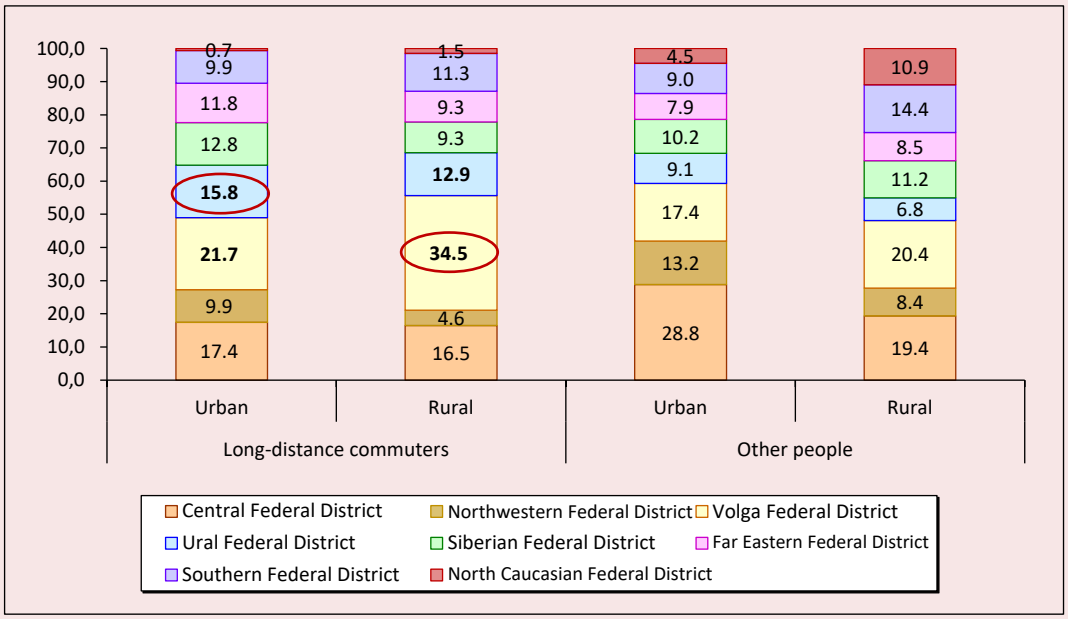
In addition, 53 constituent entities of the Russian Federation are characterized by consistency in frequency and directions of long-distance commuting along "short-term – intraregional" and "long-term – interregional" vectors, with either equal urban and rural involvement or with greater inclusion of rural residents in "short-term – intraregional" vector and urban residents – in "long-term – interregional" vector. In other regions there are other variations in urban and rural participation in ling-distance commuting.

Socio-demographic characteristics of rural and urban long-distance commuters

According to sample observation, the Volga Federal District is the macroregion of rural long-distance leaving in more than a third of cases (35%; *Fig. 5*), which is largely consistent with results of other studies confirming its supplier role in labor migrants flow (Florinskaya et al., 2015, p. 32). Among urban long-distance commuters the share of people from the Volga region is lower (22%) than among rural ones but the proportion of the Ural (16%) and Siberian (12%) macroregions residents is slightly higher. Compared to other categories of workers, there are significantly fewer representatives of the Central Federal District among urban and rural long-distance commuters (17% each versus 29% of urban and 19% of rural residents with other work schedules).

More than half of urban long-distance commuters are residents of small towns with population of less than 50 thousand people (58%), 45% of rural long-distance commuters live in medium-sized rural settlements with population of 200 to 1,000 people *(Tab. 3)*. This fact confirms conclusions of researchers about the greater prevalence of labor migration among small cities, towns and rural settlements[9] (Karachurina, Mkrtchyan, 2012; Mkrtchyan, Florinskaya, 2019).

Figure 5. Distribution of urban and rural long-distance commuters by federal districts of residence, %



Source: Selective monitoring of the use of the daily temporal resource by the population-2019. Available at: https://rosstat.gov.ru/free_doc/new_site/population/urov/sut_fond19/index.html

[9] Nefedova T. (2015). Otkhodnichestvo in migration system of post-Soviet Russia. Geography. Demoscope Weekly, 643–644. Available at: http://demoscope.ru/weekly/2015/0643/demoscope643.pdf (accessed: April 24, 2024).

Table 3. Distribution of urban and rural long-distance commuters by population amount in their places of residence, %

Population amount in place of residence, thousand people	Urban population	
	Long-distance commuters	Other people
Less than 50.0	58.2	34.1
50.0–99.9	11.2	11.0
100.0–249.9	9.9	10.7
250.0–499.9	8.2	11.2
500.0–999.9	5.3	8.6
1 million or more	7.2	24.3
Population amount in place of residence, people	Rural population	
Up to 200	5.7	4.8
201–1000	45.4	34.3
1001–5000	32.0	37.1
More than 5000	17.0	23.9
Source: Sample observation of daily time use by population 2019. Available at: https://rosstat.gov.ru/free_doc/new_site/population/urov/sut_fond19/index.html		

The vast majority of urban and rural long-distance workers are men (89% and 94%, *Tab. 4*), which is also consistent with conclusions of other researchers about the "male face" of long-distance commuting (Turakaev, Baymurzina, 2022; Kasatkina et al., 2023). For comparison: among urban and rural population with other work schedule, a different situation is observed (there are more women than men). Among long-distance commuters, compared to other categories of workers, there is a higher proportion of working population: 94% of urban and 95% of rural long-distance workers versus 85% of city residents and 84% of rural residents with other work schedule.

In groups of urban and rural long-distance commuters married people predominate (62 and 66%; *Tab. 5*). At the same time, the share of "family" workers among long-distance commuters is noticeably higher compared to other categories of workers. Otherwise, marriage and family structure does not differ significantly.

Table 4. Distribution of urban and rural long-distance workers by gender and age, %

Gender	Long-distance commuters		Other people	
	Urban	Rural	Urban	Rural
Men	89.1	94.3	44.1	46.9
Women	10.9	5.7	55.9	53.1
Age	Urban	Rural	Urban	Rural
Under 29 years old	12.1	6.7	12.4	9.6
30–39 years old	27.2	30.3	26.5	22.8
40–49 years old	25.4	28.4	22.2	25.0
50–59 years old	18.5	24.0	18.2	24.6
60 or older	4.6	3.8	8.2	8.4
Age group	Urban	Rural	Urban	Rural
Under working age	0.0	0.0	0.0	0.0
Working age	94.1	94.8	85.2	84.3
Over working age	5.9	5.2	14.8	15.7
Source: Sample observation of daily time use by population 2019. Available at: https://rosstat.gov.ru/free_doc/new_site/population/urov/sut_fond19/index.html				

Table 5. Distribution of urban and rural rotational long-distance commuters by marital status and family type, %

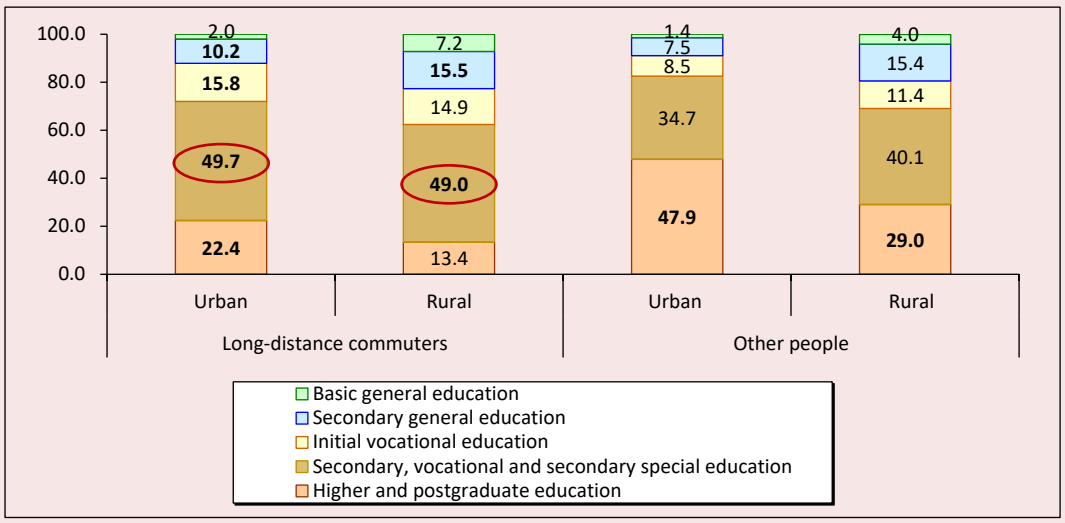
Marital status	Long-distance commuters		Other people	
	Urban	Rural	Urban	Rural
Registered marriage	61.5	66.0	56.6	60.3
Not registered marriage	7.2	6.2	6.1	5.6
Widower/Widow	5.3	2.1	5.9	6.8
Divorced	12.2	12.4	16.9	13.6
Broke up	2.3	3.6	2.2	2.2
Never been married	11.5	9.8	12.3	11.5
Family type	Urban	Rural	Urban	Rural
Married couple with children under 18 years old	41.1	42.3	32.5	32.6
Single	28.9	26.3	28.9	26.6
Married couple	27.3	28.9	30.1	33.1
Single with children under 18 years old	2.6	2.6	8.5	7.8

Source: Sample observation of daily time use by population 2019. Available at: https://rosstat.gov.ru/free_doc/new_site/population/urov/sut_fond19/index.html

Both urban and rural long-distance workers are more likely than other workers to be married and have children: 41% of urban and 42% of rural long-distance commuters versus 33% of urban residents and 33% of rural residents with other work schedules. Therefore, long-distance commuters, regardless of their original territory, are characterized by a more "family" way of life, which confirms the thesis about prevalence of desire to "provide for the family" over other motives for otkhodnichestvo (Averkieva, 2016, p. 26).

Long-distance workers, compared to other categories of workers, more often have secondary vocational, secondary specialized and primary vocational education, and less often higher education, especially if they are from rural areas *(Fig. 6)*. Among urban long-distance commuters there is a higher proportion of specialists with higher

Figure 6. Distribution of urban and rural long-distance commuters by education level, %



Source: Selective monitoring of the use of the daily temporal resource by the population-2019. Available at: https://rosstat.gov.ru/free_doc/new_site/population/urov/sut_fond19/index.html

education (22% versus 13% of rural ones), while among rural migrants there is a higher proportion of specialists with a general secondary education (16% versus 10%) and basic general education (7% versus 2%).

Long-distance commuters more often either work in open facilities, outdoors (46% urban and 50% rural), or have a traveling nature of work (15% urban and 20% rural; *Tab. 6*). Among urban long-distance commuters, compared to rural ones, there are more people employed in industry, retail and offices (23% versus 14%), while for rural long-distance workers it is more common to work in less comfortable conditions – on street or on road.

Unfortunately, sample survey data do not allow us to analyze sectoral structure of employment of long-distance commuters. However, research by HeadHunter company revealed a trend of increasing demand for long-distance commuters in areas where this type of work had not previously been widely used. According 2021 data, number of long-distance vacancies in companies in restaurant and hotel businesses increased by 127%, in companies in housing and communal services sector – by 149%, in companies creating consumer goods – by 100%. Analysts attribute this trend to "personnel shortage" influence, which pushed employers to expand geography of their search for long-distance commuters[10].

According to the sample survey, long-distance workers are more often employed in working occupations: operators, machine operators, installation and machine operators (36% urban and 38% rural) or are skilled workers in agriculture and industry (24% urban and 23% rural). Among urban long-distance workers, proportion of specialists with

Table 6. Distribution of urban and rural long-distance commuters work and occupation types, %

Work type	Long-distance commuters		Other people	
	Urban	Rural	Urban	Rural
Work in open facility or market, outdoors, at construction site, in vehicle and other outdoor places	46.1	50.0	9.8	17.7
Have a traveling nature of work	15.1	20.1	4.9	6.6
Work inside special facility or structure (pavilion, greenhouse, car service station, etc.)	15.5	15.5	10.0	14.3
Work in production, retail or office space inside a building, or at the home of a customer (employer)	23.0	14.4	73.2	60.0
Work remotely (using the Internet)	0.3	0.0	1.0	0.3
Work from home (homework)	0.0	0.0	1.1	1.1
Group of activities	Urban	Rural	Urban	Rural
Operators, operators, plant and machine operators	35.8	38.2	9.4	13.3
Qualified agricultural and industrial workers	24.1	22.5	11.4	12.5
Service sector workers, housing and communal services	13.0	18.8	16.4	17.7
Mid-level specialists	12.4	8.4	13.7	12.0
Unskilled workers	4.3	8.9	5.7	12.5
Highly qualified specialists	7.7	2.6	32.5	22.5
Heads (representatives) of government and management bodies	2.0	0.5	5.1	4.4
Workers involved in preparing information and processing documents	0.7	0.0	5.8	5.1
Source: Sample observation of daily time use by the population 2019. Available at: https://rosstat.gov.ru/free_doc/new_site/population/urov/sut_fond19/index.html				

[10] Long-distance commuting: 2021 results. HeadHunter. Available at: https://hh.ru/article/29806?ysclid=lvb0js2i9i457507615 (accessed: April 24, 2024).

medium and higher qualification levels is slightly higher (12% and 8%, respectively), while among rural workers there are workers in service sector, housing and communal services (19%), unskilled personnel (9%), which largely correlates with differences education. The fact that almost every fifth long-distance commuter from rural areas is an employee in service sector or housing and communal services confirms the trend of changes in sectoral structure of demand for workers in this category.

Long-distance commuters, compared to other categories of workers, are less likely to have a fixed start and end time of the working day: 61% urban and 67% rural long-distance workers versus 82% urban and 79% rural workers with a different schedule *(Tab. 7)*. As a result, average working week of long-distance workers exceeds the same indicator for population with a different work schedule: 50 hours for urban long-distance workers and 48 hours for rural long-distance workers versus 38 hours for urban and 38 hours for rural workers with a different schedule. At the same time, average leave duration for long-distance commuters corresponds to its duration for other categories of workers. However, among rural long-distance commuters there was a smaller proportion people with paid leave (75% versus 82% among urban long-distance workers and 81% of rural with other work schedules); 1/4 of long-distance commuters from rural areas do not have opportunity (desire) to go on paid leave.

Income of long-distance commuter is significantly higher compared to other categories of workers *(Tab. 8)*. In 2019 net monthly income of

Table 7. Working hours of urban and rural long-distance commuters

Characteristic	Long-distance commuters		Other workers	
	Urban	Rural	Urban	Rural
Fixed time of working day start, %	60.9	66.5	81.8	78.5
Fixed time of working day end, %	60.5	65.5	80.6	77.1
Average number of working hours per week	50	48	38	38
Paid leave, %	82.2	74.7	86.7	81.4
Duration of paid leave, average number of days	33	34	38	34
Source: Sample observation of daily time use by population 2019. Available at: https://rosstat.gov.ru/free_doc/new_site/population/urov/sut_fond19/index.html				

Table 8. Distribution urban and rural long-distance commuters by net monthly income and average household income, per member, %

Net monthly income	Long-distance commuters		Other workers	
	Urban	Rural	Urban	Rural
Up to 30 thousand rubles.	23.7	29.8	54.8	79.0
From 30 to 50 thousand rubles.	41.9	54.4	28.8	16.3
From 50 to 70 thousand rubles.	22.6	7.0	9.5	3.2
From 70 to 90 thousand rubles.	7.5	5.3	3.9	1.2
From 90 thousand ruble. and more	4.3	3.5	2.9	0.3
Average income	Urban	Rural	Urban	Rural
Net monthly income, rub.	46545.0	35368.6	27870.9	20164.5
Average household income, per month, rub.	61266.4	45492.3	51010.4	36257.8
Average income per household member, per month, rub.	29770.0	20988.6	23538.5	15648.1
Contribution of employee income to average household income, %	76.0	77.7	54.6	55.6
Source: Sample observation of daily time use by population 2019. Available at: https://rosstat.gov.ru/free_doc/new_site/population/urov/sut_fond19/index.html				

long-distance commuters reached from 30 to 50 thousand rubles (42% urban and 54% rural), while for workers with a different schedule its amount most often did not exceed 30 thousand rubles (55% urban and 79% rural). Average net monthly income of urban long-distance commuter was 46,545.0 rubles – 67% higher than income of other urban residents. Rural long-distance workers had average monthly net income of 35,368.6 rubles, which is 75% more than income of other f rural workers. Income gap of urban and rural long-distance commuters amounts 32%, which is comparable to income gap of other urban and rural residents (38%).

Average income of households of long-distance commuters is higher than the same indicator for other categories of workers (for urban long-distance commuters – by 20%, for rural ones – by 26%), which is also reflected in a higher level of per capita income per household member (for urban long-distance workers – by 27% , for rural ones – by 34%). At the same time, average household income gap of long-distance commuters in urban and rural areas reaches 35% (for other categories of workers – 41%), average per capita income gap per household member – 42% (for others – 50%).

Contribution of net monthly income of long-distance commuters to the total household income is by 20% higher compared to other categories of workers: for people from urban areas – 76% versus 55%, for people from rural areas -–78% versus 56%. This fact confirms importance of long-distance commuting for well-being of the whole family and not only of the worker himself.

Results and discussion

Research testing hypotheses, identifying rural-urban differences in prevalence of long-distance commuting and in portraits of long-distance commuters.

This work confirmed that rural population, compared to urban one, is more involved in long-distance commuting. Urban and rural residents engaged in long-distance commuting to earn money are mainly involved in long-term migration. Among urban workers the share of long-term departures is significantly higher. Among rural ones short-term departures are more common. This pattern is also reflected in departure directions of long-distance commuters: the majority of urban residents leave to work in other regions, while every third rural worker goes to work within their region of residence. Therefore, we can conclude that migration vector of rural long-distance workers is significantly shorter compared to urban ones. This may be due to the more pronounced "attachment" of rural workers to their households. Urban workers do not have such a "burden" and can travel greater distances and for longer periods of time. At the same time, rural long-distance commuting may be associated with desire to work in more developed and larger nearby settlements, in which there are more opportunities for employment and earnings, while urban residents are driven by the same desire but only in relation to more developed regions.

Constituent entities of the Russian Federation are highly differentiated both in the share of urban and rural residents in the total number of long-distance commuters and in the ratio of urban and rural contribution to general, short-term and long-term long-distance commuting, as well as to intraregional and interregional commuting. The designed matrix of Russian regions according to the ratio of urban and rural contribution to long-distance commuting of different frequency and direction made it possible to establish that 53 regions are characterized by consistency in frequency and directions of long-distance commuting with vectors "short-term – intraregional" and "long-term – interregional" (with equal urban and rural involvement or with greater rural involvement in the first vector and urban – in the second one), while there are different variations in rural and urban participation in long-distance commuting in other regions.

During analysis of socio-demographic portrait of a long-distance commuter, typical features were confirmed: a man of working age (30–49 years), a resident of the Volga region, a resident of a small town or a medium-sized rural settlement, with a family, with a secondary specialized or secondary vocational education, a worker or qualified specialist in agriculture, industry, working in open facilities or having a traveling nature of work, having a relatively high level of income, making the largest contribution to his household budget. Compared to other categories of workers, long-distance commuters are less likely to have a fixed working day; their working week is longer, with a comparable length of vacation. It can be stated that this category of workers is subject to greater physical and mental stress.

Research revealed differences in portraits of urban and rural long-distance commuters. Urban workers a higher level of education and, as a result, more often occupy positions of mid- and higher-level specialists, work in more comfortable conditions and have a higher level of income. Rural workers are characterized by a lower level of education, are more often specialists in service sector and housing and communal services or unskilled workers, work in less comfortable conditions, are less likely to have paid leave, have a lower income compared to urban workers but higher compared to other categories of rural workers.

Therefore, this research contributes to development of ideas about settlement characteristics of long-distance commuting, including regional differences and socio-demographic specifics of urban and rural long-distance workers. Revealed diversity of regions in terms of urban and rural contribution to different types of long-distance commuting confirms the need to take into account development and implementation of migration and socio-economic policy measures. Understanding socio-demographic differences between urban and rural workers is important for managing internal migration processes, since return labor migration is seen as a mean for maintaining employment and well-being of population while keeping their place of residence.

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Assessing the Interaction between Non-Profit Organizations and the Municipal Management System

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Abstract. The work brings to the fore the issue of improving the effectiveness of the municipal management system with the help of non-profit organizations' resource. Our goal is to assess the interaction of non-profit organizations in the form of territorial public self-government with municipal administration subjects in the municipal management system of the city of Perm. The study hypothesis suggests that the activities of non-profit organizations in the form of territorial public self-government in the municipal management system should produce significant economic and managerial effects, thus increasing the effectiveness of the municipal management system and the municipal economy. Methodologically, the work is based on a synthesis of expert survey methods, factor analysis, and structural equation modeling (SEM). We obtained a number of significant results: we substantiated key scientific categories, defined

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the basic concept of interaction between non-profit organizations and subjects of municipal government, determined the boundaries of the municipal management system; worked out a methodology for assessing the interaction of non-profit organizations in the municipal management system and tested it on the example of organizations in the form of territorial public self-government in the city of Perm. In particular, we proved that the performance indicators of non-profit organizations in the aggregate of indicators of the use of additional resources and the population are consistently and significantly interconnected with territorial development indicators; interaction with the municipal management system is consistently and significantly interconnected with territorial development indicators; the activities of non-profit organizations are indirectly interconnected with indicators reflecting the development of the territory, due to the processes of interaction with the municipal management system. Thus, we show the presence of direct and indirect effects from the activities of non-profit organizations in the territory, arising in the process of interaction with subjects of municipal government. The presence of such effects substantiates the importance of the activities of non-profit organizations in the form of territorial public administration in addressing issues of local importance, in organizing and implementing local events, in attracting additional funds to solve socio-economic issues of the territory.

Key words: non-profit organization, territorial public self-government, municipal management system, municipal management subjects.

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Introduction

The current economic situation in the Russian Federation urges all its economic sectors to activate reserves and search for growth points in achieving key strategic priorities. This necessitates the enhanced development of business entities and the "third sector", which includes non-profit organizations. Taking into account all the variety of forms of non-profit organizations, we consider their totality as a significant resource, the use of which can increase the effectiveness of economic activity in the territory and contribute to economic growth.

Attracting such a resource in order to realize the potential of the territory requires development and testing of appropriate management mechanisms, which are based on the interaction of the non-profit sector with management entities at all economic levels (federal, regional, municipal). In this regard, the study of management practices of individual non-profit organizations (hereinafter referred to as NPOs) and the processes of their interaction with subjects of municipal, regional, and federal government seems to be an urgent scientific problem. Its solution is ultimately focused on the formation of economic growth indicators, which are based on metrics reflecting the effectiveness of interaction and economic and managerial effects, primarily in municipalities.

The designated research field actualizes the issues of interaction between municipal government subjects and special forms of non-profit organizations capable of addressing a wide range of issues, accumulating territorial potentials and reserves, while obtaining significant economic and managerial effects. Such a statement of the question urged us to consider non-profit organizations in the form of territorial public self-government

(hereinafter referred to as TPSG), which have significant potential for interaction in the municipal economy, becoming one of the main subjects of economic activity. Thus, according to the annual joint monitoring of the National Association of Territorial Public Self-Government and the Ministry of Justice of the Russian Federation, there are more than 34,874 TPSGs in 84 constituent entities of the Russian Federation[1]. We should note that, being a unique form of NPO in theoretical terms, not all TPSGs are registered as NPOs. Nevertheless, we believe it is possible and expedient to consider TPSG as a theoretical and methodological category that acts as a form of NPO.

Within the framework of the article, we put forward a hypothesis that the interaction of non-profit organizations in the form of territorial public self-government with municipal government subjects leads to significant economic and managerial effects, which increases the effectiveness of the municipal management system and promotes the growth of the municipal economy.

In order to verify this statement, we present an assessment of the interaction of non-profit organizations in the form of territorial public self-government with municipal government subjects in a given municipal entity.

Theoretical and methodological foundations

First of all, it is necessary to define the framework for the system of municipal government and municipal management. The classical system of municipal government includes municipal government subjects in the composition of elected and other local self-government bodies, whose activities are aimed at developing the territory and supporting the population in key socio-economic spheres. Such a practice of government, which has been tested for several decades, has revealed a number of shortcomings related to limited resources, a significant distance between the population and authorities, the complexity of interaction through bureaucratic procedures, etc[2].

Definitions found in the scientific field indicate that municipal management includes a municipal entity and a system of local self-government (Makarova, Demenko, 2016); municipal management is a socio-economic relationship formed in the process of territory development; municipal management includes municipal government bodies and self-government bodies (Demenko, Makarova, 2016).

There are several approaches to the definition of municipal management in the scientific literature (Fadeikina et al., 2019): 1) it is synonymous with municipal government, aimed at implementing the powers of authorities in terms of socio-economic development of the region and spending municipal finances (Ashmarov, 2019); 2) it is a process of solving issues of local importance; i.e. the practice of regulating socio-economic relations (Markina et al., 2018); 3) it is a set of relationships between the population and municipal government bodies, in the process of development of which (Fadeikin, Fadeikina, 2002; Ukhanova et al., 2022) a system of interaction with government institutions, business entities, NPOs, etc. is being formed; ultimately, municipal management is a type of management aimed at involving local population in government processes (Novoyants, Kirilyuk, 2018); 4) management as part of the municipal government system associated with certain areas of activity of

[1] Strategy for the development of territorial public self-government in the Russian Federation until 2030. Available at: https://xn--43-emcmd.xn-p1ai/wpcontent/uploads/2021/11/%D0%A1%D1%82%D1%80%D0%B0%D1%82%D0%B5%D0%B3%D0%B8%D1%8F-%D1%80%D0%B0%D0%B7%D0%B2%D0%B8%D1%82%D0%B8%D1%8F-%D0%A2%D0%9E%D0%A1-%D0%B2-%D0%A0%D0%BE%D1%81%D1%81%D0%B8%D0%B9%D1%81%D0%BA%D0%BE%D0%B9-%D0%A4%D0%B5%D0%B4%D0%B5%D1%80%D0%B0%D1%86%D0%B8%D0%B8-%D0%B4%D0%BE_2030-9.03.2021.pdf

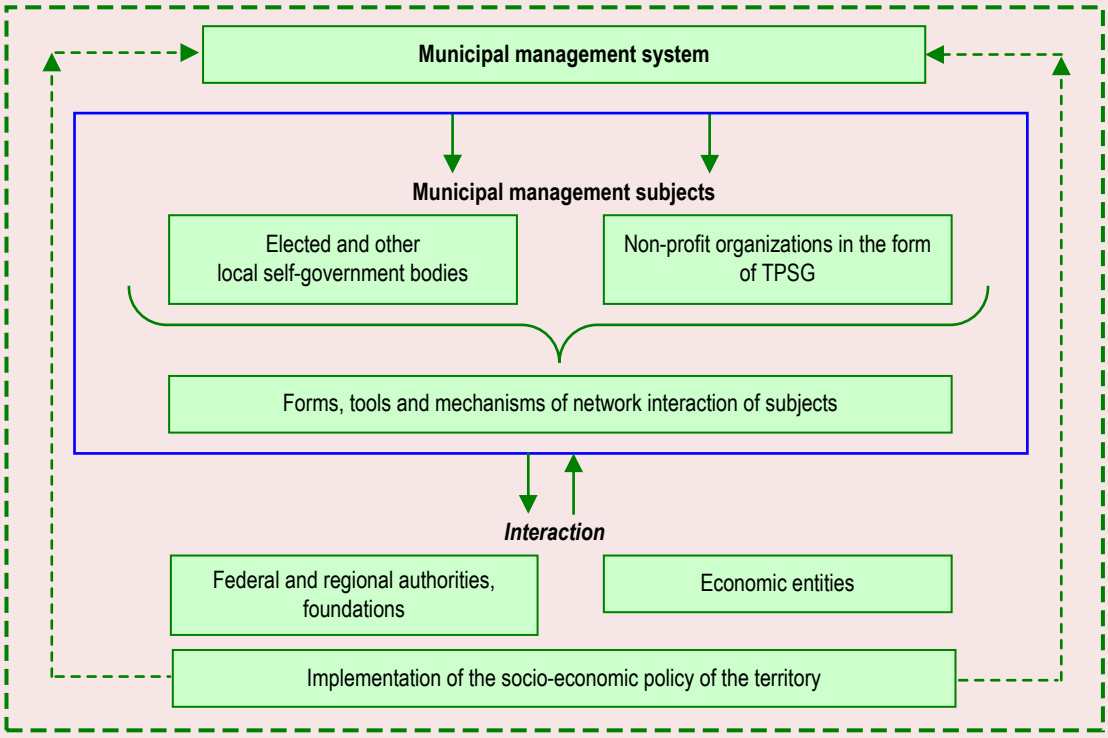
[2] *Economic Consequences of the New Legislation on Non-Profit Organizations* (2007). In-t grazhdanskogo analiza, In-t nats. proekta "Obshchestvennyi dogovor". Moscow: [SPROS]. 117 p.

authorities, for example, project management[3], municipal finance management, etc. (Airapetov, 2017).

From our point of view, the municipal management system is characterized by the possibility of interaction between a non-profit organization and municipal government subjects, whose activities are aimed at solving socio-economic problems of the territory and meeting the needs of the local population. This approach makes it possible to increase the number of sources of additional financing, use the resources of the NPO itself, use NPO as a form of interaction, involving the population in management processes in the municipality (Malakhov, Yakobson, 2021), consider NPO as a tool for interaction with other business entities.

In turn, the interaction of NPOs in the municipal management system can be defined as a system of relationships between non-profit organizations providing services and municipal government subjects, in which organizations act as nodes in a specific field of activity (Bek et al., 2014). At the same time, all participants have similar interests related to meeting the needs of the local population and common goals aimed at improving citizens' welfare; all this determines specific forms of interaction (Gruzdeva, 2016; Oleskin, 2016). Thus, the key importance for the participants of such interaction is the exchange of experience and governing practices in order to form a single development vector for the territory *(Fig. 1)*.

Figure 1. The place of NPOs in the form of TPSG in the municipal management system



Source: own compilation.

[3] *Modern Problems of Management and Development of Public and Municipal Administration* (2023). Saint Petersburg: St. Petersburg State University of Economics.

In the context of the development of the municipal management system, resources are an essential component of the interaction of non-profit organizations (Kosygina, 2021). We should note the following positive effects of such interaction: use of the experience of organizations, methodological support, possibility of training, etc. (Popkova et al., 2022).

Non-profit organizations, acting as economic entities, create conditions for building partnerships between government, business and the public. In this case the lack of resources of non-profit organizations can be eliminated within the framework of interaction with other non-profit organizations and with municipal government subjects.

The existing practice of interaction between non-profit organizations demonstrates the strengthening of their potential through the exchange of practices, work technologies, as well as common resources, which can be expressed in the emergence of a number of effects in the development of the relevant territory (Kosygina, 2022).

The question regarding the role of specific forms of NPO from the perspective of the possibility of interaction in the municipal management system is considered in different contexts (Shokhrina, Medvedeva, 2023). Thus, in recent years, scientific literature shows an increasing number of works devoted to territorial public self-government as a special form of NPO (Zaliev, Usmanova, 2018; Medvedeva et al., 2021). Most researchers agree that TPSG is a NPO with a number of characteristics, the major one of which is the possibility of interaction in the municipal management system in order to address a wide range of socio-economic issues (Badyagina, 2011; Medvedeva et al., 2021).

Thus, TPSG, as a special form of NPO, has an opportunity to participate in attracting additional funds for the development of the territory and solving significant socio-economic issues from federal (for example, the Presidential Grants Fund), regional (the Governor's Grants Fund of the Perm Territory) sources, etc. Such support can have a whole range of effects both for TPSG (income growth, saving of own resources through the use of the material and technical base of the municipality, increasing the target audience of TPSG NPOs due to the participation of more citizens, etc.) and for the municipal management system (increasing the budgetary efficiency of municipal projects, increasing the level of popular trust, increasing the speed of implementation of measures within the framework of municipal projects, etc.).

We think it is advisable to consider in more detail the process of interaction between NPOs and the municipal management system in order to identify and concretize significant economic and managerial effects.

The interaction of non-profit organizations and municipal government subjects can be defined as administration activities in the municipal management system based on the realization of the participants' potential through the exchange of practices, work technologies and resources in order to increase the effectiveness of socio-economic development of the territory.

A whole range of researchers consider methods and techniques for evaluating the participation of non-profit organizations in public and municipal management systems.

We can point out a methodology proposed by L.A. Tretyakova, T.V. Tselyutina and Zh.N. Avilova, who associate the nature of the influence of NPOs on the regional management system with an increase in the gross regional product created. Their methodology uses the calculation of integral indicators based on official statistics data and methods of a multiplicative deterministic factor model based on the calculation of the geometric mean (Tretyakova et al., 2016). This methodological approach allowed the authors to take into account the socio-economic and political context of NPO participation in the regional government system.

V.Yu. Kulkova suggests synthesizing two key approaches, dynamic and transactional, when building methods for evaluating the activities of NPOs in public administration systems at various levels. Dynamic analysis tools help to describe the activities of NPOs metrically, build integral indicators, design synthetic indicators of NPO development in the context of organization, financing, participation, etc. in the public administration system. In turn, the transactional approach is associated with monitoring the interaction of a non-profit organization with stakeholders: public administration bodies, business entities, and population (Kulkova, 2016).

A similar synthesis can be observed in the study of E.B. Dvoryadkina and D.M. Prostova, who use the linear scaling method to calculate the private indices of NPO functioning, as well as the composite index of NPO functioning in the economic space of the region (Dvoryadkina, Prostova, 2021).

Some authors consider a system of indicators reflecting the effectiveness of NPO activities and mention general indicators characterizing the organizational activities of TPSG NPOs; social parameters related to the provision of social services to the population, as well as economic components expressed in the positive dynamics of territory's development (Maksimov, 2004; Sycheva, Shramchenko, 2020). In particular, it is proposed to evaluate economic performance of TPSG NPOs, i.e. cost indicators, for example, the cost of services provided, the amount of funds attracted to the development of the territory, etc. (Perfiliev, Kuznetsova, 2015).

Other researchers put forward a system of criteria for evaluating NPOs in the form of TPSG, taking into account the focus of NPO activities. At the same time, the collection and processing of indicators according to these criteria can be carried out by various methods, the most popular of which are expert survey and statistical analysis (Veretnova, 2019).

Many researchers have used expert analysis methods in relation to the municipal economy and municipal government. Thus, expert interviews serve as a methodological basis in many foreign studies (Crowe, 2006; Hallegatte et al., 2019) that consider the implementation of municipal resources, self-development of territories, development of social infrastructure, etc. (Sharp et al., 2016; Szajnowska-Wysocka, 2009).

From a methodological point of view, an expert survey can be characterized by a number of specific features: 1) competence of an expert; 2) ability to present data both qualitatively and quantitatively; 3) different number of experts, determined by the complexity of the subject field.

Researchers believe that the growth of the expert group does not always affect the reliability of estimates. For example, when conducting an in-person study, the optimal number of the expert group members usually varies from 5 to 7 people; and during correspondence surveys, their number should be about 20–30 people (with a maximum of 60–80 people) (Nechaev et al., 2012).

Some authors apply the partial least squares method to the analysis of expert assessments in order to test several hypotheses at once. This approach helps to evaluate the contribution of each observed variable to the final indicator[4].

We should also note the study using a semi-structured questionnaire, which allowed obtaining meaningful and detailed competent answers to a number of specific questions related to the work of municipalities in the Far North of the Russian Federation (Kondratovich, 2022).

A model for assessing the level of organizational development of NPOs, designed on the basis of analysis and systematization of more than 40 relevant methods used abroad, was proposed by

[4] Molodchik M.A. (2021). *Knowledge Management of the Organization: Methodology and Practice: Doctor of Sciences (Economics) Dissertation*. Perm.

scientists from the Higher School of Economics[5]. The technique contains 12 indicators for key areas of NPO activity. In particular, the experts assessed financial stability, external communications, organizational culture, etc. More than 590 NPOs participated in the survey. We also note a survey conducted by HSE scientists on the assessment of the external conditions of NPO activities, which includes representatives of NPOs from 61 regions of eight federal districts and offers the final value of the index of the external environment of NPO development as the average value of six indicators included in the model[6].

The assessment of specific economic and managerial effects from the interaction of NPOs is associated with the problem of evaluating the effectiveness of NPO as such. In particular, in relation to NPOs, the criteria of profitability, cost-effectiveness and capitalization cannot be used, since market pricing is not applicable to these services. In the case of NPOs, we can talk about several concepts of performance assessment, which are based on different criteria (Herman, 1990; Herman, Heimovics, 1994).

Thus, the effectiveness of NPOs can be interpreted as the degree of achievement of goals (Price, 1972), the ability to provide resources (Yuchtman, 1967; Ivanovsky, 2023); a multi-element indicator (Connolly et al., 1980; Kosygina, 2020). As part of our research, we propose, based on the data of an expert survey, to build a methodology for assessing the interaction between NPOs in the form of TPSG and the municipal management system, which would allow us to identify and concretize significant economic and managerial effects of this process.

Data and methods

In the absence of a generally accepted approach, it seems advisable to propose a methodology for evaluating the network interaction of NPOs in the form of TPSG with municipal government subjects, based on expert assessments *(Tab. 1)*.

Based on the data on the interaction of TPSG NPOs in the Perm municipal management system, questions reflecting the main characteristics of such interaction were formulated and an expert survey questionnaire was compiled. During June – August 2023, heads of TPSG NPOs participated in the survey. TPSGs were checked and verified for compliance with the term "non-profit organization" (autonomy from state and business structures, self-government and focus on providing socially significant services, changing socially and economically significant conditions for the development of the municipal economy). The composition of experts included 85 people.

Table 1. Stages of analyzing the interaction of non-profit organizations in the municipal management system

Stage 1. Selecting experts. Describing the sample	85 experts – heads of TPSG NPOs in the city of Perm, Perm Territory, were selected
Stage 2. Selecting indicators and an evaluation scale	14 indicators were selected, based on data from monitoring the network interaction of NPOs in the municipal management system of Perm. The experts' responses were evaluated on a 10-point scale
Stage 3. Initial processing of expert assessments and the formation of interaction components	Average expert estimates are calculated and analyzed. The components of network interaction are formed in accordance with the following three areas of activities of TPSG NPOs in the municipal management system: functional, organizational and process-based
Stage 4. Conducting a PCA analysis and building a SEM model of interaction	Diagnostics of the level of network interaction of TPSG NPOs concerning the key components of identifying direct and indirect effects of network interaction
Source: own elaboration.	

[5] Assessment of the level of organizational development of NPOs (2023). HSE: Pulse of NPOs. Available at: https://drive.google.com/file/d/1g851gNVK9SNdg8fmEljFt1nofBEQb9KY/view

[6] Assessment of the external development environment (2022). HSE: Pulse of NPOs. Available at: https://drive.google.com/file/d/1IoTZQRKe1rgly4FWt1Ff4-CHERprm9f6/view

The degree of agreement with each statement was assessed by respondents on a 10-point scale based on the responses of the heads of TPSG NPOs to the questions of the online questionnaire (Tab. 2).

Table 2. Assessment scale for respondents

It has no effect at all
1
2
3
4
5
6
7
8
9
10
It has a strong effect

The value of each indicator was calculated as the average value for all statements included in it. At the same time, an individual average value of the indicator was determined for each respondent. Characterizing all experts as a whole, the average value of all individual averages was recorded. If the respondent was unsure in more than 50% of the statements, the value was excluded. The final value of the indicator was calculated as the average value of all components included in the assessment methodology. As a result of processing the survey results, fourteen indicators were formed, which became the basis for SEM modeling.

Results

The Perm Territory is one of the leaders in terms of the level of activity of the population and the dynamics of NPOs creation. Thus, to date, the number of TPSGs in the Perm Territory has reached 647, of which 110 are located in Perm. Since 2017, TPSG NPOs have been participating in competitions to receive subsidies from the federal budget. For 2017–2022, applications totaling 24,930,025.48 rubles were received from the TPSG NPOs of the Perm Territory. Of these, only 23% received funding.

The TPSG NPOs of the city of Perm are most actively involved in the implementation of activities set out by municipal programs (about 100 events per year) and activities aimed at developing the social infrastructure of the territory (about 60–70 events per year). In addition, they take an active part in budget planning (25 initiatives). Such trends made it possible to consider TPSG from the perspective of opportunities for interaction with municipal government subjects.

The primary analysis of the average expert assessments provides a whole range of arguments justifying the possibilities and effects of interaction between TPSG NPOs in the Perm municipal management system. Thus, the data obtained made it possible to identify three key components of the interaction.

Component 1 "Network interaction of NPOs with municipal government subjects", as part of the following indicators: support of non-profit organizations by authorities; attraction of additional funds for the development of territories; direct participation of NPOs in the management of the territory; interest of the municipality in the work of NPOs.

Component 2 "Development of the territory", as part of the following indicators: level of interrelation between development indicators and the indicators of municipality development; extent of NPOs influence on the quality and efficiency of the administration's work; impact of non-profit organizations on the development of municipalities; impact of non-profit organizations on the development of municipal management; extent of development of the non-profit sector in the territory.

Component 3 "NPO activities", as part of the following indicators: effectiveness of an NPO as a partner of the local administration; effectiveness of an NPO as an element of the municipal management system; level of network interaction of NPOs in the development of the municipality's economy.

The factor loadings calculated by the principal component method for each component are presented in *Table 3*.

Thus, based on the analysis of the data obtained, several conclusions can be drawn:

– Component 1 is related to the development of the municipality in various fields, including infrastructure, economy and social sphere;

– Component 2 reflects the development of the territory where the interaction of the municipal management system with NPOs is developing;

– Component 3 is related to the activities of TPSG NPOs, including the attraction of additional resources.

Let us present the data on the calculation of the explained variance: Component 1 explains 29.5% of the total variation, with a cumulative percentage of 29.5%; Component 2 explains 24.4% of the total variation, with a cumulative percentage of 53.8%; Component 3 explains 14.1% of the total variation, with a cumulative percentage of 67.9% *(Tab. 4)*. They show that the highlighted components explain

Table 3. Factor loadings of the components (1 "Network interaction of NPOs with municipal government subjects", 2 "Development of the territory", 3 "NPO activities")

Name	Component 1	Component 2	Component 3	Uniqueness
Impact of non-profit organizations on the development of municipalities	**0.599**			0.627
Impact of non-profit organizations on the development of municipal management			**0.814**	0.321
Extent of development of the non-profit sector in the territory			**0.548**	0.603
Support of non-profit organizations by authorities			**0.748**	0.412
Attraction of additional funds for the development of territories		**0.854**		0.257
Direct participation of NPOs in the management of the territory	0.317	**0.839**		0.188
Interest of the municipality in the work of NPOs	0.316	**0.772**		0.259
Level of activity of the population in municipal management	0.431	**0.781**		0.196
Extent of NPOs influence on the quality and efficiency of the administration's work	**0.659**			0.493
Effectiveness of an NPO as a partner of the local administration	**0.816**			0.239
Effectiveness of an NPO as an element of the municipal management system	**0.797**			0.206
Level of interrelation between development indicators and the indicators of municipality development	**0.828**	0.376		0.158
Level of influence of NPO on the development of the municipality's economy	**0.765**	0.400		0.216

Principal component method, rotation method: Varimax, the number of components is determined based on eigenvalues > 1.
Source: calculations performed in Jamovi (Version 2.3) (The jamovi project (2022). jamovi. (Version 2.3) [Computer Software]. Available at: https://www.jamovi.org

Table 4. Explained variance for each component

Component	Load	Differences, %	Aggregate %
1	3.83	29.50	29.50
2	3.17	24.40	53.80
3	1.83	14.10	**67.90**
Source: calculations performed in Jamovi (Version 2.3) (The jamovi project (2022). jamovi. (Version 2.3) [Computer Software]. Available at: https://www.jamovi.org			

most of the variation in the data. However, since the cumulative percentage does not reach 100%, there is an additional variation that is not explained by these components.

Thus, in order to detail the components explaining this variation, we will conduct structural equation modeling (SEM)[7] *(Tab. 5)*.

Let us consider the external loads for estimating latent variables and the relative contribution of each indicator to creating an estimate of its latent variable. Thus, the observed variable "Support of non-profit organizations by authorities" has a load of 0.190 for the hidden variable "Network interaction of NPOs with municipal government

Table 5. Results of structural equation modeling for the components (1 "Network interaction of NPOs with municipal government subjects", 2 "Development of the territory", 3 "NPO activities")

External loads	External load value	Average value of sub-samples	Standard deviation	Average value of sub-samples / standard deviation	Statistical significance
Support of non-profit organizations by authorities < Network interaction of NPOs with municipal government subjects	0.190	0.185	0.044	4.292	0.000
Attraction of additional funds for the development of territories <- Network interaction of NPOs with municipal government subjects	0.301	0.305	0.032	9.522	0.000
Direct participation of NPOs in the management of the territory < Network interaction of NPOs with municipal government subjects	0.318	0.317	0.026	12.197	0.000
Interest of the municipality in the work of NPOs <- Network interaction of NPOs with municipal government subjects	0.332	0.333	0.032	10.340	0.000
Extent of NPOs influence on the quality and efficiency of the administration's work < Development of the territory	0.242	0.242	0.036	6.749	0.000
Impact of non-profit organizations on the development of municipalities < Development of the territory	0.273	0.273	0.024	11.289	0.000
Impact of non-profit organizations on the development of municipal management < Development of the territory	0.314	0.314	0.027	11.522	0.000
Extent of development of the non-profit sector in the territory < Development of the territory	0.339	0.340	0.029	11.639	0.000
Effectiveness of an NPO as a partner of the local administration < NPO activities	0.505	0.493	0.113	4.451	0.000
Effectiveness of an NPO as an element of the municipal management system < NPO activities	0.417	0.413	0.116	3.584	0.000
Level of network interaction of NPOs in the development of the municipality's economy < NPO activities	0.429	0.425	0.117	3.657	0.000
Source: calculations performed in Jamovi (Version 2.3) (The jamovi project (2022). jamovi. (Version 2.3) [Computer Software]. Available at: https://www.jamovi.org					

[7] Structural equation modeling (SEM) was conducted in SmartPLS 4: Ringle C.M., Wende S., Becker J.-M. (2022). *SmartPLS 4*. Oststeinbek: SmartPLS GmbH. Available at: http://www.smartpls.com

subjects", t-statistic is 4.292, and p-value is 0.000; therefore, this load is statistically significant. The observed variable "Extent of development of the non-profit sector in the territory" has a load of 0.339 in relation to the hidden variable "Development of the territory", t-statistic is 10.340, and p-value is 0.000, which indicates a very strong and significant relationship.

In general, Table 5 shows that all relationships are statistically significant at p-values of 0.000, and the load coefficients range from moderate to strong (from 0.190 to 0.505). The consistency of statistical significance and the strength of the load coefficients for various observed variables suggest that the model has recorded reliable relationships between the observed and latent variables.

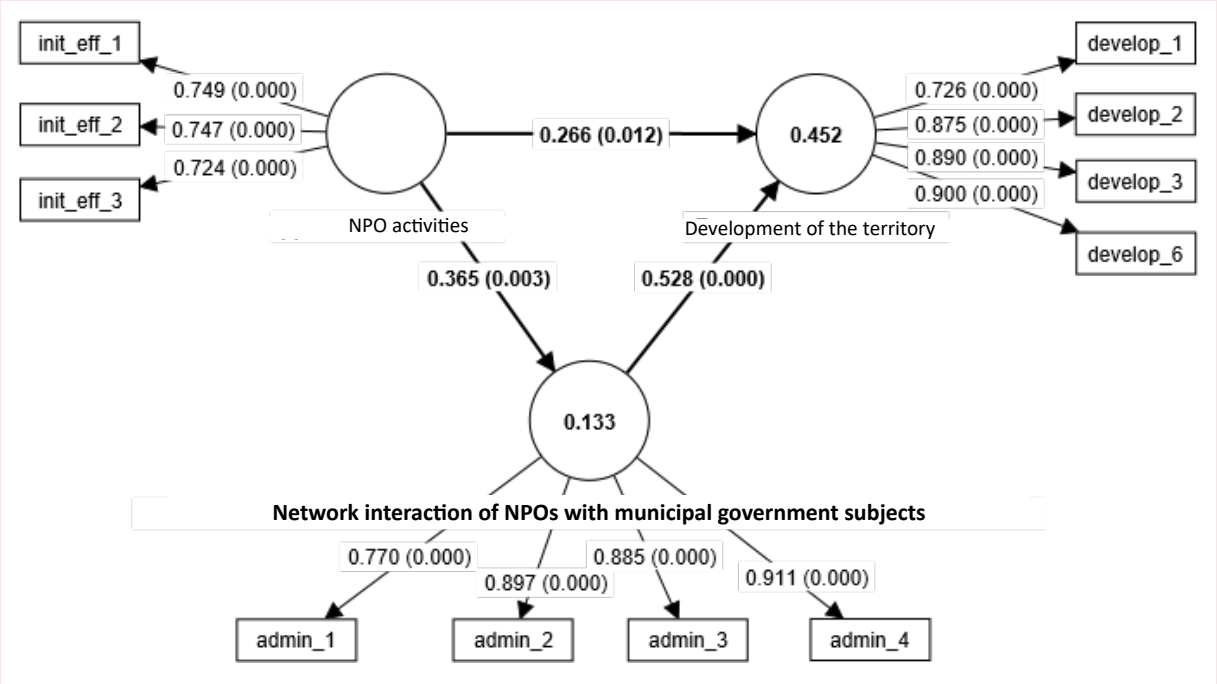
Next, let us proceed to the analysis in order to test theoretical models by measuring the relationships between several variables, based on the following hypothesis: there exist significant direct and indirect effects from the impact of hidden variables on the observed components.

The modeling in the direction of "Territory development" > "NPO activities" > "Network interaction of NPOs with municipal government subjects", taking into account multicolinearity, looks like this *(Fig. 2)*.

The analysis of the obtained model allows us to talk about direct and indirect effects *(Tab. 6)*.

According to the data, the activities of NPOs have a direct impact on the interaction of NPOs with municipal government subjects in the amount of 0.365 with a standard deviation of 0.121; t-statistic is 3.012, p-value is 0.003, which indicates a statistically significant effect. The network

Figure 2. Modeling using structural equations for the components "Territory development" > "NPO activities" > "Network interaction of NPOs with municipal government subjects"



Source: Downloaded from Jamovi (Version 2.3) (The jamovi project (2022). jamovi. (Version 2.3). Available at: https://www.jamovi.org

Table 6. Direct effects identified based on the analysis of the obtained SEM model

Direct effect	Path coefficients	Average value of sub-samples	Standard deviation	t-statistic	p-value
NPO activities -> Development of the territory	0.266	0.277	0.107	2.501	0.012
NPO activities -> Network interaction of NPOs with municipal government subjects	0.365	0.386	0.121	3.012	0.003
Network interaction of NPOs with municipal government subjects -> Development of the territory	0.528	0.522	0.106	4.965	0.000

Table 7. Indirect effects identified based on the analysis of the obtained SEM model

Inirect effect	Path coefficients	Average value of sub-samples	Standard deviation	t-statistic	p-value
NPO activities > Network interaction of NPOs with municipal government subjects > Development of the territory	0.192	0.201	0.074	2.610	0.009

Table 8. Full effect revealed on the basis of the analysis of the obtained SEM model

Full effect	Path coefficients	Average value of sub-samples	Standard deviation	t-statistic	p-value
NPO activities -> Development of the territory	0.459	0.477	0.105	4.357	0.000
NPO activities -> Network interaction of NPOs with municipal government subjects	0.365	0.386	0.121	3.012	0.003
Network interaction of NPOs with municipal government subjects -> Development of the territory	0.528	0.522	0.106	4.965	0.000

interaction of NPOs with municipal government subjects has a direct impact on the development of the territory in the amount of 0.528 with a standard deviation of 0.106; t-statistic is 4.965, p-value is 0.000, which indicates a very statistically significant effect.

Thus, all these relationships are statistically significant, and "Network interaction of NPOs with municipal government subjects -> Development of the territory" demonstrates the strongest effect and the highest significance *(Tab. 7)*.

The indirect effect suggests that NPOs influence the development of the territory indirectly through network interaction with municipal government subjects. The specific indirect effect is the product of the effects that are involved in the path: 0.192 = 0.365*0.528 *(Tab. 8)*.

The variable "NPO activities" has a full effect of 0.459 on the "Development of the territory" in our case, and this effect is higher than the direct effect (0.266) and the indirect effect through the network interaction of NPOs with municipal government subjects (0.192), confirming that it represents the overall effect (the sum of direct and indirect effects (0.459) = 0.192 + 0.266)[8]. A standard deviation of 0.105 indicates relatively small differences in estimates of the magnitude of the effect across the samples, which leads to a t-statistic of 4.357; p-value = 0.000 ($p < 0.001$), providing very convincing statistical evidence of the effect[9].

[8] Due to the approximation of the values, an error of 0.001 appeared in the program (sum = 0.458).

[9] Both the saturated and estimated models have an SRMR of 0.087, which is slightly above the preferred threshold, but still indicates an acceptable match.

Thus, first, NPO performance indicators in the aggregate of indicators of the use of additional resources and the population are steadily and significantly interrelated with indicators of the territory's development. Second, the component reflecting interactions with the municipal management system is steadily and significantly interconnected with territorial development indicators. These effects are direct and have high statistical significance. Third, the component "NPO activities" is indirectly interconnected with indicators reflecting the development of the territory. This relationship is due to the processes of interaction with the municipal management system. Therefore, it is definitely possible to talk about the existence of indirect effects from the activities of NPOs in the territory, which arise in the process of interaction with the municipal management system.

The constructed model reflects the degree of influence of the "Development of the territory" component in the aggregate of the observed variables (1–6) on the components "NPO activities" (three variables), "Network interaction of NPOs with municipal government subjects" (four variables). The analysis of the obtained parameters of the model's reliability indicates that the selected data are correct and confirms the existence of a relationship between the designated components. The expert assessments obtained have the necessary level of consistency and represent a high-quality sample of data.

Based on the results of the analysis, the hypothesis was confirmed that the interaction of NPOs in the form of TPSG with municipal government subjects is expressed in the form of a network relationship reflecting the socio-economic development of the territory and the activities of TPSG NPOs with direct and indirect effects.

Conclusion

The analysis made it possible to evaluate the process of interaction of TPSG NPOs in the municipal management system of the city of Perm. This process can be characterized as a network and reflects the transformation of municipal management functions. At the same time, the analysis revealed some difficulties in the evaluation procedures related to the lack of regularly observed data in a number of areas, the need to analyze individual cases, the difficulty of identifying and interpreting managerial effects in the development of the municipal management system due specifically to the participation of NPOs rather than other processes and phenomena.

However, these circumstances acted as justifying factors in choosing a set of methods for conducting an assessment in the form of a synthesis of methods for monitoring individual cases of TPSG NPOs, expert assessments and factor analysis, including a set of metrics that collectively reflect the nature of the ongoing interaction process.

The novelty of the research consists in the formation of own assessment tools, which made it possible to identify and substantiate the economic and managerial effects of interaction between NPOs and municipal government subjects, reflecting the quantitative metrics of NPO activities in addressing local issues, in organizing and implementing local events, in attracting additional funds to solve socio-economic problems of the territory.

In the context of the possibilities of practical application, the obtained research results may be of interest to various groups of people: representatives of actively developing non-profit organizations; a municipal education management system focused on the search and active use of additional resources.

Taking into account the fact that the majority of NPOs in the form of TPSG are characterized by isolation in matters of organization, poor participation in network interaction projects and insignificant use of municipal resources, there is clearly a high potential for increasing forms and formats of interaction with municipal government subjects through the participation of TPSG NPOs

in all municipal programs for the socio-economic development of the territory; TPSG participation in the development of individual municipal projects; conducting joint events involving the maximum number of citizens and individual population groups; improving the coherence of the organizational activities of subjects (NPOs, municipal government subjects); promoting the activity related to attracting additional funds for the development of the territory.

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National Economy Development Trends Highlighted by Leading Scholarly Journals

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Abstract. Currently, the Russian academic community faces an important task of providing information support to the scientific and technological development of the national economy, aimed, among other things, at minimizing the consequences of increasing information isolation, which is changing the established publishing patterns and destroying the working models of scientific journals. The hypothesis of our research is that journals, which are at the stage of the life cycle characterized by a continuous increase in publication citation, possess scientific maturity enabling them to integrate basic trends in the development of the national economy. Therefore, the aim of our study is to design a theoretical and methodological approach to identifying basic trends in the development of the national economy through content analysis of a pool of leading Russian journals of international level that are at the stage of scientific maturity. Methodological base includes a set of approaches to life cycle modeling: scientific

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school, scientific research, scientific data, scientific publication, scientific citation and other elements of scientific activity adapted to the specifics of periodicals' functioning. To confirm the hypothesis and achieve the goal, the indicator "journal's scientific maturity index" has been developed, the structural elements of which are two-year impact factors, five-year impact factors, number of article views per year, number of article downloads per year, probability of citation after reading. Methodological support for modeling is carried out with the use of assessment tools that allow determining the vector of comprehensive development of the journal by citation indicators. The methodological approach to life cycle modeling that we developed has been tested on the example of such journals as *Vestnik MGIMO-Universiteta; Vestnik mezhdunarodnykh organizatsii: obrazovanie, nauka, novaya ekonomika; Zhurnal novoi ekonomicheskoi assotsiatsii; Mirovaya ekonomika i mezhdunarodnye otnosheniya; Sovremennaya Evropa; Voprosy ekonomiki; Forsait; Ekonomicheskaya politika; Ekonomika regiona; Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz.* As a result, we have found that academic journals which possess scientific maturity integrate ideas that can become the determinant of new directions for national economic development. The findings will be useful to the authorities involved in designing basic trends in the development of the national economy.

Key words: national economy, basic trends, life cycle, academic journal, development modeling, scientific maturity, citation.

Introduction

Forming and achieving basic priorities of national economic development is impossible without intensifying research and development activities and making the results available to civil society. These targets have been established in federal regulatory and legal documents since 2011:

– *Strategy for Innovative Development of the Russian Federation for the period up to 2020* (approved by RF Government Resolution 2227-r, dated December 8, 2011) contained such target indicators: to increase a number of publications by Russian researchers in the total amount of publications in scientific journals to three percent globally by 2020 (2.08 percent in 2010), to increase a number of citations per publication by Russian researchers in scientific journals indexed in the Web of Science database to four citations per publication (2,4 citation per publication in 2010);

– *Strategy for Scientific and Technological Development of the Russian Federation* (approved by Presidential Decree 642, dated December 1, 2016) sets a task of creating an effective communication system to improve sensitivity of economy and society to innovations, to create conditions for high-tech business development;

– *National Project "Science and Education" (2019–2030)* directs scientific communities to increase the share of the Russian Federation in the total amount of articles in fields defined by scientific and technological development priorities in publications indexed in international databases;

– *Presidential Decree* declares the decade before 2031 Decade of Science and Technology; as the main goal it notes "increasing availability of information about achievements and prospects of Russian science for citizens of the Russian Federation"[1].

[1] On declaring the Decade of Science and Technology in the Russian Federation. Presidential Decree 231, dated April 25, 2022. Available at: http://www.kremlin.ru/acts/bank/47771

All these documents are focused on forming a reliable communication platform for researchers, scientists, business representatives and authorities, which enables genesis, evolution and expansion of new scientific ideas. Components of this platform will be scientific periodicals demanded by the society. They provide access to qualitatively new knowledge, enable further development of ideas to ensure sustainable development of country's economy and to increase its scientific and technological independence on the global stage. This in turn serves as a premise for the author to formulate the *hypothesis* of research: journals at the stage of life cycle, which is characterized by continuous growth of citations, integrate basic trends of national economic development. Hypothesis setting is conditioned by information isolation of Russian scientists, reflected in limited availability of foreign research results. This brings into focus the importance of scientific maturity of Russian journals, which reflects the level of their demand among scientists and guarantees the relevance and quality of scientific content in general. In this regard, our research *aims* to develop a theoretical and methodological approach to identify basic trends in national economy development through content analysis of the pool of leading Russian international journals that are at the stage of scientific maturity.

To reach this aim it is necessary to solve the following tasks:

– to offer the author's view on life cycle idea of scientific journal, taking into account express analysis of theories of scientific components life cycle;

– to identify peak development stages of the most significant Russian economic journals with a focus on regional studies (continuous growth periods of citation rate or scientific maturity of publications), to analyze the content of the most cited publications during these periods;

– to identify and visualize basic development trends of the national economy reflected in journals with scientific maturity.

The results will be useful for authorities engaged in basic development trends in development of national economy, including providing regulatory and legal support for development of scientific journals in regions of the Russian Federation.

Degree of knowledge

Theory of life cycle in relation to components of scientific activity has a long history. The first object to apply this theory was *creative activity* of scientists. In 1953 American psychologist Harvey Lehman published his monograph *Age and Achievement*, in which he outlined results of research on relationship between age and creative activity (Lehman, 2017). He concluded that the peak of creativity for most scientists falls on age of 30–35 years, by age of 45 years there is a significant decline and by age of 70 years creative activity disappears. Lehman also provides examples of scientists being highly active later in life but considers them as exceptions from the pattern he derived (Lehman, 1958). Goodwin and Sauer (Goodwin, Sauer, 1995) note that creativity of scientists slightly declines after they obtain an administrative position but it reaches its peak (throughout the cycle) at the time of re-election. Creative activity over life cycle of scientists has also been examined in works (Diamond, 1984; Diamond, 1986; Levin, Stephan, 1991; Horlings, Gurney; 2013; Rauber, Ursprung, 2006; Rauber, Ursprung, 2008). Baser and Pema (Baser, Pema, 2004) analyzed creative activity of academic economists.

O.I. Nechaev applies the theory of the life cycle to *scientific school* research and distinguishes the following stages: work of a narrow circle of like-minded people, developing a research team in

relevant areas and allocating certain directions with choosing new leaders (from students) and their followers. O.I. Nechaev notes that a scientific school loses its activity after its leader who "unties employees on the basis of moral qualities rather than administrative ones" leaves (Nechaev, 2019). There are also studies devoted to *life cycle of scientific direction* (Bochkaryov, Guseva, 2019; Tattershall et al., 2021); *life cycle of scientific research* (Humphrey, 2006; Allan, 2009) and *life cycle of scientific organization* (Buzni, Troshin, 2020).

Quite often life cycle theory is applied to *data and data management, including scientific data*. The most comprehensive review of this area was performed by the Committee on Earth Observation Satellite (USA). In 2012 the Committee published a report presenting 55 data life cycle models[2].

In Russia *life cycle of scientific data* was considered by Yu.I. Shokin and A.V. Yurchenko (Shokin, Yurchenko, 2019). According to the authors, the work with scientific data rotates around the cycle "obtaining – storage – use – disposing". Scientific data, unlike other types of data, have the following features: multiple sources; diversity of data and their formats; different quality and larger volume. Working with them is also characterized by a number of distinctive features related to: 1) need to exchange and share data; 2) need to verify research results; 3) diversity of methods and tools for data analysis; 4) need to integrate varying data. The authors divided the life cycle of working with scientific data into 22 stages. With the emergence of the *big data* phenomenon, life cycle theory began to be applied to it (Balyakin et al., 2020).

Life cycle of a scientific publication was first explored in 2002 when P.H. Franses, editor of *Statistica Neerlandica*, analyzed 66 published papers (Franses, 2002). According to his findings, the life cycle of scientific publications consists of two stages. The first stage covers article concept, its submission to journals, possible revision due to reviewers' comments and acceptance of the manuscript. The second stage is measured by citation evaluation. In addition to describing this process in detail, the author concludes the following:

1) special issue articles are cited more frequently;

2) editing takes more and more time;

3) longer articles with more references get more citations.

Issues of scientific publication life cycle are also considered in (Chaitow, 2019). Emergence of digital scientific articles has aroused interest of many scientists. For example, *life cycle of digital scientific publication* has become the object of research by E.N. Babin, A.M. Elizarov, D.S. Zuev, and E.K. Lipachev (Babin et al., 2013; Elizarov et al., 2014).

The study (Darling et al., 2013) devoted to the role of social networks in the life cycle of scientific publications is also worth mentioning. According to the authors, social networks can have a significant impact on popularizing scientific ideas. Publication of materials on such information platforms helps to widespread results of work among wide audience of other researchers, decision-makers, journalists and public in a short period of time and this can improve scientific and social impact of publications, to form relevant narratives and to determine economic development priorities of national economy. Despite the fact that the article was published almost 10 years ago, these recommendations are still relevant today. The authors suggest using social networks as an informal platform for previewing unfinished

[2] Committee on Earth Observation Satellites (CEOS) Working group on Information Systems and Services (2012). Data life cycle models and concepts, CEOS Version 1.2. Available at: https://ceos.org/document_management/Working_Groups/WGISS/Interest_Groups/Data_Stewardship/White_Papers/WGISS_Data-Lifecycle-Models-And-Concepts.pdf (accessed: May 15, 2022).

works (preprints) – a source of forming the first stage of scientific publication life cycle.

Life cycle of scientific publication directly depends on its citation, which also has its own cycle. In 1979 A. Avramescu proposed the existence of three types of *citation life cycles within a single category of scientific publications* (Avramescu, 1979). On the basis of these observations he distinguished three types of scientific papers: highly cited, barely noticed and brilliant.

V. Cano and N. Lind identified two types of life cycle curves citation. Analysis was based on 10 classic works in medicine and biochemistry. The first type is characterized by a relatively rapid accumulation of citations in the first years of article's existence (4–7 years after publication), followed by a gradual decline. It is typical for articles with low and medium citations. The second type is characterized by moderate citations in the first six years followed by a steady climb in citations. This pattern was found in particular for biochemistry articles and for highly cited papers (Cano, Lind, 1991). P. Wouters considered life cycle of citations as a mean of scientometrics to visualize science:

1) in form of information on performance of researchers, research institutes or other entities in terms of certain indicators;

2) in form of maps of science;

3) in form of rankings, for example, journals in terms of impact factors (Wouters, 1997).

H. Bouabid proposes a model for predicting future or expected citations for a corpus of scientific publications (Bouabid, 2011). The article (Gou et al., 2021) identifies four stages in life cycle of scientific article:

– stage I: citation rate of publication follows a zero-growth model, number of citations is equal or approximately zero;

– stage II: citation rate of publication follows exponential model and accelerate;

– stage III: citation rate corresponds to linear model; number of citations grows smoothly;

– stage IV: citation rate corresponds to deceleration phase of logistic model, number of citations decreases over the years.

Life cycle of (scientific) knowledge is considered in works (Swanson, 1993; Peinigrahi, 2011; Ivanova, 2016). D. Swanson notes that scientific knowledge becomes increasingly divided into areas as it develops. However, combining knowledge from different fields (subjects) can result in something new. Consequently, knowledge can go through more than one life cycle as new relationships that were not obvious at the time of initial publication, are formed (Swanson, 1993).

Therefore, we see that the concept of life cycle is quite actively applied to research certain elements of scientific activity. However, studies of life cycle of a scientific periodical journal have not yet been conducted either by domestic or foreign scientists. The term *"journal's life cycle"* appeared in 1992 in an article (Maczelka, Zsindely, 1992) devoted to impact factor and self-citation rate of chemistry journals. At the same time, topic of journal's life cycle was not revealed in the article. Among works in Russian research devoted to *life cycle of printing products* can be mentioned (Levykin, 2013; Anisimova, Nazarenko, 2015). However, these works do not also concern scientific periodicals.

Scientific relevance of our study is driven, among other things, by lack of works devoted to life cycle of scientific periodical. A pool of leading economic journals is researched.

Materials and methods

Mentioned review of life cycle theory application to components of scientific activity allows us to note that currently there is no universally recognized interpretation of "life cycle of scientific periodical" concept. At the same time, we

established a conceptual link between life cycle of scientific object and its citation rate, which is an important factor in its development. Therefore, in this research we will define stages of journal's evolution as a basic definition: from creation to loss of citation rate. These stages are quite difficult to formalize without having a developed methodological basis.

After examining methodological features of life cycle model design in works of foreign (Dauns, 1967; Lyppite, Shmidt, 1967; Katz, Kahn, 1978; Boulding, 1953; Miller, Friesen, 1984; Greiner, 2002; Lester et al., 2003; Adizes, 2004) and Russian scientists (Emel'yanov E.N., Povarnitsyna, 1996), the following universal features of its construction can be noted:

– life cycle curve is designed taking into account two parameters: time and performance;

– life cycle stages are consistent, each subsequent stage is a consequence of the previous one;

– each life cycle stage has individual content;

– movement through life cycle goes in direction "from the past to the future", which is inherent in evolutionary nature of any economic object, including journal;

– time of passing through stages is variable, for each scientific publication it is individually based;

– it is possible to determine stage of life cycle only by "looking back", by the fact of what happened.

We propose to use time and scientific maturity index of journal, which is introduced to reflect integrated performance of its functioning, as parameters for designing development trajectory. To calculate this index, we will use evaluation framework that comprehensively measures reader's interest for different time periods of journal's functioning. One of the basic indicators will be impact factors from several time periods.

Impact factors as components of scientific activity assessment have been actively discussed over the last 15 years (Archambault, Larivière, 2009; Kiesslich et al., 2021; Torres-Salinas et al., 2022; Tret'yakova, 2015), although 1927 when journal rankings based on their citations were conducted for issues related to selection of periodicals for libraries, can be considered as the origin of such scientometric indicators. (Gross, Gross, 1927). In 1955 E. Garfield proposed his own method to calculate such metric, designated as impact factor of scientific journal (Garfield, 1955). From that time studies to identify the most important journals in certain fields of research have been actively conducted.

We have to admit that, despite more than half a century of metric's history, indicator "impact factor" is controversial. Many domestic and foreign scientists criticize it (Balatsky, 2015; Lariviere, Sugimoto, 2019; West et al., 2017). The most popular argument against its use is related to uneven distribution of citations across publications (Seglen, 1997). Therefore, in order for impact factors to provide a qualitative assessment of journal, our research proposes to integrate them with other indicators in authors' calculation methodology. The structure of Index of Scientific Maturity is shown in *Table*.

As an evaluation mean we propose to use method of calculating the length of a vector by its coordinates, in which coordinate values correspond to journal metric indicators (formula 1).

$$\text{Index of Scientific Maturity} = \sqrt{\sum_{i=1}^{m} a_i^2}, \quad (1)$$

where Index of Scientific Maturity – index of scientific maturity of journal,

a_i – journal citation metric;

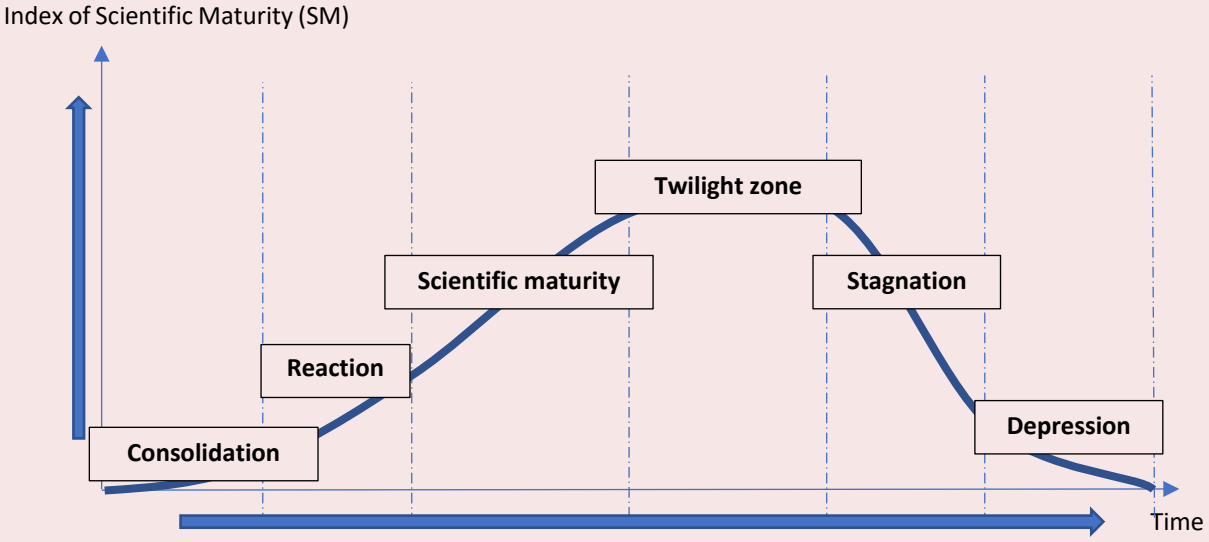
$i = 1, 2,.., m$ – number of metrics used.

Behavior of scientific maturity index at stages of journal's life cycle is shown in *Figure 1*.

Scientific maturity structure of journal (Index of Scientific Maturity)

A_i	Metric	Content
A_1	Two-year RSCI impact factor without self-citation	Number of citations in the current year from other journals to articles in this journal published in the previous two years, divided by number of these articles
A_2	Two-year RSCI impact factor taking into account citations from all sources	Amount of citations in the current year to articles published in journal over the previous two years, divided by number of these articles; self-citation is also taken into account
A_3	Two-year impact factor according to the RSCI core	Amount of citations in the current year to articles published in journal over the previous two years, divided by number of these articles; in this case, only references from journals included in the RSCI core (WoS, Scopus or RSCI) are taken into account; self-citation is taken into account (if journal is included in the RSCI core)
A_4	Two-year impact factor according to the RSCI core without self-citation	Amount of citations in the current year from other journals to articles in this journal published in the previous two years, divided by the number of these articles; references are taken into account only from journals included in the RSCI core (i.e. included in WoS, Scopus or RSCI)
A_5	RSCI five-year impact factor	Amount of citations in the current year to articles published in journal over the previous five years, divided by number of these articles; self-citation is also taken into account
A_6	Five-year RSCI impact factor without self-citation	Amount of citations in the current year from other journals to articles in this journal published in the previous five years, divided by number of these articles
A_7	Five-year impact factor according to the RSCI core	Amount of citations in the current year to articles published in journal over the previous 5 years, divided by the number of these articles; in this case, only references from journals included in the RSCI core (WoS, Scopus or RSCI) are taken into account; self-citation is taken into account (if journal is included in the RSCI core)
A_8	Five-year impact factor according to the RSCI core without self-citation	Amount of citations in the current year from other journals to articles in this journal published over the previous 5 years, divided by number of these articles; references are taken into account only from journals included in the RSCI core (WoS, Scopus or RSCI)
A_9	Number of article views per year	Number of views of pages with abstracts of articles in journal by elibrary.ru users per year; Items of all types for all available years are taken into account; depends not only on interest of readers, but also on journal's volume and depth of archive posted on elibrary.ru
A_{10}	Number of article downloads per year	Number of downloads of full texts of articles in journal by users of the elibrary.ru portal per year; Items of all types for all available years are taken into account; depends not only on interest of readers, but also on journal's volume, depth of archive posted on elibrary.ru and access mode (open or paid); Repeated uploads of an article by the same user are not counted
A_{11}	Probability of citation after reading, %	It is calculated as the average share of authors who cited article for all articles per year among the authors who downloaded full text of this article on the portal elibrary.ru; all citations and all downloads of article made from the moment this article was posted on elibrary.ru are taken into account
Source: own compilation		

Figure 1. Scientific journal's life cycle model



Consolidation	Reaction	Scientific maturity	Twilight zone	Stagnation	Depression
Thinking through a publishing idea to support research	Implementation of ideas	Launching mechanisms for promoting a scientific publication and building a brand	Still a strong position but the process of aging has begun	No vision for the future	Loss of authors and readers Resignation of scientists from the editorial
Integrating resources and efforts	Organizing storage of published materials	Integrating research results into international scientometric databases	Focus on past achievements that stop working	Deterioration in the metrics of scientific publications and articles	Ending publishing activities
Active communications	Ensuring accessibility of published materials	Educational activities and work with authors	Order for order – further educational work with authors	Exclusion from high-rating international scientometric databases	Reduction or complete ending of financial support of founder
Taking risks	High vulnerability	Sustainability or confidence in the future	Dangerous stability: if you chose the right path, you will get off it	Personal survival	Trace is being is erased, "death" may take years
Index of SM = min	Index of SM → max	Index of SM = max	Index of SM =< max	Index of SM < max	Index of SM → min

Source: own compilation.

This framework can be extended with citation indicators of scientific publication in other databases, if journal in question is indexed in them. Besides, it has been recommended to take into account the number of downloads of journal's articles from its website, social network pages and other public sources that reflect readers interest in published materials, if journal has appropriate Internet metrics

Therefore, the authors' methodological approach to identify basic development tendencies national economy includes the following research steps:

1. Identifying testing ground for research. RSCI journal database RSCI in open access of the Scientific Electronic Library elibrary.ru is proposed as a source.

The total number of economic journals in elibrary.ru in April is 1542; 533 of them are indexed in RSCI; 364 journals are included in the List of peer-reviewed scientific publications, they contain the main scientific results of dissertations for the degree of candidate and doctor of sciences; 44 journals are included in core of RSCI; 35 journals are included in RSCI (collection of the best Russian journals on the Web of Science platform); 22 journals are indexed in Scopus; 18 journals are indexed in WoS (WoS indexes 1518 journals in economics; 1166 journals in Economics, Econometrics and Finance).

Simultaneous fulfillment of the following conditions serves as a selective filter for our research: journal indexation in Web of Science and Scopus, its presence in RSCI database, the RSCI core and in the VAK list. Currently, 8 Russian journals meet these conditions: "Voprosy ekonomiki"; "World Economy and International Relations"; "Foresight and STI Governance", "Journal of the New Economic Association"; "Ekonomicheskaya politika"; "International Organisations Research Journal", "MGIMO Review of International Relations", "Contemporary Europe".

The sample additionally included two highly cited top ten journals: "Economy of Regions" and "Economic and Social Changes: Facts, Trends, Forecast". During the public examination of RSCI, experts singled them out as national-level publications worthy of inclusion in RSCI (Tret'yakova, 2020). These journals are also included in rating based on analysis of bibliometric parameters and expert assessments of scientific level (Balatsky, Ekimova, 2019). Journals "Economy of Regions" and "Economic and Social Changes: Facts, Trends, Forecast" are included in the Diamond List of rating, which forms the 13 best Russian economic publications (ranking third and tenth).

Thus, the sample includes ten journals.

2. Designing a model of life cycle curve of selected journals by calculating scientific maturity index for the period 2014–2022. To identify basic trends in the development of Russian economy, we should consider publications of "scientific maturity" stage, which is characterized by a continuous growth in citations, reflecting high interest of readers in articles published in journals.

3. Conducting content analysis of the most cited publications with "scientific maturity". Units of analysis will be key words of these articles, which is due to the fact that key words are designated by authors as dominants of conceptual space of their research. They also represent an easily formalizable construct even within a large corpus of texts (Belousov, Zelyanskaya, 2012). Use frequency of particular keyword helps to identify core of tsubject area ontology and its periphery.

The authors' approach will help to identify the main proposed by the authors and selected by the reviewers research topics of corresponding time period for each journal, collectively representing scientific basis for forming of trends in development of national economy.

Results and discussion

Content analysis of key words in the most citation-rated articles from previously selected journals allows us to note that in 2009–2013 innovations, sustainable development and economic security of regions, investments and human capital as factors of economic growth of national economy were the most discussed topics. Since 2014 research interest has shifted to industries digitalization and to digital economy development. Scientific focus on import substitution processes as a factor of regional economic growth in response to sanctions pressure from other countries has also become in demand. In 2018–2022 research topics related to digital transformation strengthened their positions and formed the main trend in national economy development *(Fig. 2)*.

Calculation of scientific maturity index of journals shows that all journals, except for "Voprosy ekonomiki", have a steady growth, which allows us to record "scientific maturity" stage of their life cycle, forming reliable platforms for discussing relevant issues of national economic development, serving as sources for generating answers to modern challenges *(Fig. 3)*.

Content analysis of the first twenty most cited articles from journals in question at the identified citation peaks allowed us to identify the main development tendencies of national economy that have emerged in the scientific community.

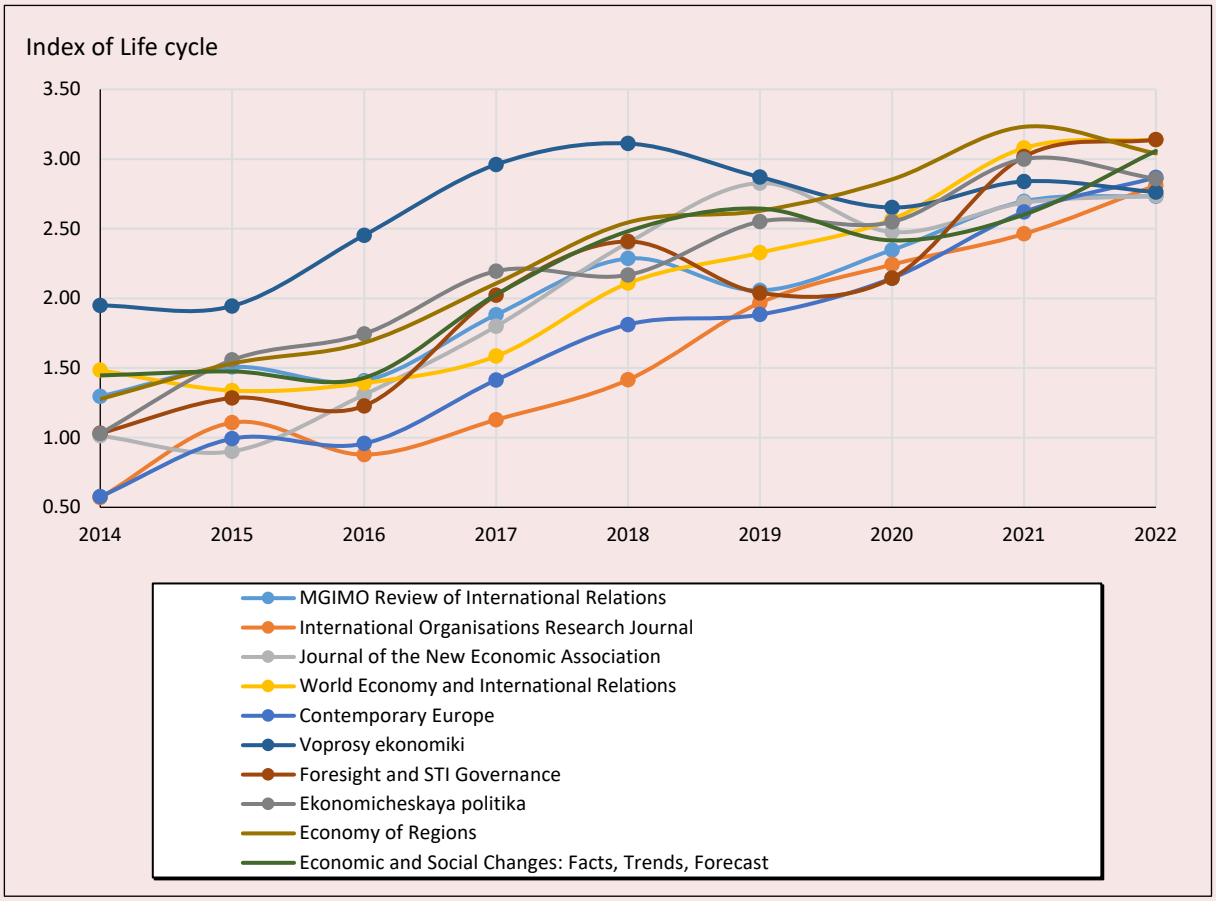
Most of the authors are focused on digital economy (20%); 18% of the authors studied issues of regional economic development, including spatial aspects with rating articles; green economy / alternative energy were covered by 12% of the authors; impact of the COVID-19 pandemic was reflected in by 10% of the authors; behavior of various economic entities under shock conditions or conditions of uncertainty were touched upon by 10% of the authors; technological revolution as a factor of economic growth is studied by 5% of the authors; impact of sanctions was touched upon by 3% of the authors. However, in terms of citation index, ranking of topics are different *(Fig. 4)*.

Figure 2. Key words in highly rated Russian scientific journals of international level, 2009–2022

2009–2013 **2014–2018** **2018–2022**

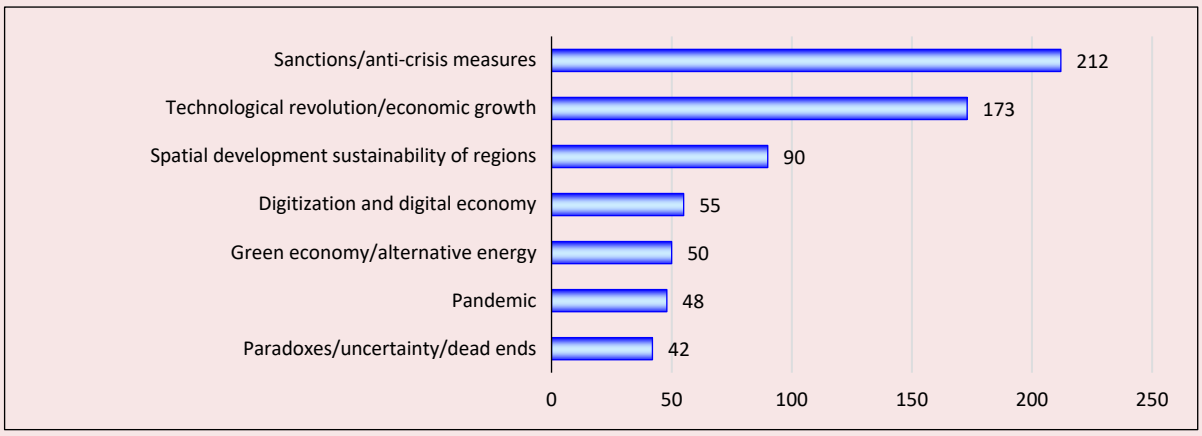
Source: own compilation.

Figure 3. Life cycles of highly rated Russian scientific journals of international level, 2014–2022



Source: own compilation.

Figure 4. Ranking of research topics stated in titles of articles, by the average citation rate of articles, 2014–2022



Source: own compilation.

Figure 5. Content analysis of key words in the most popular articles from highly ranked journals in the "scientific maturity" stage, 2014–2022

Source: own compilation.

Content analysis of key words in the most popular articles from highly rated journals at the stage of "scientific maturity" also confirms identified prioritization of scientific topics *(Fig. 5)*.

Therefore, the example of journals in question shows that scientific periodicals can serve as a source of basic trends integration in development of national economy in case it reaches the stage of scientific maturity in its life cycle, which is characterized by steady growth in citation rate of articles.

Conclusion

This research aims to address the issue of strengthening information support for scientific and technological development of national economy, to minimize impacts of growing scientific isolation. An option for its comprehensive solution, according to authors, is to improve national discussion platform. Components of this platform are Russian journals. Their scientific maturity determines genesis, evolution and expansion of creative ideas and new knowledge demanded in the new economic reality.

Within article authors attempted to transfer the hypothetical link between establishing basic directions of national economy development into publication reality, taking into account life cycle of journals. For this purpose, we developed theoretical and methodological aspects of modeling life cycle of scientific periodicals and proposed a methodological framework that enables identifying a development stage of a particular journal. Therefore, an additional research filter was to find journals at the stage of scientific maturity, reflecting steady growth in their citation rate and their functioning due to publication authority formed over the years.

The next step not only to identify but also to assess the potential for sustainability of national economic development can be key (by citation index) research topics comparison of the leading ranking journals characterized by scientific maturity, with key topics of journals from the VAK List of category K1, grouped by the regional characteristics of the founders. The maximum overlap of topics will indicate uniform forming of basic development tendencies. If there is a maximum overlap over the entire research period, we can talk about the coherence of scientific space, which serves as a fundamental basis for country's economic growth.

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Development of Inland Waterway Transport in Russia and the Experience of China

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Abstract. In Soviet times, inland waterway transport played a decisive role in the exploration of the country's remote areas. The year 1985 witnessed the peak of its development, when the world's highest volume indicators were achieved. Currently, China is the world leader in this sector, having managed to transform inland waterway transport from an inconspicuous economic sector into a dynamically developing means of transport within 45 years. China's achievements deserve attention, especially in terms of the scale and speed of the process. While Russia and China differ significantly in population density, production volumes, and seasonality of water transport, they have certain similar characteristics as well (vastness of territory, length and configuration of inland waterways, possibility to reach poorly developed areas). The article identifies four stages in the development of inland waterway transport, differing in goals, objectives, financing mechanisms and tools for the implementation of development

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goals set for a specific stage. It is shown that the development of inland waterway transport in the Russian Federation is determined by the complex economic and geographical characteristics of the country and by accumulated system-wide problems in the development of the sector. The latter include insufficient financing of inland waterways; shortage of modern vessels; low investment attractiveness and insufficient investment in the industry; poor interaction with other means of transport, which deprives inland waterway transport of part of the cargo base; shortage of modern transshipment complexes; outflow of skilled personnel from the industry. In order for the Russian inland waterway transport to regain its influence on the country's territorial development, it is necessary to use China's experience in organizing financing projects in this area, developing a training system, and combating interspecific competition in transport. Scientific significance of the study lies in the theoretical analysis and comparative assessment of the level of development of inland waterway transport in Russia and China. Proposals for addressing the accumulated problems of Russian river transport based on the use of China's experience in promoting the activities of inland waterway transport are of practical importance.

Key words: inland waterway transport, backbone network of inland waterways, Russia, China.

Introduction

The importance of transportation infrastructure is always manifested at crucial moments of the country's development. Increased attention to the development of infrastructure of inland waterway transport (hereinafter – IWT) in Russia is currently associated with the sanctions against the Russian Federation, which requires the creation of highways of special importance that will not only contribute to the development of domestic transportation, but also ensure the effective functioning of international transport corridors[1]. In this regard, the Government of the Russian Federation has developed documents providing for the "debottlenecking" and development of the backbone network of inland waterways of the country[2].

The Russian IWT played a determining role in the development and exploration of territories, especially in remote and hard-to-reach regions, and its development peaked during the Soviet era, when the highest volume indicators were reached in 1985 (Miloslavskaya, Trotsenko, 2007).

China is currently the world leader in inland waterway transportation, having succeeded in transforming the IWT, which 40 years ago was a low-profile sector of its economy, into a dynamic mode of transportation as a result of successive multi-year reforms in the triad of "cargo base, river vessels, waterways". The dramatic growth of China's IWT has facilitated the development of areas along riverbanks and turned inland waterways into economic corridors for the development of the PRC's western territories (Aritua et al., 2020).

China's achievements in IWT development are noteworthy, especially in terms of the scale and speed of this process. It is definitely difficult to compare the IWT of different countries in terms of transportation volume, ship size and shipping lanes. Nevertheless, China's experience is being explored in many countries to revitalize the IWT system[3] (Amos et al., 2009).

[1] Muzlova G.I. (2024). Highways of special importance. *Morskie vesti Rossii*, January 12, 2024. Available at: https://morvesti.ru/analitika/1690/106978/ (accessed: February, 15, 2024).

[2] Draft Concept for the Development of Inland Waterways of the Russian Federation until 2024. Available at: https://mintrans.gov.ru; Transport Strategy of the Russian Federation up to 2030 with a forecast for the period up to 2035, 3363-r, dated November 27, 2021.

[3] Promoting inland waterway transport in the People's Republic of China. Mandaluyong City, Philippines: Asian Development Bank, 2016. Available at: https://www.adb.org/publications/promoting-inland-waterway-transport-prc (accessed: February 15, 2024).

Undoubtedly, Russia and China differ significantly in terms of population density, industrial production volumes, and seasonality of the IWT operation. However, there are similar characteristics: vastness of territory, uneven development of productive forces, as well as the length of inland waterways in use, their configuration, the ability to serve the deep and underdeveloped regions of the country.

Let us try to answer the questions of how and why such a serious failure in the development of the IWT was formed in the Russian Federation over the last 45 years. Is the Russian IWT destined to suffer the fate of the cart transportation that befell the latter in the early 20th century? Under what conditions can the period of revival of inland waterway transport come in Russia, and what conclusions should Russia draw from China's lessons in the IWT development?

Research materials and methods

The methodological basis of the work is system and comparative analysis, methods of statistical analysis. The information base is the data of state programs for waterway transport development, state and departmental statistics of Russia and China, as well as analytical documents of federal authorities, official reports of the administration of Russia's water basins.

Literature review and problem statement

Studies on the impact of waterway transport on the development of regional economy form a significant section of works on classical infrastructure topics. The presence of the developed transport infrastructure is noted to have a positive impact on the region and can be manifested in the reduction of transport costs, increase in the level of transport accessibility, development of logistics services for the population, growth in the volume of foreign trade, increase in the turnover of money in the region, increase in the volume of investment in infrastructure development, improvement of labor productivity, attraction of other types of economic activities, growth of employment and welfare of the population, growth of agglomerations (Fujita, Mori, 1996; Notteboom et al., 2009; Shcherbanin, 2011; Witte et al., 2014; Isaev, 2015; Park, Seo, 2016; Krasnopol'skii, 2018; Mel'nikov, 2019; Leonov, Zaostrovskikh, 2021; Xiao et al., 2022).

As a rule, transport development in conjunction with the regional economy is sequential: at the first stage, the skeleton of transport communications is formed; at the second stage, the volume of transportation is increased due to the development of production; at the third stage, transportation services are created; at the fourth stage, international transport corridors are formed. The sequential replacement of one stage by another leads to the formation of a balanced unified transportation system and its adequate elements, where the key is the creation of a backlog ahead of the infrastructure elements, to support the stable and sustainable development of the economy of the region and the country as a whole (Bely, 2009; Persianov, Sakul'eva, 2014; Krasnopol'skii, 2018).

At present, Russia's IWT is a significant infrastructure complex that provides transportation links with 52 constituent entities of the federation. Inland waterways have an extensive network of water communications, which makes it possible to use them both for transportation services to remote areas and for areas located at the intersection of the country's main highways. There are 117 ports functioning on inland waterways, eight of which are open for international traffic and are transportation hubs for multimodal transportation. The river fleet has 12.7 thousand vessels of various purposes, the average age of which is 33 years[4]. The Unified Deep Water System (hereinafter – UDW) of European part of the Russian Federation, which unites eight of the thirteen basins of the country, occupies a special place in the IWT structure. A significant part of

[4] Transport Strategy of the Russian Federation up to 2030 with a forecast for the period up to 2035, 3363-r, dated November 27, 2021.

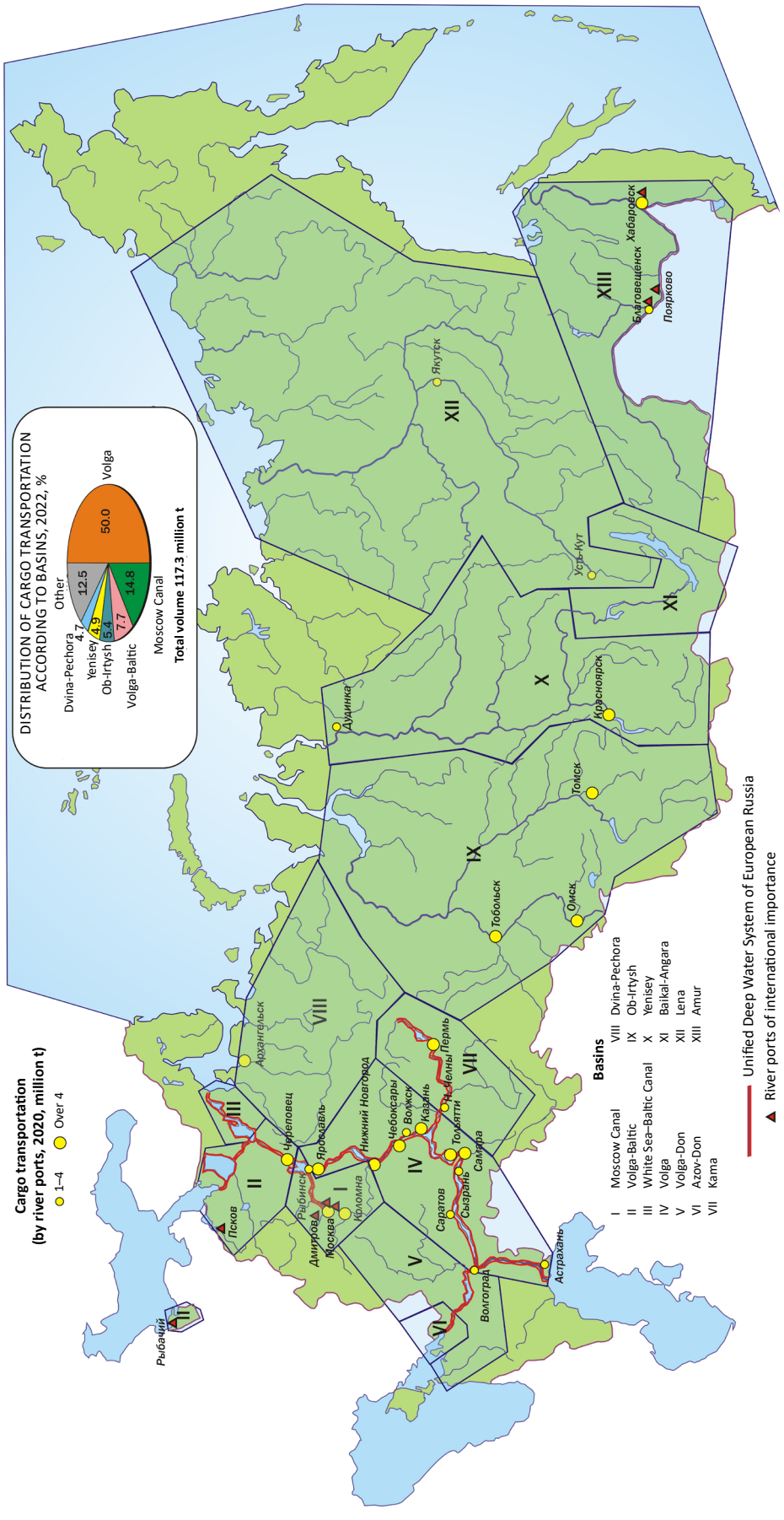


Figure 1. Scheme of federally managed inland waterways basins in Russia

According to: On the definition of basins of inland waterways of the RF: Order of the Ministry of Transport of the RF 316, dated August 17, 2012 (with amendments and additions from September 29, 2023); (Dmitrieva, Maslova, 2023).

Russia's cargo transportation (82%) falls on these eight basins of the UDW, located in the developed regions of the country, where the directions of transportation flows mainly coincide with the "north–south" inland waterways *(Fig. 1)*.

The features of Russia's IWT development are determined by complex economic and geographical characteristics: limited navigation period (240 days in the south of the country due to river shoaling, 120–150 days in the north due to ice drift); meridional location of main rivers with latitudinal direction of main transportation routes; low density of population and industrial enterprises along the banks of main rivers; small dimensions of ship passage; long payback period of river vessels due to limited navigation period (Egorov, 2021).

Along with the noted economic and geographical features, there are a number of systemic problems in the development of Russia's IWT: insufficient financing of inland waterways and hydraulic structures; shortage of modern ships, the need for which by 2035 will amount to 500 units[5]; low investment attractiveness of industry enterprises and the level of investment insufficient for cardinal modernization of their fixed assets; poor interaction with other modes of transport, which deprives the IWT of a part of the cargo base; shortage of modern transshipment facilities; lack of modern cargo transportation facilities; outflow of skilled personnel from the industry (Shcherbanin, Golubchik, 2017)

Given the enormous tasks set before the IWT to ensure domestic and international transportation[6], in the near future Russia will have to make a "quantum" leap in the construction and modernization of transport infrastructure, as well as the transformation of the systems of financing, management and training of personnel for this industry.

[5] Huge, but as yet unrealized potential. *Morskie vesti Rossii*, June 20, 2023. Available at: https://morvesti.ru/news/1679/103357/ (accessed: February 15, 2024).

[6] Transport Strategy of the Russian Federation up to 2030 with a forecast for the period up to 2035, 3363-r, dated November 27, 2021.

Let us consider how problems in the development of inland waterway transport in Russia have arisen and why they have accumulated.

Periodization of the formation of the Russian IWT

The problems peculiar to the Russian IWT have been forming for many years. During almost half a century (1980–2023) four stages of the Russian IWT development are distinguished, differing in the declared targets, solved problems, financing, management and personnel training systems for the industry *(Table)*.

The first stage (1980–1990) is associated with the formation of a unified transportation system and the creation of large-scale infrastructure projects in the country. The tasks of ensuring interconnection between the IWT and other branches of the national economy, as well as between different modes of transportation were put in the foreground. The Central Research Institute of Water Transport Economics and Operation (TsNIIVET) played a key role in the elaboration of the General Scheme of River Transport Development. The main objective of this scheme, based on regional and sectoral specifics, was to develop a comprehensive approach that took into account the ratio of freight traffic volumes, the number and structure of river vessels, and the specialization of ports and ship repair enterprises (Grigor'ev, 1982; Zolotarev et al., 1986; Zaostrovskikh, 2017). As part of the accelerated industrial development of the Far North, Siberia and the Far East, the task was set to form river communications with access to the Northern Sea Route (Goncharenko et al., 2017). Under the influence of the container revolution that unfolded in the world, the second task was formulated by the middle of this stage – the development of transport hubs and the formation of the general scheme of the container transportation system of the country. In fact, this stage was characterized by "competition" not only in quantitative indicators

Description of the main stages in Russia's IWT development

	First stage 1980–1990	Second stage 1991–2000	Third stage 2001–2013	Fourth stage 2014–2023
Main goal	Formation of the Unified Water Transport System of the country	Overcoming disproportions in the development of the IWT, resulting from changes in transportation links	Modernization of infrastructure, improvement of efficiency and competitiveness of the IWT	Creation of highways for the development of domestic and international transportation
Main tasks	Creation of the UDW; formation of the General Scheme of the container system of the country	Modernization, increase of efficiency and competitiveness of the IWT	Reorientation of mass cargoes from land to inland waterways	Formation of river transportation corridors to support the Northern Sea Route and the North-South direction
Interrelation of the IWT and regional economies	Close relationship between production and transportation	Transportation is distinguished as an independent system		Revitalization of production and transportation systems
	Comprehensive development of the IWT in coordination with the country's needs; balanced development of cargo transportation, ships, inland waterways, ports and ship repair base	Changes in transportation links, emergence of intraspecific and interspecific transportation competition; haphazard development of transportation infrastructure facilities		Attempt to comprehensively justify the development of cargo transportation, vessels, inland waterways, ports and ship repair facilities; interspecific competition
Funding	Planned state funding of transport infrastructure facilities of the IWT	Emergence of financial security problems. River steamship companies and ports corporatization	The total amount of financing for 2001–2009 amounted to 3.6 billion rubles Federal subsidies for passenger transportation on interregional routes and cargo transportation to the Far North	Total funding for the period 2019–2024 is 281.96 billion rubles Subsidies from the federal budget for passenger transportation on interregional routes and the importation of socially important cargoes to the Far North regions
Regulatory documents for the IWT development	General scheme of river transport development	Program of revival of the Russian merchant fleet for 1993–2000.	Subprogram "Inland Waterway Transport" of the Federal Target Program "Modernization of the Transport System of Russia"	The IWT development strategy of Russia's waterways for the period until 2030; Concepts for the development of Russia's inland waterways for the period until 2024.
IWT status for the last year of the phase	Cargo transportation volume 516.7 million tons	Cargo transportation volume 116.8 million tons	Cargo transportation volume 137.3 million tons	Cargo transportation volume 108.7 million tons
	Volume of passenger transportation 89.8 million people	Volume of passenger transportation is 27.7 million people	Volume of passenger transportation 13 million people	Volume of passenger transportation is 10.5 million people
	Volume of transportation of the IWT cargoes to the Far North 49 million tons	Volume of transportation of the IWT cargoes to the Far North 14 million tons	Volume of transportation of the IWT cargoes to the Far North 18 million tons	Volume of transportation of the IWT cargoes to the Far North 16 million tons
	Cargo transshipment in ports 917 million tons	Cargo transshipment in ports 150 million tons	Cargo transshipment in ports 176 million tons	Cargo transshipment in ports 125 million tons

According to: Program for revival of the Russian merchant fleet for the period 1993–2000 1034, dated December 30, 2000; Subprogram "Inland waterway transport" of the federal target program "Modernization of the transport system of Russia (2002–2010)" MK-P-10-13850, dated November 19, 2003; Strategy for the Development of Inland Waterway Transport of the Russian Federation until 2030 372-r, dated February 29, 2016; draft concept for the development of inland waterways of the Russian Federation until 2024 (https://mintrans.gov.ru); Transportation and communications in Russia: Statistical compendium. Goskomstat of Russia. Moscow, 2001; Transport in Russia. 2022: Statistical compendium. Rosstat. Moscow, 2022; (Zolotarev et al., 1986; Kostygina, 2004; Miloslavskaya, Trotsenko, 2007; Dmitrieva, Maslova, 2023).

(tons, t/km, pass/km), but also in qualitative ones, such as the speed of container handling in the port, the coefficient of technical equipment, etc. (Kilin, 1980; Krivoshei, 2010).

Thanks to the created balanced transportation system, a radical re-equipment of the IWT was carried out. The 6.5 thousand km long and 365 cm deep UDW made it possible to use river-sea vessels and develop international transportation. With the help of canals, the UDW had access to five seas: the White, Baltic, Black, Azov and Caspian seas (Aksenov, 1980). The development peak of the Russian waterways was in 1985, when the length of the operated inland waterways was 126.6 thousand km, the cargo transportation volume was 632.6 million tons, and 26.3 thousand technical vessels were on the balance of the administrations of inland waterways basins. Passenger transportation amounted to 132 million people, passenger turnover – 5.9 billion passengers/km. Such indicators made Russia a world leader in the IWT development (Miloslavskaya, Trotsenko, 2007).

The second stage (1991–2000) was initiated by the collapse of the Soviet Union, which led the transportation sector, like other economic spheres, to a deep systemic crisis. Due to the abolition of the unified system of cargo transportation provision, approaches to the formation of demand for cargo transportation and its planning changed. And the law adopted in 1992 on the abolition of supplies of products and goods for state needs[7] finally consolidated the rejection of centralized distribution of material and technical resources, which gave rise to large-scale problems in providing transportation to the Far North, Siberia and the Far East.

The primary tasks in the IWT development during this period were overcoming the crisis and creating a transportation infrastructure to meet the needs of the country's economy[8].

As competition appeared on the market of transportation services, the IWT developed within the framework of market requirements, increasing infrastructural limitations. To survive, many enterprises were forced to engage in activities that were not typical for them before. River ports, for example, began performing not only transshipment operations, cargo storage and repair of used equipment, but also cargo transportation. River vessels had the hardest time, as the cost of river transportation was 25–30% higher than that of railroad transportation (Krivoshei, 2010).

At the same time, the unfolding process of corporatization and privatization of the IWT enterprises disrupted the planned work on renewal of river vessels, reconstruction of previously operating communications, as well as increasing the guaranteed depth on the UDW from 365 to 400 cm (Belov et al., 1987). The reform process took place under conditions of a sharp decline in the volume of transportation, massive mutual non-payments, and rising prices for all material and technical resources. It is no surprise that the decline in production volumes in the main cargo-forming industries sharply affected the final indicators of the IWT. In turn, the population outflow from the northern regions, as well as the closure of a number of industrial production facilities led to a 3.5-fold decrease in cargo delivery to the Far North. During the period under consideration, not only the nomenclature of cargoes, but also the transportation volume by basins of the country changed (Miloslavskaya, Trotsenko, 2007). The volume of freight transportation decreased 4.4 times compared to 1990 and amounted to 116.8 million tons in 2000 (see Table).

[7] On the organization of work to implement RF Law 2859-1, dated May 28, 1992 "On the supply of products and goods for state needs": RF Government Resolution 638, dated August 27, 1992.

[8] Federal target program "Revival of the merchant fleet of Russia (1993–2001)", federal target program "Modernization of the transport system of Russia (2002–2020)".

The third stage (2001–2013) of inland waterway transport development was aimed at overcoming the negative trends of the 1990s and differed from the previous two stages by increasing the level of competitiveness of inland waterway transport due to the reorientation of a part of mass cargo from land routes to inland waterways. From the methodological point of view, it was important not only to improve the IWT system, but also to develop economic methods to provide a "reserve" of transport infrastructure in accordance with the international requirement of the transportation services market. In other words, it was important to take into account not only the operational costs of transportation, but also the external costs of society for the IWT functioning (Bugromenko, 2009).

The key objectives of the stage were declared to be modernization, improvement of efficiency and competitiveness of the IWT through construction of new generation ships and development of ports with due regard to modern requirements. For this purpose, it was planned to replace transshipment equipment in the ports of Samara, Ust-Donetsk, Azov, Yeisk, Astrakhan, and to dredge up to 4 m along the entire length of the UDW[9].

Since 2001, there has been a positive trend in the development of the IWT freight transportation, the volume of which increased 1.5-fold to 151 million tons between 2000 and 2008. However, the economic crisis had a strong impact on the IWT indicators. In 2009, the volume of transportation fell to 97 million tons (64% of the 2008 level), and compared to 1989, the volume of the IWT transportation in Russia decreased almost six times. The shortage of modern transshipment complexes and port terminals with an excess of outdated and inefficient transshipment equipment hampered the development of container transportation by waterways (Miloslavskaya, Trotsenko, 2007). This forced cargo owners to refuse to transport cargo through river ports, so it was impossible to switch mass cargoes from land routes to inland waterways. As a result, the transportation process of a single production and technological complex (river vessels, ports, ship repair bases) was disrupted.

In addition, due to the merger of maritime and river services of the Russian Ministry of Transport[10], the structure of river transport management underwent serious changes and actually dissolved into the Federal Agency of Maritime and River Transport in 2004 (Krivoshei, 2010). As a result, the Research Institute of Water Transport Economics (TsNIIVET) actually ceased its activities.

At the same time, such transportation issues of the 1990s as rational distribution of freight flows by individual modes of transportation, door-to-door management of transportation services, and comparison of the system of the IWT indicators with other modes of transportation were left unattended and unresolved (Zaostrovskikh, 2017).

During the fourth stage (2014–2023), it was planned to reorient mass cargo from land routes to inland waterways. In the future, the focus was supposed to shift toward the creation of thoroughfares of special importance for the development of domestic and international transportation. This was supposed to ensure the growth of competitiveness of the IWT in relation to other modes of transportation, increase the availability and quality of its services for shippers[11].

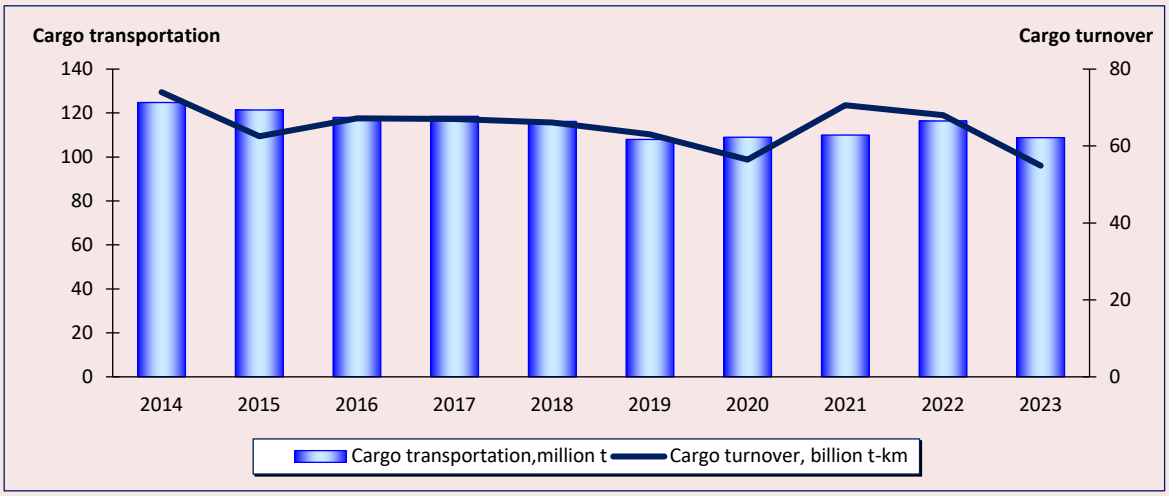
However, it is impossible to realize these tasks of the IWT. The volume of cargo transportation decreased by 12.8% and cargo turnover by 25.8% compared to 2014 with the unchanged total length of inland waterways (100–101 thousand km) by 2024 *(Fig. 2)*.

[9] Subprogram "Inland waterway transport" of the federal target program "Modernization of the transport system of Russia (2002–2010)", dated November 19, 2003. We should say that the task of ensuring guaranteed depths of 400 cm at the UDW has not been solved so far.

[10] On the system and structure of federal executive bodies: Presidential Decree 314, dated March 9, 2004.

[11] Strategy for the Development of Inland Waterway Transport of the Russian Federation until 2030 372-r, dated February 29, 2016.

Figure 2. Dynamics of cargo transportation and cargo turnover of Russia's IWT



According to: Transportation and communications in Russia: Statistical compendium. *Goskomstat of Russia*. Moscow, 2001; Transport in Russia. 2022: Statistical compendium. *Rosstat*. Moscow, 2022.

The prerequisites for the decrease in indicators by 2024 were, on the one hand, international economic sanctions, on the other hand, internal reasons caused by low water levels in the rivers (river vessels operated underloaded), as well as the reorientation of cargoes to land transport modes after the completion of a number of large oil and gas projects.

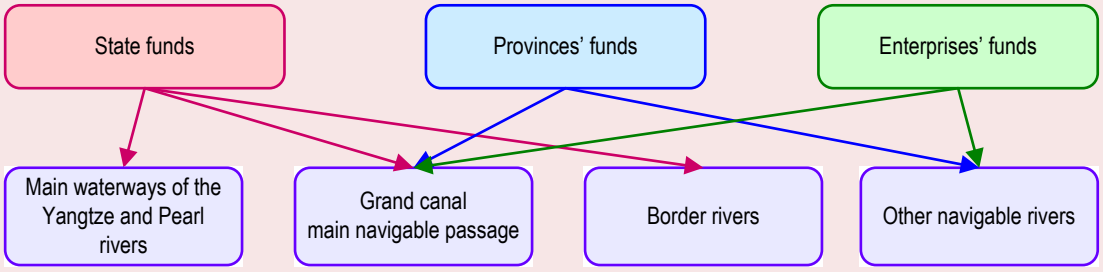
In fact, it is at this stage that a certain "fading" of the IWT activities in Russia takes place. The main mass cargoes move from inland waterways to railroads and pipeline transport, and other cargoes – to road transport. During the analyzed years the Russian IWT has turned into a highly specialized type of transport for transportation of mineral and construction materials[12], and its share in the total volume of cargo transportation by the transport complex of the country has been steadily decreasing. If in 2000 it amounted to 4.5%, then by the end of 2023 it will be only 1.3%.

[12] The predominant cargoes of the Russian IWT are mineral and construction materials (43%), coal (19%), cement (6%) and grain (3%).

Main problems of the Russian IWT

We should state that by now Russian inland waterway transport has lost its leading positions in the world, ceding them to China. On the one hand, on the whole, the IWT at the fourth stage to some extent repeats the development trajectory of the second half of the 1990s, when an important emphasis was placed on the balanced development of cargo transportation, ships, inland waterways, ports and ship repair facilities. On the other hand, there is a significant difference: the IWT development is reduced to the formation of highways of special importance from the interior of the country to the ports for the purpose of exporting raw materials. At the same time, the tasks of developing the Far North, Siberia and the Far East, development of transport communications to ensure the national security of the country are poorly taken into account. The most serious problems of the Russian IWT are the lack of financial resources, personnel shortage and destruction of the system of integrated development of the IWT in interaction with other modes of transportation.

Figure 3. Main sources of financing for the development of China's inland waterways



Source: (Aritua et al., 2020).

What makes China's IWT experience interesting for Russia?

Unlike Russia, China has managed to transform its own IWT system from an inconspicuous infrastructure industry into the busiest means of transportation in 45 years (1978–2023). The length of inland waterways during this period has increased by 19% and amounted to 128 thousand km; cargo transportation volume increased 10 times (from 436 million tons to 4.4 billion tons), and IWT turnover increased 14.5 times and reached 1.9 billion tons/km. The volume of cargo transshipment in PRC river ports in 2022 exceeded 5.5 billion tons of cargo, of which 58% in domestic traffic and 42% in overseas traffic. In fact, the IWT has become one of the key means of transport in providing transportation within China (17%), overtaking rail transport (10%) (Aritua et al., 2020). Modernization of China's IWT infrastructure required huge investments within the framework of the established multichannel system of financing the IWT reform, transforming the education and training system, and changing the IWT management system.

1. Changes in China's IWT management system. The existence of a large inland waterway network required a clear distribution of responsibilities at all levels of government, so China's IWT is under the jurisdiction of the Ministry of Transport and provincial transport departments. The Ministry of Transport has overall responsibility for the policy and administration of inland waterways, as well as for planning the operation of canals of national importance. The provincial departments of transportation are responsible for waterways of local importance. The Ministry of Water Resources is responsible for the development of inland waterway and port infrastructure, taking into account national, provincial and municipal plans (Aritua et al., 2020).

2. Financing of China's IWT reform. Orientation on large-scale development of China's waterways required huge capital investments for construction and maintenance of the emerging transportation infrastructure. During the reform period, China managed to create a multichannel extensive system of financial sources for investing in the development of waterways, which, despite its multi-element nature, had built-in mechanisms for controlling the targeted use of funds *(Fig. 3)*.

In general, China's IWT reform focuses on a range of project funding sources (Aritua et al., 2020; Lu, Aritua et al., 2023):

– state (central and local) budget funds;

– trust funds of the Ministry of Transport, which were formed from the tax on the purchase of vehicles, fees for the construction of ports and special allocations for the development of inland waterways;

– loans provided by Russian (mainly state-owned) and foreign banks;

– funds from local government budgets;
– enterprise and institutional funds.

Multi-channel fundraising opportunities have been widely utilized by the Chinese government at the provincial level of management, which has shaped preferential policies and a blended financing model to finance navigation and energy solutions based on co-investment, risk sharing and profit sharing. To this end, concession models have been used by financial organizations and the government. The benefits of such multidisciplinary projects were shared in proportion to each party's share of the investment. The experience has been successful, and local government investment platforms have been established in a number of places to invest in local waterways (Aritua et al., 2020).

Government funds are the determining financial source of support for the IWT development. China applies a hierarchical model of waterway management, in which central government agencies are responsible for the maintenance of navigation aids and lighthouses on the main waterways of the Yangtze and Heilongjiang (Amur) rivers and state-owned coastal main waterways; local governments are responsible for the maintenance of waterways and navigation aids within their jurisdictions. The main sources of funds for waterway maintenance are waterway maintenance fees, enterprise revenues, local financial subsidies, and other transportation and port charges for cargo transportation (Lu et al., 2023).

In August 1992, the Ministry of Transportation, together with the Ministry of Finance and the State Price Control Bureau of China, issued the "Measures on the collection and utilization of inland waterway maintenance fees". The document clarified the scope of waterway maintenance fees, adjusted the standard of the fee, and specified that waterway maintenance fees are collected and managed by divisions of transportation departments, which strengthened control over the targeted use of fees for waterway maintenance and development. The active establishment of trust funds for inland waterway development in China began under the Ninth Five-Year Plan (1996–2000), when the central government established trust funds for waterway development, requiring the Ministry of Transportation to allocate a portion of funds from the vehicle purchase tax and port construction fees to waterway construction and the IWT development[13].

It is worth noting the flexibility of the Chinese government's policy on the design of port service charges. In 2020, amid the COVID crisis, the Ministry of Transportation reduced the existing port service charges by 20% to help renew the business environment and restart the operation of logistics companies[14].

The amount of foreign capital, which also began to be attracted during the years of China's Ninth Five-Year Plan (1996–2000), amounted to about 1 billion US dollars by 2019. Loans from international financial institutions accelerated infrastructure projects in China and helped standardize and modernize the management of inland waterways. The World Bank, Asian Development Bank and other international financial institutions have carried out project management and introduced standardized systems and practices from project preparatory work, project implementation (including bidding and tender management) and post-project evaluation to ensure smooth project implementation. The introduction of advanced international management concepts

[13] Between 2005 and 2007, 150–200 million US dollars was invested annually for inland waterway construction. Since 2008, annual investment has increased to 300 million US dollars, and in 2018, the Ministry of Transportation invested more than 1.5 billion US dollars in trust funds for inland waterway construction development. At the same time, local governments raised about 1.14 billion US dollars (Aritua et al., 2020, p. 57).

[14] Ageev A. China cuts port service charges to incentivize supply chains. Available at: https://glavpaluba.ru/ports/1271-kitaj-snizhaet-portovye-sbory-za-obsluzhivanie-chtoby-stimulirovat-logisticheskie-cepochki (accessed: February 11, 2024).

and experience has played an important role in bringing China's inland waterway construction and maintenance management in line with global practices (Lu et al., 2023).

The role of the central government is to develop and implement policies and measures, and to encourage and support parties investing in waterway construction. Tiered and multi-level and multi-channel project financing mechanisms are used for the construction of local waterways. Examples of such multi-channel financing sources include loans from banks (most often state-owned banks that implement economic and trade development financing policies for public investment projects), commercial bank funds, public funds, investment platforms and direct investment from enterprises.

Examples of regional initiatives to finance the construction and maintenance of inland waterways in China are numerous[15].

Investors putting into the construction of inland ports and waterways shall be allowed to carry out comprehensive land development through land reclamation and use the proceeds for the IWT development. Compensation fees for any damage or occupation of waterways and enclosing structures, as well as maintenance funds reserved for construction projects, should be used for the rehabilitation, construction and maintenance of waterways.

3. China's education and personnel training reform for the IWT was directly linked to the reform of the water transport market in the 1980s. The opening of the domestic market led to a sharp increase in the number of private ship owners whose crews lacked ship maneuvering experience and engine maintenance skills. This, along with the modernization of the IT sector, the growth of international trade and the introduction of new information and communication technologies, increased the need for logistics managers and middle and senior management staff in inland shipping companies. Modernization of the industry required continuous improvement of qualification of personnel and crews of inland shipping companies. To dilate the resulting problems, reform in the IWT training system was required, which "overlapped" with the overall development model of higher education in China in terms of university mergers (Li et al., 2023).

China's universities and vocational schools at all levels have been reoriented to meet the growing demand for skilled IWT personnel. An important point was that, as part of the reform process, the central government increased the autonomy of waterborne transport training institutions, leaving only the recommendation function.

To adapt more actively to the development needs of the water transportation industry, the Ministry of Transportation changed the structure of water transportation education institutions and established new higher education institutions. In 1992, Wuhan Maritime Engineering College merged with Wuhan Institute of Water Resources of Transportation, officially changing its name to Wuhan University of Transportation. Dalian Maritime College then changed its status to Dalian Maritime University. The establishment and development of the two universities has created a favorable environment for improving the quality of education to the academic level in shipping and water transport engineering in China (Aritua et al., 2020).

[15] For example, the Guangdong provincial government allocates about 70 million US dollars annually for the construction and maintenance of waterways, which covers a significant share of work related to waterway maintenance in the province; in Gansu and Jilin provinces, the main costs of waterway maintenance and management are directly included in provincial budgets; the central government authorizes the establishment of special IWT companies that are responsible for financing, operational asset management and loan repayment of the IWT projects (in Jiangxi and Hunan provinces, port and waterway investment and development groups have been established that are responsible for investment and financing, construction and operational management of IWT infrastructure); the central government is encouraged to canalize waterways by building dams with both power generation and navigation facilities, directing the revenue from power generation to further improve waterways (for more details, see Aritua et al., 2020, p. 59).

The Ministry of Transportation and local governments have jointly established several water transport vocational schools, including Guangzhou Maritime Institute, Jimei University Maritime College and Wuhan Transport University Water Transport Vocational College.

China's established system of inland navigation universities and schools is unique. China has become the only country in the world with inland navigation universities. In other nations in the world, inland navigation education is usually limited to vocational schools and training schools (Lu et al., 2023).

In fact, China has managed to revitalize the IWT over the previous four decades by implementing a long-term central government policy that was clearly oriented toward achieving the postulated goals, coordinating the central and provincial governments with strong central leadership, clearly supporting multichannelization and diversification of financial resources, and reforming the education and training system for the IWT.

Discussion

It is worth noting that there is no real continuity and consistency in solving problems by stages when analyzing the development of the Russian IWT. Unresolved problems of the Soviet period in the conditions of a deep system crisis in the 1990s did not allow the IWT to fully transition from the first stage of development to the second, where the main goal was to improve all structural elements as the volume of transportation grows. The third stage of the IWT development, like the second one, only partially corresponds to the set of necessary conditions (development of transportation services), so it can hardly be called complete. The fourth stage implies the formation of highways for the development of inland and international transportation. However, to implement this stage, it is necessary to build the supporting infrastructure that would meet the modern needs of the country's economy. There are no such obvious steps, so we cannot say that Russia has created a balanced unified transportation system of the IWT.

The situation is complicated by the fact that the Russian IWT, unlike the Chinese, has long been in the "shadow" of the country's strategic transportation priorities. As a result, the IWT problems were largely only declared and smoothly "flowed" from one strategy to another[16], thus acquiring a systemic character.

As part of the Transport Strategy, the idea of year-round navigation on inland waterways in the south is currently being developed. First of all, this is the so-called "Southern Horseshoe": the Caspian, Azov-Don and Volga-Don basins. The initiative is planned to be fully implemented by 2030[17]. This will require "a number of large technical developments". The prospects for the IWT development are mainly related to the modernization of infrastructure and fleet renewal, elimination of limiting areas on the UDW[18] .

The main emphasis in the development of Russia's IWT is shifting to the development of international transport corridors within the UDW framework. This explains the aspiration to organize year-round navigation on inland waterways in the Caspian, Azov-Don and Volga-Don basins by 2030[19]. At the same time, the potential of inland

[16] Subprogram "Inland waterway transport" of the federal target program "Modernization of the transport system of Russia (2002–2010)", 2004; Strategy for the Development of Inland Waterway Transport of the Russian Federation until 2030372-r, dated February 29, 2016; Transport Strategy of the Russian Federation until 2030 with a forecast for the period until 2035 3363-r, dated November 27,2021.

[17] Transport Strategy of the Russian Federation until 2030 with a forecast for the period until 2035 3363-r, dated November 27, 2021.

[18] Sidorov A. A comprehensive solution is being prepared for the IWT. *Morskie vesti*, April 20, 2021. Available at: https://morvesti.ru/analitika/1690/89290 (accessed: February 11, 2024).

[19] Transport Strategy of the Russian Federation until 2030 with a forecast for the period until 2035 3363-r, dated November 27, 2021; draft concept for the development of inland waterways of the Russian Federation until 2024 (https://mintrans.gov.ru).

water transport in Siberia and the Far East is still underestimated in strategic documents and insufficiently exploited in reality, so the prospects for the development of transport in Siberia and the Far East are largely confined to the plans for further economic development of these macro-regions.

However, in strategic terms, the interests of Siberia and the Far East can really cooperate with the development of international transportation corridors. This is the idea laid down in the new Northern Sea Route Development Plan until 2035[20], where the "river transport corridors" block has been added to the transportation tasks for the first time, which should form a "transportation grid" connecting the Trans-Siberian Railway and the Northern Sea Route. In fact, this means the recognition of the fact that the prospects for the development of the Siberian and Far East IWT are subject to a triune task: further economic development of these macro-regions, damping the insufficient development of other modes of transport here and the formation of transport links between the Northern Sea Route and the Trans-Siberian Railway (Leonov, Zaostrovskikh, 2023; Baklanov et al., 2023).

An important issue that has not been resolved in the Russian Federation to date is the possibility of returning to the IWT cargo flows previously developed by inland water transport, but lost in the post-perestroika period, and now served by other modes of transport. For instance, the Transport Strategy for 2016–2030 provides for the delivery of the following cargo flows, million cubic meters: sand – 1,700, sand and gravel mixture – 760, crushed stone – 880, cement – 520. These are traditional cargo flows of inland waterway transport, which until 1990 accounted for up to 400 million tons annually in the total volume of transportation. Their return to inland water transport can be ensured through preferential taxation of shipping companies and river ports, similar to what is practiced in China, which has developed inland water transport.

The current situation in the Russian river industry shows that river transport has already practically abstracted from the Russian transportation system and has no significant impact on the country's economy. Moreover, it continues to surrender its positions and, if cardinal measures are not taken in the near future, the IWT may actually cease to exist, which is unacceptable for Russia as a country with the longest, most extensive and in the recent past very effective network of inland waterways.

As we have already noted, China has been able to revitalize its IWT over the previous four decades for a number of reasons: first, it has demonstrated consistent, sustainable, predictable and adaptable central government policies that set long-term goals and objectives for economic and industrial development in line with the country's five-year plans and oriented long-term government policies to achieve the postulated goals and objectives; second, it synchronously coordinated the activities of the central and provincial governments at all levels under the strong central leadership; third, it clearly supported the step-by-step implementation of the IWT planning goals by multichannelization and diversification of necessary financial resources for the IWT development; fourth, it reformed the education and personnel training system for the long-term development of China's inland waterway transport.

Conclusions

The performed analysis has shown that for the previous 45 years inland waterway transport in the Russian Federation has lost its positions of the world leader, ceding them to China. Problems concerning the IWT development have accumulated and are still multiplying.

[20] Northern Sea Route Development Plan until 2035 2115-r, dated July 1, 2022.

Unlike Russia, over the same period China has managed to transform its IWT from an inconspicuous infrastructure industry into the busiest inland waterway transport system in the world, in fact making IWT one of the key modes of transport in ensuring the transportation of goods within the country (17%), overtaking even rail transport (10%).

The main lesson learned from the Chinese IWT development experience is that river transport, which is the world's most economical, most environmentally friendly and safest mode of transport, should once again become such in Russia, regaining its lost positions, especially since the fundamental conditions for this are still available.

To solve river transport problems accumulated in Russia, it is necessary cardinal measures to develop and systematically promote a clearly thought-out, consistent, adaptable state policy in the sphere of river transport and inland waterways; to improve the system of river transport management; to create a diversified system for attracting findings for Russia's IWT development; to improve the competitiveness of river vessels and optimize their structure, taking into account the world experience and real conditions of the Russian waterways; to develop the system of personnel training for the IWT, restore the industry science to perform prospective and advanced research and development.

It is necessary to use the Chinese experience in organizing financing of water transport projects, experience in developing the system of personnel training, fighting interspecific competition in transport and completing the large-scale dredging works declared long ago and actually expected to turn the Russian inland water transport into a real force of the country's territorial development.

The scientific significance of the research lies in the theoretical analysis and comparative assessment of the degree of development of inland waterway transport in Russia and China. The practical significance consists in the proposals to solve the accumulated problems of Russian river transport on the basis of using China's experience in stimulating the country's IWT activity.

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The Monitoring of Public Opinion on the State of the Russian Society

As in the previous issues, we publish the results of the monitoring of public opinion concerning the state of the Russian society. The monitoring is conducted by VolRC RAS in the Vologda Region[1].

The following tables and graphs show the dynamics of several parameters of social well-being and socio-political sentiment of the region's population according to the results of the latest round of the monitoring (June 2024) and for the period from June 2023 to June 2024 (the last seven surveys, that is, almost a year).

We compare the results of the surveys with the average annual data for 2000 (the first year of Vladimir Putin's first presidential term), 2007 (the last year of Vladimir 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 Vladimir Putin's third presidential term).

We also present the annual dynamics of the data for 2018 and for 2020–2023[2].

In April – June 2024, the President's approval rating did not change significantly and amounts to 67–68%. The proportion of negative assessments is 20–21%, which is significantly lower in comparison with positive ones[3].

Positive dynamics have been recorded over the past 12 months (from June 2023 to June 2024): the President's approval rating increased by 6 percentage points (from 61 to 67%)[4].

[1] The surveys are held six times a year in the cities of Vologda and Cherepovets, in Babayevsky, Velikoustyugsky, Vozhegodsky, Gryazovetsky, Tarnogsky Kirillovsky, Nikolsky municipal okrugs, and in Sheksninsky Municipal 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 Region's adult population. Sampling error does not exceed 3%.

More information on the results of VolRC RAS surveys is available at http:// www.vscc.ac.ru/.

[2] In 2020, four rounds of the monitoring were conducted. Surveys in April and June 2020 were not conducted due to quarantine restrictions during the spread of COVID-19.

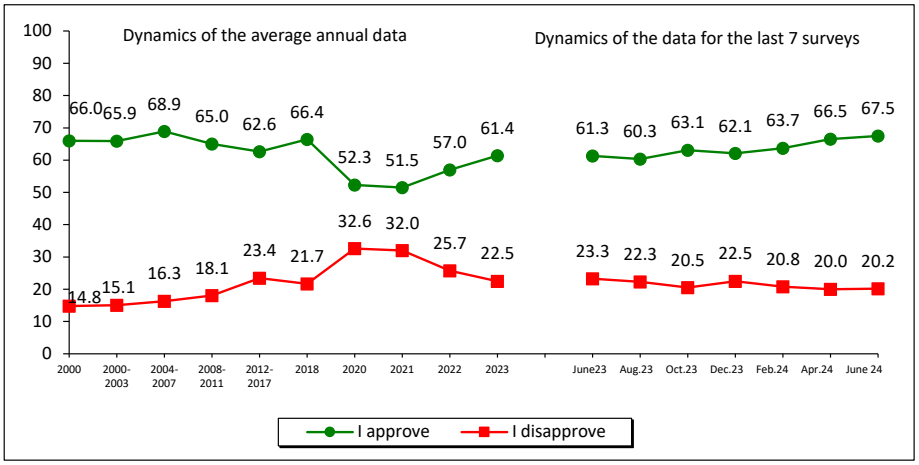
[3] Here and elsewhere, in all tables and in the text, positive changes are highlighted in green, negative changes are highlighted in red, and no changes – in blue. Due to the fact that the changes of +/- 3 p.p. fall within the limits of sampling error, they are considered insignificant and are marked in blue.

[4] Here and elsewhere in the text, the results of a comparative analysis of the data from the survey conducted in June 2024 and the results of the monitoring round conducted in June 2023 are given in the frame.

How would you assess the current work of…? (% of respondents)

Response	Dynamics of the average annual data									Dynamics of the data for the last 7 surveys							Dynamics (+/-), June 2024 to	
	2000	2007	2011	2012	2018	2020	2021	2022	2023	June 2023	Aug. 2023	Oct. 2023	Dec. 2023	Feb. 2024	Anp. 2024	June 2024	June 2023	Anp. 2024
RF President																		
I approve	66.0	75.3	58.7	51.7	66.4	52.3	51.5	57.0	61.4	61.3	60.3	63.1	62.1	63.7	66.5	67.5	+6	+1
I disapprove	14.8	11.5	25.5	32.6	21.7	32.6	32.0	25.7	22.5	23.3	22.3	20.5	22.5	20.8	20.0	20.2	-3	0
Chairman of the RF Government																		
I approve	-	-	59.3	49.6	48.0	38.7	39.9	45.4	50.1	49.2	50.8	51.3	51.9	52.7	53.7	53.5	+4	0
I disapprove	-	-	24.7	33.3	31.6	40.4	37.6	32.0	27.6	27.1	26.1	28.6	27.9	26.2	24.3	23.4	-4	-1
Vologda Region Governor																		
I approve	56.1	55.8	45.7	41.9	38.4	35.0	36.7	40.9	48.1	48.7	48.1	47.5	49.1	50.8	51.7	51.6	+3	0
I disapprove	19.3	22.2	30.5	33.3	37.6	42.5	40.5	35.8	30.9	30.7	29.7	29.7	29.9	27.5	30.1	28.0	-3	-2
Wording of the question: "How would you assess the current work of ...?"																		

How would you assess the way that the RF President is handling his job?
(% of respondents, VolRC RAS data)*



Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
I approve	+6	+1
I disapprove	-3	0

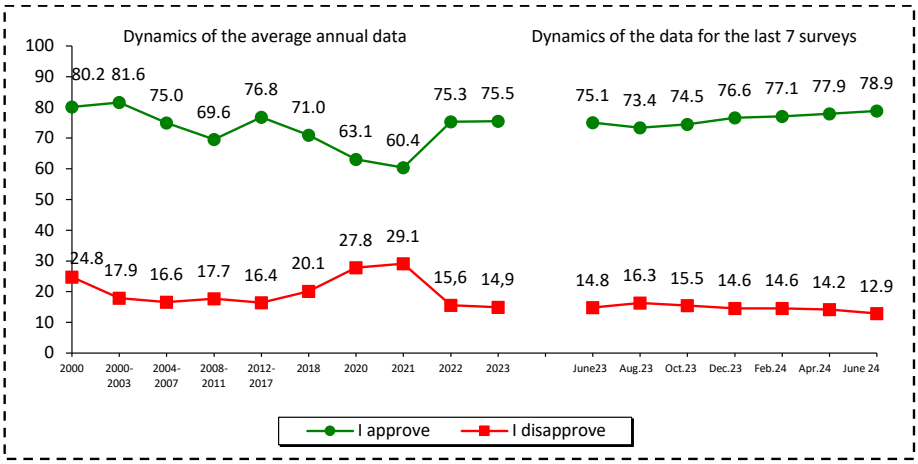
* Here and elsewhere, all graphs show the average annual data for 2000, 2018, 2020, 2021, 2022, 2023, as well as the average annual data for the periods 2000–2003, 2004–2007, 2008–2011, 2012–2017 that correspond to presidential terms.

For reference:

*According to **VCIOM**, the President's approval rating for the period from April 2024 to the beginning of June 2024 has not changed and amounts to 78–79%. The proportion of those who disapprove of the way the President is handling his job is significantly lower (13%).*

A positive trend in the President's approval rating was recorded in June 2024 compared to the same period in 2023: the share of approving responses increased by 4 percentage points (from 75 to 79%).

Do you approve or disapprove of the way that the RF President is handling his job?
(% of respondents; VCIOM data)



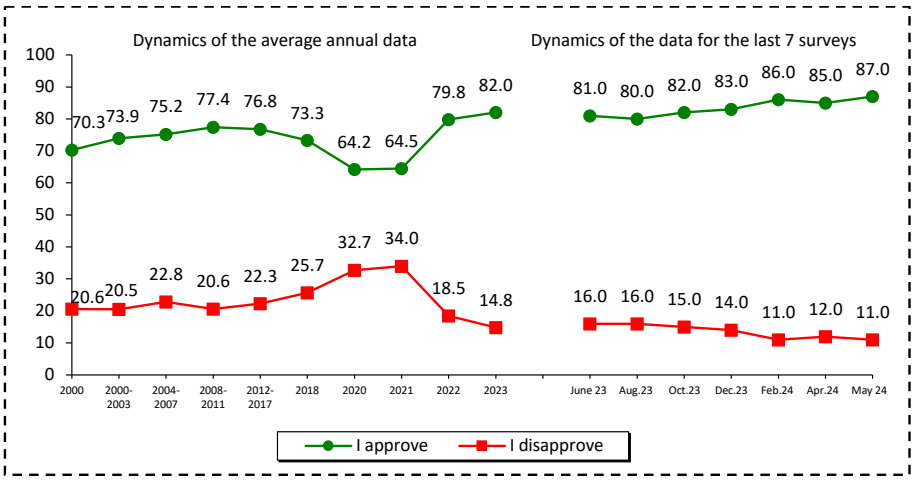
Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
I approve	+4	+1
I disapprove	-2	-1

Wording of the question: "In general, do you approve or disapprove of the way that the Russian President is handling his job?"
Data as of June 2024 reflect an average for three surveys: June 2, 2024, June 9, 2024 and June 16, 2024.
Source: VCIOM. Available at: https://wciom.ru/

*According to **Levada-Center***, the President's approval rating for April – May 2023 has not change significantly: the share of those who approve of the way that the head of state is handling his job is 85–87%. The proportion of negative assessments is 11–12%.*

Compared with June 2023, the President's approval rating in May 2024 increased by 6 percentage points, from 81 to 87%.

In general, do you approve or disapprove of the way that Vladimir Putin is handling his job as President of Russia? (% of respondents; Levada-Center* data)



Dynamics (+/-), May 2024 to		
Response	June 2023	Apr. 2024
I approve	+6	+2
I disapprove	-5	-1

Wording of the question: "In general, do you approve or disapprove of the way that Vladimir Putin is handling his job as President of Russia?"
Source: Levada-Center*. Available at: https://www.levada.ru/

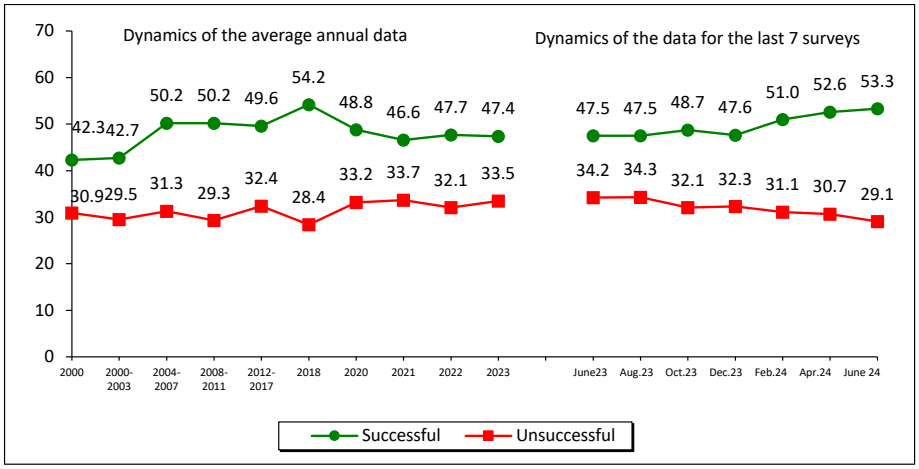
* Included in the register of foreign agents.

In April – June 2024, the share of the region's residents who consider the President's actions to strengthen Russia's international positions successful was 53%. The proportion of those who hold the opposite point of view is significantly lower (29%).

Compared to June 2023, in June 2024, the share of positive assessments increased by 6 percentage points (from 47 to 53%); the proportion of negative ones decreased by 5 percentage points (from 34 to 29%).

In your opinion, how successful is the RF President in handling challenging issues?
(% of respondents; VolRC RAS data)

Strengthening Russia's international position

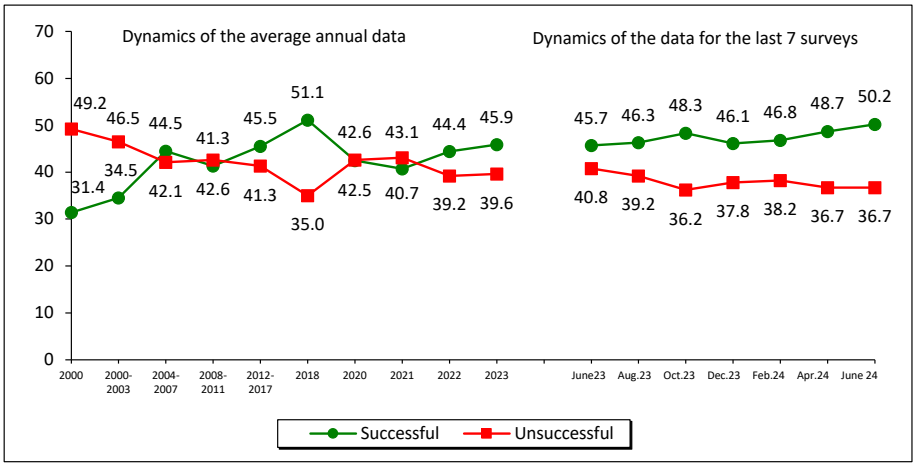


Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
Successful	+6	+1
Unsuccessful	-5	-2

Over the past two months, the share of positive judgments about the RF President's work to restore order in the country has not changed and amounts to 49–50%. The share of negative judgments is 37%.

Over the past 12 months, we observe a positive trend: an increase in the proportion of those who approve of the work of the head of state to restore order in the country, from 46 to 50%. The share of negative ratings decreased by 4 percentage points (from 41 to 37%).

Imposing order in the country

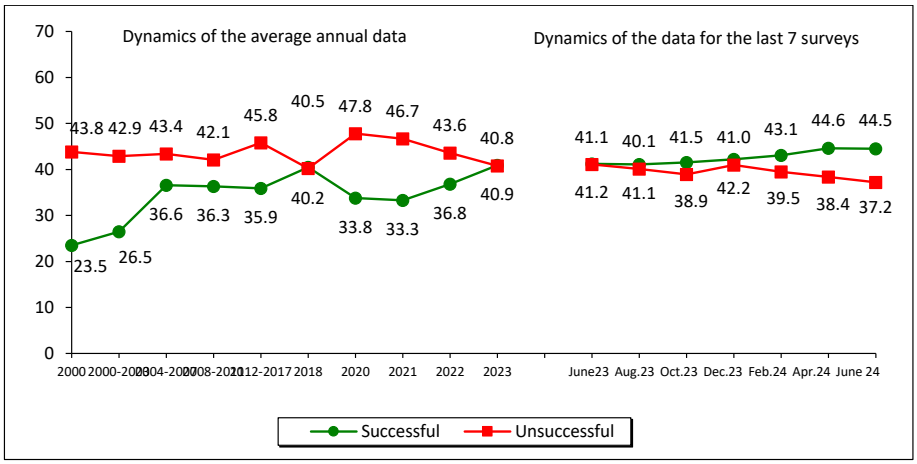


Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
Successful	+5	+2
Unsuccessful	-4	0

In April – June 2024, the share of Vologda Region residents who consider the President's work to protect democracy and strengthen citizens' freedoms successful amounted to 44–45%. The proportion of those who adhere to the opposite point of view is 38–40%.

In June 2024, the population's estimates were slightly better than in June 2023 (the share of positive assessments increased by 3 percentage points, from 41 to 44%). The share of negative judgments decreased by 4 percentage points (from 41 to 37%).

Protecting democracy and strengthening citizens' freedoms

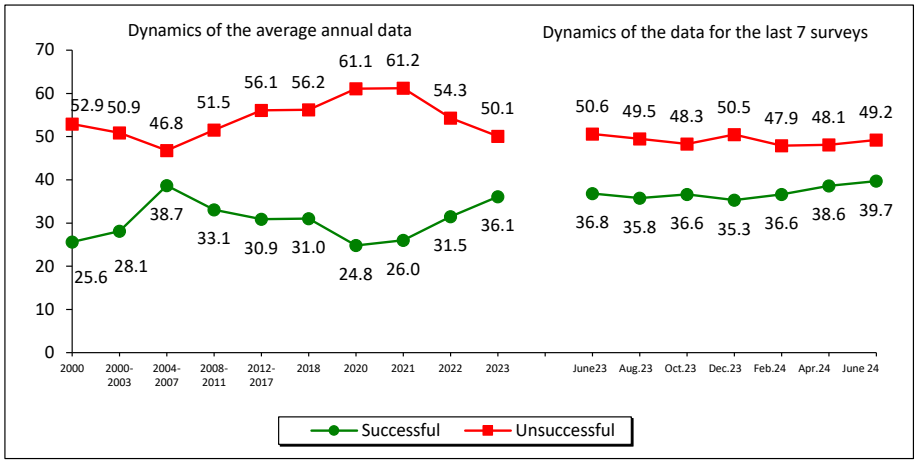


Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
Successful	+3	0
Unsuccessful	-4	-1

In April – June 2024, the share of positive assessments of the way the Russian President handles the problem of economic recovery and growth of citizens' welfare did not change and amounted to 39–40%.

In annual dynamics (June 2023 – June 2024), population estimates improved slightly: the proportion of residents who noted the success of the RF President's work in handling economic issues increased by 3 percentage points (from 37 to 40%).

Economic recovery, increase in citizens' welfare



Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
Successful	+3	+1
Unsuccessful	-1	+1

The political preferences of Vologda Region inhabitants remained stable in April – June 2024. The share of people whose interests are expressed by the United Russia party was 44%, the Communist Party – 8%, the Liberal Democratic Party – 7%, the Just Russia – 2%, the New People – 2%

In the period from June 2023 to June 2024, the level of public support for the United Russia party increased (from 39% to 44%). The share of supporters of other parties remained unchanged.

Which party expresses your interests? (% of respondents; VoIRC RAS data)

Party	Dynamics of the average annual data													Dynamics of the data for the last 7 surveys							Dynamics (+/-), June 2024 to	
	2000	2007	2011	Election to the RF State Duma 2011, fact	2012	2016	Election to the RF State Duma 2016, fact	2018	2020	Election to the RF State Duma 2020, fact	2021	2022	2023	June 2023	Aug. 2023	Oct. 2023	Dec. 2023	Feb. 2024	Apr. 2024	Июнь 2024	June 2023	Apr. 2024
United Russia	18.5	30.2	31.1	33.4	29.1	35.4	38.0	37.9	31.5	49.8	31.7	35.2	39.5	39.3	39.0	40.3	41.7	42.7	44.5	43.7	+4	-1
KPRF	11.5	7.0	10.3	16.8	10.6	8.3	14.2	9.2	8.4	18.9	9.3	10.1	9.6	9.5	9.8	9.8	9.8	9.0	8.5	8.2	-1	0
LDPR	4.8	7.5	7.8	15.4	7.8	10.4	21.9	9.6	9.5	7.6	9.9	7.3	7.0	6.7	7.8	7.9	6.5	6.6	6.5	7.1	0	+1
Just Russia – Patriots for the Truth	-	7.8	5.6	27.2	6.6	4.2	10.8	2.9	4.7	7.5	4.7	4.9	4.4	4.7	4.5	4.5	3.5	3.6	2.8	2.7	-2	0
New People*	–	–	–	–	–	–	–	–	–	5.3	2.3	1.5	1.9	2.1	2.3	1.5	1.9	1.4	1.9	2.3	0	0
Other	0.9	1.8	1.9	–	2.1	0.3	–	0.7	0.5	–	0.2	0.3	0.1	0.0	0.2	0.0	0.3	0.1	0.1	0.1	0	0
None	29.6	17.8	29.4	–	31.3	29.4	–	28.5	34.2	–	33.9	30.6	26.5	26.5	25.2	24.6	26.6	25.2	24.2	26.1	0	+2
Difficult to answer	20.3	21.2	13.2	–	11.7	12.0	–	11.2	11.1	–	10.0	10.1	11.1	11.4	11.2	11.4	9.9	11.4	11.4	9.8	-2	-2

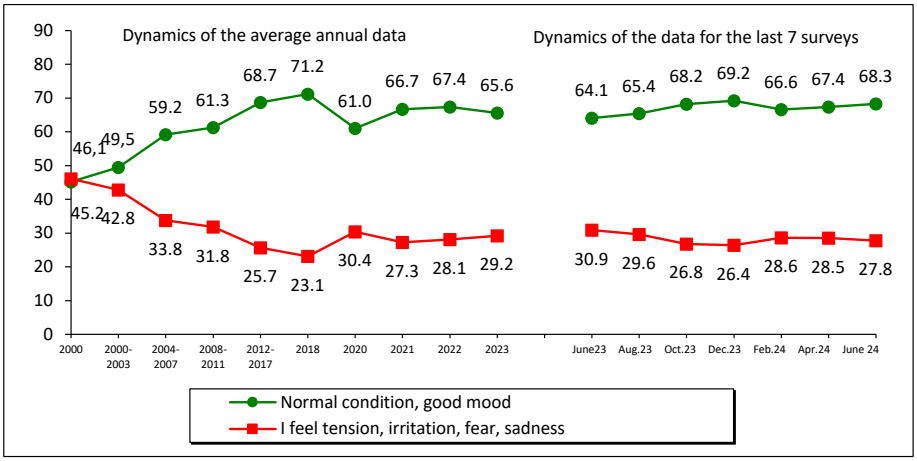
* The New People party was elected to the State Duma of the Russian Federation for the first time following the results of the election held on September 17–19, 2021.

Estimation of social condition (% of respondents; VolRC RAS data)

Over the past two months, the share of positive assessments of social mood has amounted to 67–68%; the share of negative characteristics was 27–28%.

Over the past 12 months, the proportion of people describing their mood as "normal, fine" increased by 4 percentage points (from 64 to 68%). The proportion of those who more often feel "tension, irritation, fear, sadness" decreased by 3 percentage points (from 31 to 28%).

Social mood

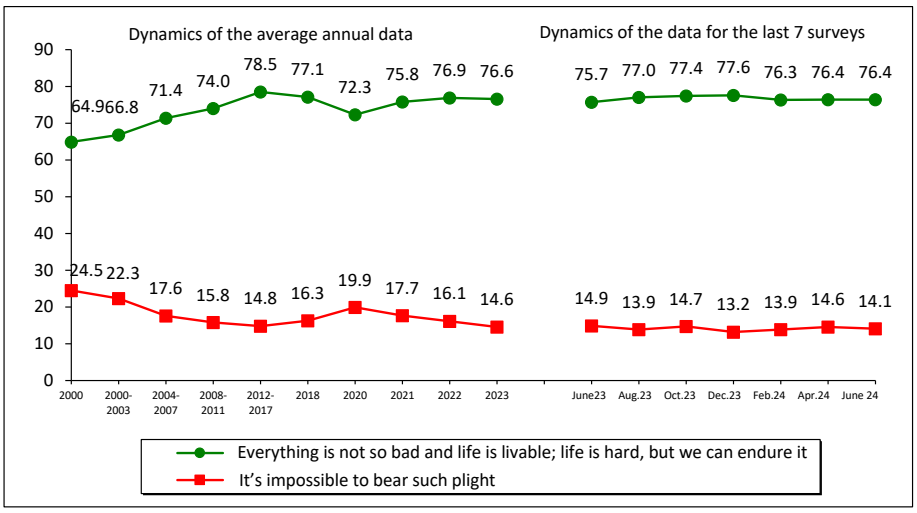


Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
Normal condition, good mood	+4	+1
I feel tension, irritation, fear, sadness	-3	-1

The stock patience remains consistently high: in April, 76% of the region's residents pointed out that "everything is not so bad and life is livable" The proportion of those who believe that "it is impossible to bear such plight" was 14–15%.

Similar estimates of the stock of patience of the region's residents were observed in June 2023.

Stock of patience

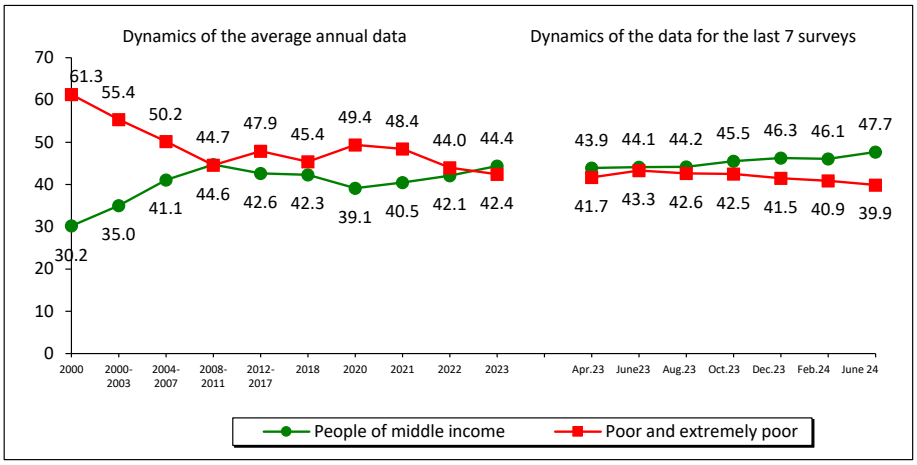


Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
Everything is not so bad and life is livable; life is hard, but we can endure it	+1	0
It's impossible to bear such plight	-1	-1

In June 2024, like in April, the share of Vologda Region residents who consider themselves people of "average income" was 46–48%. The proportion of the "poor and extremely poor" did not change (40%).

Over the past 12 months, the share of "middle-income" people has increased by 4 percentage points (from 44 to 48%). The proportion of those who consider themselves poor and extremely poor did not change.

Social self-identification*



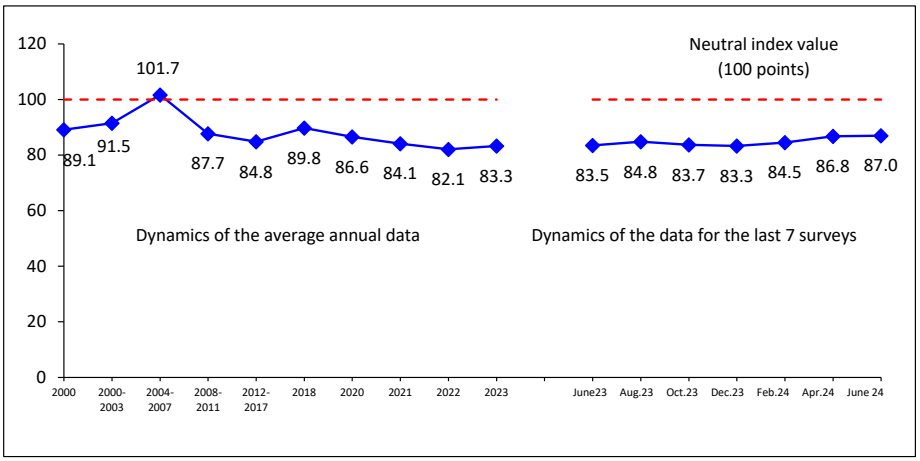
Dynamics (+/-), June 2024 to		
Response	June 2023	Apr. 2024
People of average income	+4	+2
Poor and extremely poor	-2	-1

* Wording of the question: "What category do you belong to, in your opinion?"

The Consumer Sentiment Index (CSI) in April – June 2024 amounted to 87 points.

The CSI shows positive dynamics compared to June 2023: the index increased by 4 percentage points (from 83 to 87 points).

Consumer Sentiment Index
(CSI, points; VoIRC RAS data for the Vologda Region)



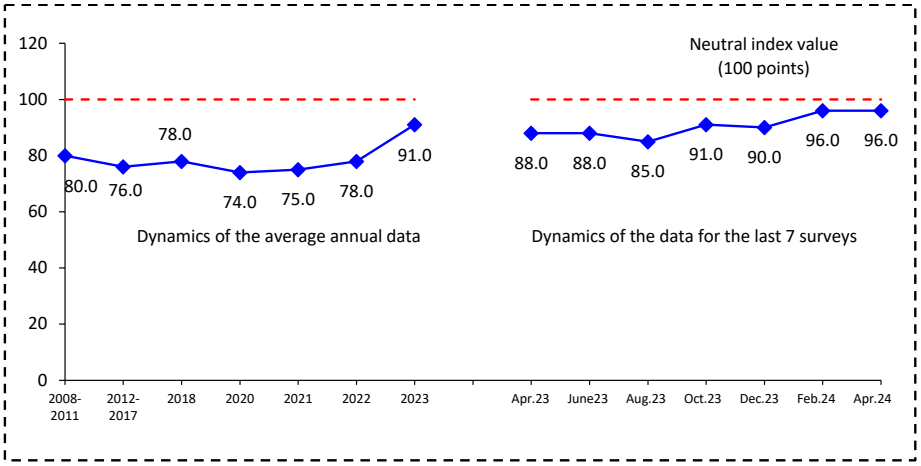
Dynamics (+/-), June 2024 to		
CSI	June 2023	Apr. 2024
Index value, points	+4	0

For reference:

According to the latest data from the all-Russian surveys by Levada-Center (for the period from February to April 2024), the consumer sentiment index amounted to 96 points.*

Tangible positive changes have been observed over the past 12 months (the CSI increased by 8 points, from 88 to 96 points).

Consumer Sentiment Index (CSI, points; Levada-Center* data for Russia)



Dynamics (+/-), April 2024 to		
CSI	June 2023	Apr. 2024
Index value, points	+8	0

The latest data are as of April 2024.

The index is calculated since 2008.

Source: Levada-Center*. Available at: https://www.levada.ru/indikatory/sotsialno-ekonomicheskie-indikatory/

* Included in the register of foreign agents.

During the period from April to June 2024, there were no significant changes in the dynamics of the share of positive assessments of social mood in 10 of the 14 main socio-demographic groups. The proportion of those who characterize their daily emotional state as positive has increased among women (by 5 percentage points, from 67 to 72%), persons with higher and incomplete higher education (by 6 percentage points, from 70 to 76%). There is a deterioration in mood in the group of people under the age of 30 (by 6 percentage points, from 78 to 72%), as well as in men (by 4 percentage points, from 68 to 64%).

In the period from June 2023 to June 2024, the share of positive assessments of social mood increased in 8 of the 14 main socio-demographic groups, especially among women (by 7 percentage points, from 65 to 72%), residents over 55 years of age (by 7 percentage points, from 55 to 63%), people with higher and incomplete higher education (by 8 percentage points, from 68 to 76%), and among the population of Vologda (by 7 percentage points, from 58 to 65%). There are no noticeable changes in the other groups.

Social mood in different social groups (response: "Wonderful mood, normal, stable condition", % of respondents; VolRC RAS data)

Population group	Dynamics of the average annual data									Dynamics of the data for the last 7 surveys							Dynamics (+/-), June 2024 to	
	2000	2007	2011	2012	2018	2020	2021	2022	2023	June 2023	Aug. 2023	Oct. 2023	Dec. 2023	Feb. 2024	Apr. 2024	June 2024	June 2023	Apr. 2024
Sex																		
Men	50.1	65.9	64.5	69.1	72.8	60.8	65.7	66.8	65.5	63.4	65.4	66.9	69.6	66.5	67.7	63.5	0	-4
Women	43.3	61.7	62.0	65.8	69.8	61.2	67.4	67.9	65.7	64.7	65.3	69.4	68.9	66.5	67.1	72.1	+7	+5
Age																		
Under 30	59.1	71.3	70.0	72.3	80.0	67.6	73.5	77.6	75.0	72.9	76.2	79.4	78.0	75.1	77.5	71.8	-1	-6
30–55	44.2	64.8	62.5	67.9	72.6	61.8	69.5	69.4	68.8	68.6	69.2	71.1	72.3	69.9	70.0	71.8	+3	+2
Over 55	37.4	54.8	58.3	62.1	65.2	57.4	60.5	61.1	58.2	55.4	56.3	60.5	62.0	59.2	60.7	62.7	+7	+2
Education																		
Secondary and incomplete secondary	41.7	58.4	57.4	57.2	64.8	56.1	62.1	64.6	62.0	61.6	63.2	64.4	65.5	63.9	64.7	65.5	+4	+1
Secondary vocational	46.4	64.6	63.6	66.7	72.2	63.5	66.7	68.3	66.1	63.7	65.1	70.1	69.1	66.0	67.9	65.2	+2	-3
Higher and incomplete higher	53.3	68.6	68.3	77.0	76.8	63.3	71.5	69.5	68.8	68.2	67.4	70.0	72.8	69.4	69.8	76.0	+8	+6
Income group																		
Bottom 20%	28.4	51.6	45.3	51.5	57.3	43.4	54.6	57.0	50.1	50.4	49.6	52.5	54.2	52.2	53.0	51.3	+1	-2
Middle 60%	45.5	62.9	65.3	68.7	71.9	62.6	67.3	68.1	67.4	65.7	67.9	71.0	73.1	66.9	68.5	70.0	+4	+1
Top 20%	64.6	74.9	75.3	81.1	82.9	75.6	79.9	78.3	73.9	72.1	70.3	73.2	75.9	74.4	77.5	78.5	+6	+1
Territory																		
Vologda	49.2	63.1	67.1	73.6	71.0	60.9	60.3	59.8	59.6	57.8	60.8	63.8	64.8	62.5	64.2	65.2	+7	+1
Cherepovets	50.8	68.1	71.2	76.2	75.8	60.4	71.0	71.2	68.1	67.9	66.4	69.4	70.6	67.2	68.2	69.4	+1	+1
Districts	42.2	61.6	57.1	59.8	68.7	61.4	67.8	69.5	67.7	65.6	67.3	70.2	70.9	68.5	68.8	69.4	+4	+1
Region	46.2	63.6	63.1	67.3	71.2	61.0	66.6	67.4	65.6	64.1	65.3	68.3	69.2	66.5	67.4	68.3	+4	+1
positive changes / no changes / negative changes																	8 /6 / 0	2 /10 / 2

RESUME

The latest round of public opinion monitoring took place in May – June 2024 against the background of the formation of a new political cycle in Russia. Key internal events of this period are as follows: inauguration of Vladimir Putin as President of the Russian Federation (May 7, 2024); appointment of a new composition of the Government of the Russian Federation and the Presidential Administration of the Russian Federation (June 14, 2024); definition of medium-term indicators of national development for the period up to 2036 ("May decrees" of the President of the Russian Federation, dated May 7, 2024).

Given the importance of these events for the development of the country, regions, and citizens' personal well-being, we should note that the survey results show the stability of public assessments of key indicators of public administration effectiveness.

In June 2024, the President's approval rating remained consistently high, amounting to 67–68%. The share of positive assessments has increased by 6 percentage points over the past year, which indicates a steady trend of increasing support for the head of state among the region's population.

The positive assessments of the region's population regarding the work of the head of state are confirmed by all-Russian data. On May 6, 2024, on the eve of the inauguration, VCIOM presented the results of a monitoring survey on public perception of Vladimir Putin's activities as President of the Russian Federation. The survey results show that over the past two years, the confidence of Russians in Vladimir Putin's ability to ensure stability and development in Russia has increased by 13 p.p. (from 67% in January 2022 to 80% in May 2024). The image of Vladimir Putin as a leader who has a well-thought-out economic program and is better able than other politicians to govern the country has been strengthened[5].

The party and political preferences of the region's residents remain stable, the United Russia Party is in the lead (44%). In the period from June 2023 to June 2024, the level of support for this party increased by 4 percentage points, while the support for other parties has not changed (2–8%).

There are no negative shifts in the dynamics of assessing the standard of living (the share of "the poor and extremely poor" remained at 40%, people of "average income" – at 46–48%) and prospects for its development (consumer sentiment index was 87 points). There is an improvement in the indicator compared to the previous year, when the index was 83 points, which indicates positive changes in the material well-being of the region's population and expectations for the future.

Estimates of social mood remain consistently high (the proportion of those who experience predominantly positive emotions was 68%; the proportion of people who believe that "everything is not so bad and life is livable; life is hard, but we can endure it" was 76%).

However, we should note that Over the past two months, the share of positive assessments of social mood has decreased in some socio-demographic groups, primarily in the group of people under the age of 30 (by 6 percentage points, from 78 to 72%), as well as among men (by 4 percentage points, from 68 to 64%). The changes in these groups cannot be interpreted outside the context of the ongoing special military operation, since men under the age of 30 belong to the category of military age, which causes them to have alarming expectations regarding mobilization to the war zone of the SMO. Nevertheless, Russian

[5] President Putin: Assessments and attitudes of citizens. VCIOM. May 6, 2024. Available at: https://wciom.ru/analytical-reviews/analiticheskii-obzor/prezident-putin-ocenki-i-otnoshenie-grazhdan

President Vladimir Putin said during the plenary session of the Saint Petersburg International Economic Forum (SPIEF) that there is no need to mobilize in Russia and mobilization is not planned[6].

In addition, the start of the admission campaign to universities and the exam period could affect the social well-being of young people, leading to a decrease in the proportion of positive assessments, causing young people to feel insecure and anxious.

In general, indicators of social mood remain consistently positive for socio-demographic groups, which is caused, among other things, by the period of vacation, when you can take your mind off work and study, devote time to rest, favorite activities and loved ones. However, psychological well-being in the context of groups requires a further monitoring of the situation, as well as closer attention from the authorities in order to prevent the development of negative trends.

The monitoring data provided indicate that the society retains a high potential for stability, support for the head of state and his chosen external and internal political course. Despite the alarming foreign policy situation associated with the pressure of NATO countries, the authorities manage to maintain the trend toward economic development in general and the preservation of the welfare of the population in particular. The adopted "May decrees" of the President of the Russian Federation (May 7, 2024) indicate that the state does not forget about the current state of affairs, continuing to actively make managerial decisions to improve the quality of life of citizens, as well as to strengthen "state, cultural, value and economic sovereignty"[7].

Prepared by K.E. Kosygina and I.M. Bakhvalova

[6] Putin explained why Russia does not need a new mobilization. Available at: https://www.rbc.ru/politics/07/06/2024/6663238e9a79474c3c7a8890

[7] Decree on the national development goals of the Russian Federation for the period up to 2030 and for the future up to 2036. Available at: http://kremlin.ru/events/president/news/73986

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